FACTORS AFFECTING TIPPING BEHAVIOR: A REGRESSION ANALYSIS OF STATE-LEVEL DETERMINANTS

by

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Tipping originated hundreds of years ago before it was imported to the United States in the mid 1800s. Today, restaurants across the country have switched to integrated point-of-sale technology systems such as Toast and Square. This study investigates the determinants of average tip percentages left on the Toast platform across all 50 states and six quarter periods spanning 2022 and 2023 using a fixed effects regression model. The goal of this study is to test whether independent variables measuring tip credit, cost-of-living, unemployment rate, state and local sales tax, and personal income per capita affect average tip percentages at the U.S. state level. The significant results propose higher levels of cost-of-living are associated with decreases in average tip percentage, suggesting that higher living costs may reduce consumers' willingness to tip generously. In contrast, increases in unemployment rate and reductions in personal income per capita, on average per state, are associated with increased average tip percentages. These findings align with theories of altruism and generosity that suggest during times of economic recession, consumers tip in larger percentages as motivated by a desire to help servers.

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1. Introduction

The important findings of this study are that, on one hand, increases in the cost-of-living index are associated with reduced tip percentages. On the other hand, increases in the unemployment rate and decreases in personal income per capita are associated with greater tip percentages. This relationship is consistent with previous findings that suggest consumers are motivated to tip by the desire to help servers. The results of this research may be explained by customers' empathetic perceptions of need among service staff during times of hardship, especially those working for a subminimum wage. As of today, 16 states maintain a tip credit commensurate with the federal subminimum wage of $2.13 established under the Fair Labor Standards Act of 1938. Research on tipping may provide tools and resources for tipping policy makers, restaurant employers considering equitable tip practices, and the millions of Americans who rely on tips to make a living.

1.1. Historical Context

The concept of leaving an amount of money that exceeds the amount due for the goods sold, often directly to an employee, is called tipping. Giving a gratuity or tip is speculated to have begun hundreds of years ago. In his piece, *Tipping: An American Social History of Gratuities,* Kerry Segrave suggests that tipping may have originated as a form of appreciation for a good deed or a demonstration of compassion when masters or lords of the late Middle Ages gave a small sum of extra money to a servant or laborer (Segrave, 1998). One 2016 study states that "[d]uring the reign of Henry VIII, the idea that a tip was given for something extra (either service or effort) had become the norm" (BeomCheol Kim et al., 2016, p. 2). The practice of tipping "was certainly underway in England by the 16th century where brass urns in coffee houses and pubs were inscribed with the words 'To Insure Promptitude'" (Lahr, 2022, p. 2).

During this time period, patrons tipped in advance in order to ensure high-quality service. Some scholars claim that the word "tip" derives from the first three letters of each word in "To Insure Promptitude" (Brenner, 2001; Schein et al., 2001).

During the late 1850s and 1860s, wealthy Americans traveling in Europe seem to have discovered the aristocratic practice of tipping and imported it to the United States to demonstrate their understanding of European customs (Schein et al., 1984). The practice was loathed by patriots as a master-serf custom and "blamed for encouraging servility and degrading America's democratic, puritanical, and anti-aristocratic ethic" (Martyris, 2015, p. 2). In 1896, George Gunton called "tipping offensively un-American, because it was contrary to the spirit of American life of working for wages rather than fawning for favors" (Gunton, 1896). In 1916, William Scott wrote, "Tipping, and the aristocratic idea it exemplifies, is what we left Europe to escape. It is a cancer in the breast of democracy" (Scott, 1916, p. 13). Proponents against tipping included names such as John D. Rockefeller, Andrew Carnegie, and Ralph Waldo Emerson, who once said in his piece *Self-Reliance,* "I confess with shame I sometimes succumb and give the dollar, it is a wicked dollar which by and by I shall have the manhood to withhold" (Emerson, 1841, p. 3,). By 1915, six states including Iowa, South Carolina, Tennessee, Washington, Mississippi, and Arkansas had enacted anti-tipping laws. In 1918, Georgia was soon to follow when it "deemed tips as 'commercial bribes' or tips for the purpose of influencing service, illegal" (Greenspan, 2019, p. 3). However, by 1926, all these anti-tipping laws had been ruled unconstitutional by the respective states' Supreme Courts. Segrave suggests this is because it was futile to police something that had gained momentum on its own (Segrave, 1998).

Despite this resistance, tipping took root in the South following the abolition of slavery and the American Civil War. Previously enslaved people newly freed from bondage, were

limited in their options for work. Menial roles in service and hospitality, such as servants, waiters, barbers, and railroad porters, were often among the first jobs available. However, for restaurant workers and railroad porters, "many employers would not actually pay these workers, under the condition that guests would offer a small tip instead" (Greenspan, 2019, p. 3). American business sought to make tips the only source of income for Black workers they didn't wish to pay, continuing the legacy of slavery.

Figure 1

PASSENGERS DINING IN A PULLMAN PARLOUR RAILWAY CAR.

Figure 1 ("Passengers Dining in…", 1882)

According to Nina Martyris, author of *When Tipping Was Considered Deeply Un-American,* tipping began to spread by rail. A luxury railcar service, the Pullman Company, run by George Pullman, hired newly liberated Black men as porters and paid them measly wages of only $27.50 per month. As Martyris explains, "Nobody could live on that wage - the rest of it was made up in tips. And that became the place where tipping really began to spread, because the Pullman cars traveled all across the country" (Abdelfatah et al., 2021, p. 3). Pullman porters depended on the generosity of patrons and suffered abysmal working conditions. Porters were "required to work 400 hours a month and often had to work 20-hour shifts with only three or four

hours of sleep in between. They had to pay for their own food, do unpaid prep work and supply their own uniforms" (Blakemore, 2016, p. 5). Moreover, this all happened inside elegant railroad cars that they themselves couldn't even sit in during the time of Jim Crow segregation. In 1925, A. Philip Randolph, a leader in labor rights, formed the "nation's first Black union to be affiliated with the American Federation of Labor and fought and won higher wages with tips on top" (Alexander, 2021, p. 3). More than 10 years later, this union, called the Brotherhood of Sleeping Car Porters, signed a labor agreement with Pullman and secured recognition and better working conditions that laid some of the foundations for the Civil Rights Movement (Blakemore, 2016).

1.2. Tip Credit & Subminimum Wage

In 1938, the Fair Labor Standards Act (FLSA), a major accomplishment of New Deal legislation, was signed by Franklin Roosevelt. The FLSA established a federal minimum wage of 25 cents per hour, maximum work week of 44 hours, and prohibited general employment of children under 16 (Pitts & Allegretto, 2013). Despite this progress, the FLSA failed to include tipped workers as part of new minimum wage legislation, a group that included a disproportionate number of Black people (Alexander, 2021). In 1942, the U.S. Supreme Court ruled "that employees had an exclusive right to their tips and that their employers could not force them to share their tips with kitchen staff" (Martyris, 2015, p. 5). When the FLSA was amended in 1966, the law was expanded to cover restaurant workers and other tipped employees, but a subminimum wage was established for this particular group. The subminimum wage was pegged at $2.13, where it has stayed for nearly 60 years. The subminimum wage is based on a "tip credit" provision that allows employers to use tips, provided by customers, as a credit toward an employee's standard wage.

Table 1

State	Combined Cash & Tip Minimum Wage	Maximum Tip Credit Against Minimum Wage	Minimum Cash Wage
Federal: Fair Labor Standards Act (FLSA)	$7.25	$5.12	$2.13
State requires employers to pay tipped employees full state minimum wage before tips			
Alaska			$11.73
California			$16.00
Minnesota			$9.61
Montana			$6.975
Nevada			$10.75
Oregon			$14.20
Washington			$15.74
State requires employers to pay tipped employees a minimum cash wage above the minimum cash wage required under the federal Fair Labor Standards Act ($2.13/hour)			
Arizona	$13.85	$3.00	$10.85
Arkansas	$11.00	$8.37	$2.63
Colorado	$13.65	$3.02	$10.63
Connecticut	$15.00	$7.695	$7.305
Delaware	$11.75	$9.52	$2.23
Florida	$12.00	$3.02	$8.98
Hawaii	$12.00	$1.00	$11.00
Idaho	$7.25	$3.90	$3.35
Illinois	$13.00	$5.20	$7.80
Iowa	$7.25	$2.90	$4.35
Maine	$13.80	$6.90	$6.90
Maryland	$13.025	$9.395	$3.63
Massachusetts	$15.00	$8.25	$6.75
Michigan	$10.10	$6.26	$3.84
Missouri	$12.00	$6.00	$6.00
New Hampshire	$7.25	$3.99	$3.26
New Jersey	$14.13	$8.87	$5.26
New Mexico	$12.00	$9.00	$3.00

New York	$14.20	$3.55	$10.65
North Dakota	$7.25	$2.39	$4.86
Ohio	$10.10	$5.05	$5.05
Oklahoma	$7.25	$5.12	$2.13
Pennsylvania	$7.25	$4.42	$2.83
Rhode Island	$13.00	$9.11	$3.89
South Dakota	$10.80	$5.40	$5.40
Vermont	$13.18	$6.59	$6.59
Wisconsin	$7.25	$4.92	$2.33
West Virginia	$8.75	$6.13	$2.62
State minimum cash wage payment is the same as that required under the federal Fair Labor Standards Act ($2.13/hr.)			
Alabama	$7.25	$5.12	$2.13
Georgia	$7.25	$5.12	$2.13
Indiana	$7.25	$5.12	$2.13
Kansas	$7.25	$5.12	$2.13
Kentucky	$7.25	$5.12	$2.13
Louisiana	$7.25	$5.12	$2.13
Mississippi	$7.25	$5.12	$2.13
Nebraska	$10.50	$8.37	$2.13
North Carolina	$7.25	$5.12	$2.13
South Carolina	$7.25	$5.12	$2.13
Tennessee	$7.25	$5.12	$2.13
Texas	$7.25	$5.12	$2.13
Utah	$7.25	$5.12	$2.13
Virginia	$12.00	$9.87	$2.13
Wyoming	$7.25	$5.12	$2.13

Table 1 ("Minimum Wage for Tipped Employees", 2024)

Today, the federal tip credit is $5.12, which is the difference between the standard minimum wage of $7.25 and the tipped wage of $2.13 ("Minimum Wages for Tipped Employees", 2024). This means that in 16 states with subminimum wages congruent with the federal government, the sum of tips and employer-provided wages must total at least the standard

minimum wage of $7.25. Tip credits are not deducted from employee's pay but rather, if permitted by state, "employers may claim a certain amount of gratuities the employer receives against their minimum wage requirement" ("What Are Tip Credits…", 2024, p. 2). At the federal level, a tipped worker is defined as an employee that receives more than $30 per month ("Minimum Wages for Tipped Employees", 2024). Therefore, "while restaurant customers typically believe their tip is a reward to the worker for good service, in reality, the customers are paying part of the minimum wage instead of the employer" (Pitts & Allegretto, 2013, p. 13). By sustaining a subminimum wage, employers can push the responsibility to pay their employees onto consumers and advertise lower prices. The creation and persistence of the tip credit and subminimum wage maintains a legacy of slavery that began in the 1860s. As Michelle Alexander put it best, as of January 1st, 2024, "43 states and the federal government still persist with this legacy of slavery, allowing a tipped work force that is close to 70 percent female and disproportionately Black and brown women to be paid a subminimum wage" (Alexander, 2021, p. 4). In 16 states, employees eligible to earn tips are pegged at a minimum wage of $2.13. According to MIT, the livable wage in 2023 for a family of 4 (two adults and two children) was $25.02 per hour (Glasmeier, 2023). A $2.13 per hour wage isn't close to a livable wage for hundreds of thousands of Americans, nor is the combined subminimum wage of $7.25 per hour including tips.

1.3. Current Tipping Atmosphere

The tip amount has steadily risen in the United States since its introduction from Europe more than a century and half ago, but the subminimum wage has remained the same. As Michael L. Lahr writes, "In North America, the tip has become a social norm or expectation formalized as percentage of the bill, straying somewhat from its original, simple purpose as pure expression of

gratitude" (Lahr, 2022, p. 2). During the 1970s, a 10 to 15 percent tip was considered generous at the finest restaurants (Post, 1986). By the 1990s, that number had creeped closer to 20 percent (Post, 1997). Today, in a nearly cashless world with full integration of touch screen point-of-sale systems that conveniently spin around to face consumers, restaurants can set tip suggestions to whatever they'd like. According to one integrated point of sale system, Toast, full-service restaurants' sales on their platform across all 50 states during Quarter 4 of 2023 had a national average of 19.99% for tips. "The state with the highest total tip percentage in Q4 was Delaware, averaging 21.9%" ("Q4 Trends Report...", 2024, p. 11). Tip percentages have grown over time, and now 20% seems to be the status quo. In contrast, in Europe where the practice of tipping originated and was common long before it arrived in the United States, tipping has largely evaporated in frequency and magnitude. In many European countries, it is considered appropriate to round out the bill or add small pocket change.

2. Literature Review

2.1. Motivations to Tip & Previous Findings of Significance

Many researchers have examined the peculiar nature of tipping behavior. Patrons of hospitality and service industries often leave voluntary gifts that exceed the contracted prices of purchased services. These gifts, or tips, are typically paid directly to employees and occur after service has been received. However, tips differ from other economic transactions in that their amount is up to the discretion of the customer. Due to the fact that consumers are free to avoid the extra monetary loss of a tip, it is fascinating to explore the motivations for tipping. Tipping behavior is peculiar because most economists would assume the rational consumer would tip 0% or $0.00 for a cost they could freely avoid. The typical "assumption in economics is that people are selfish, and they maximize utility subject to a budget constraint by consuming the goods and services that give them the highest utility" (Azar, 2011, p. 516). However, the behavior of tipping is more fraught than many economic decisions because of shifting social norms and complex interactions between humans.

In his piece *Explanations of Service Gratuities and Tipping: Evidence from Individual Differences in Tipping Motivations and Tendencies*, Michael Lynn, a leading researcher in the field of tipping from Cornell University, offers potential explanations for tipping behavior, citing the following: help servers, reward service, buy future service, buy social status/esteem, avoid social sanctions, and fulfill internalized social obligations (Lynn, 2015). Contrary to popular belief and intuition, evidence has found that there is a weak relationship between service quality and tip size. A study that examined 1,129 customer reviews of service on ten cruise lines associated with Carnival Cruises found that the effect of tipping on customer satisfaction was small (partial r of 0.06). In the early 2000s, Carnival Cruises abandoned its voluntary tipping

model and adopted an incorporated service charge. Researchers examined customer satisfaction reviews before and after and found that under the voluntary tipping model, reported customer satisfaction was higher. Although statistically significant, the size of the tipping policy effect was only the change of about one-third on a five-point scale of customer satisfaction (Lynn & Kwortnik, 2015). Moreover, through a meta-analysis of 2,547 dining parties at 20 different restaurants, Michael Lynn and Michael McCall found that there is a positive and statistically significant relationship between tip size and service evaluations. However, this effect was smaller than anticipated, only "accounting for less than two percentage of the variability in tip percentages" (Lynn & McCall, 2000, p. 211). This evidence indicates that tippers may be more concerned with equitable economic relations with servers and that tip size may not be a valid indicator of high-quality customer service.

In his piece *The Economics of Tipping*, Ofer H. Azar finds that most of tipping behavior is not motivated by economic considerations but rather by psychological and social motivations such as tipping as a social norm (Azar, 2020). Azar concludes that social norms such as tipping are created to "improve service quality and social welfare" (Azar, 2020, p. 220-221). In a 1997 study of 700 diners in seven Minnesota restaurants, Örn Bodvarsson and William A. Gibson found that tipping is both a social norm and a means of rewarding good service. They found that regular customers (once a month or more) tip slightly more and that tips were higher in larger cities as compared to smaller cities (Bodvarsson & Gibson, 2006). Bodvarsson and Gibson also found that "lone diners tip a higher percentage of the bill than groups of diners and that restaurants licensed to serve alcoholic beverages rake in greater tips" (Bodvarsson & Gibson, 2006). These findings suggest that tipping is a social norm used to periodically reward service and buy future service.

Other relationships associated with tipping have been researched over the last 50 years. One of which is that "dining customers with a larger bill size who pay with credit cards tend to leave larger tips than those with smaller bill size who pay with cash" (BeomCheol et al., 2016, p. 4) Furthermore, there has been an effect found between increased tip amounts and requesting a tip after service compared to beforehand. Requesting a tip before any service has been provided, such as at a fast-food restaurant or coffee shop, is associated with smaller tips, reduced intentions to return, fewer word-of-mouth suggestions, and lower online ratings (Warren et al., 2020). There has also been a statistically significant link between when an employee squats down next to the table being associated with larger tips compared to when servers maintain an erect posture throughout the service interaction. In 1993, Michael Lynn and Kirby Mynier determined that "[t]he waiter received an average tip of $5.18 when he remained standing throughout the service encounter and received an average tip of $6.40 when he squatted down during his first visit to the table $(t(268)= 3.10, p < .003)$" (Lynn & Mynier, 1993). This effect was even more prominent when tips were measured as a percentage of bill size. Lynn and Mynier saw a difference in tip percentage of 14.9% to 17.5% with each respective behavior treatment at a p-value of less than 0.001 (Lynn & Mynier, 1993).

In another study, Michael Lynn found that customers tipped statistically significantly more when they were touched by the server than when they were not touched. Young customers responded more positively to being touched than did older customers. For younger customers without the touch treatment, they tipped an average 10.9% but that increased dramatically to 17.7% after the treatment effect of being touched (Lynn et al., 1998). Moreover, in 2005, Rick B. van Baaren observed that mimicry was associated with more generous tipping behavior in the Netherlands. "When servers repeated customers orders verbatim, they received larger tips than

when they merely acknowledged or paraphrased orders" (van Baaren, 2005, p. 79). In study 1, the waitress received a 69 percent greater tip in the mimicry condition than in the non-mimicry condition. van Baaren dubbed this finding the "Parrot Effect" and suggested that because restaurants in the Netherlands add service charges to customer's checks, the Parrot Effect is a firm and valid indication of customer satisfaction. The mimicry effect consistently brought in larger tips than the oral paraphrase of the order or written acknowledgement (van Baaren, 2005).

Other behaviors demonstrated by service workers that are associated with greater tip revenue include those detailed above and those summarized by Michael Lynn in 2005 ("CHR Reports Compendium 2005", 2004, p. 9). To improve tip revenue, servers are encouraged to:

1. Introduce themselves by name

2. Squat down next to the table during the initial interaction

3. Smile

4. Upsell

5. Wear something unusual

6. Entertain patrons with stories, jokes, or puzzles

7. Repeat patrons' orders verbatim

8. Touch patrons on the arm or shoulder

9. Forecast good weather

10. Draw a smiley face or "Thank You" on the check

11. Use the credit card insignia on tip trays and check folders

12. Call patrons by name

13. Give customers candy

While odd, these fascinating interactions provide some context to service staff to adjust their work practices to net greater tip revenue, which is of particular importance to the millions of Americans who work as servers. According to the United States Bureau of Labor Statistics, in 2022 there were an estimated 4,540,700 servers in the US earning a median pay of $13.52 ("Food and Beverage…"). As Lynn puts it, these techniques provide "nonobvious, concrete, and easy-to-implement ways of increasing tips" (Lynn and Mynier, 1993, p. 678). Moreover, these techniques are beneficial to managers who would like to reduce employee turnover. In another paper published in 2023, Michael Lynn found a relationship between tip percentages and server experience. Servers who worked for more days ultimately netted slightly higher overall tip percentages. This confirms Lynn's previous speculation that "managers in the hospitality and tourism industries can reduce turnover at their establishments by training their employees to engage in behaviors known to increase tip percentages" (Lynn, 2022b, p. 76).

2.2 Default Options & Maintenance of the Voluntary Tipping Model

Another way for restaurants, waitstaff, and managers to generate larger tip revenue is likely through raising default tip options. Default options are important under circumstances when individual consumers are not sure what the best choice is; this can come to a head when consumers are asked to leave a tip at the register. Today, restaurants, coffee shops, and street vendors utilize integrated iPad checkout systems with tip options starting at *20%, 25%,* and beyond. These integrated point-of-sale (POS) systems provide cloud-based, all-in-one restaurant management software specifically designed for restaurants. Toast and Square, are two of the largest and most highly rated companies of this type (Haan, 2024). Each provides comprehensive POS solutions, making it easy for restaurant owners and managers to adjust pricing and tipping options. Raising default tip options has been shown to be an effective way to increase tip

revenues by "nudging" consumers to shape their behavior. In their book *Nudge*, Richard Thaler and Cass Sunstein explain, "[a] nudge, as we will use the term, is any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates" (Thaler & Sunstein, 2008, p. 6). To gently steer consumers toward greater tips, customer service establishments have increased their default tip option.

In 2014, researchers Kareem Haggag and Giovanni Paci manipulated New York City (NYC) taxicab ride data based on changing default tip amounts and formats ($ or % of the ride) for fares costing less and more than $15. Haggag and Paci compared the effects of the differences between two taxi firms' default tip amounts on fares above $15 to measure the impact of default tip amounts (Haggag & Paci, 2014). They found that raising default tip options led to a lower likelihood of tipping but larger tip amounts for those who did and greater tip income overall for the driver. The directionality of findings was confirmed by a 2020 NYC taxicab fare difference-in-differences analysis of changes in one of two companies' default tip amount (Hoover, 2021) and a 2019 manipulation of tipping default information in the Uber App (Chandar et al, 2019). Additionally, a study published in 2020 titled *The Effects of Tip Recommendations on Customer Tipping, Satisfaction, Repatronage, and Spending*, found that among 94,571 orders from 24,637 customers of an app-based laundry pick-up, cleaning, and delivery service, "recommending larger tip amounts decreased the likelihood of tipping (when the recommendations exceeded familiar and normative amounts) and increased the size of tips that were left as well as overall tip revenues, but had no comparable or opposite effects on customer satisfaction, repatronage frequency, or spending" (Alexander et al., 2024, p. 12). This

evidence suggests that raising default options, at least in the realms of laundry and car service, is an effective form of generating larger tips without disrupting normal consumer behavior or incentives. This may explain the prolific expansion of integrated point of sale technologies (the data source for this study) that make tipping a one-tap process, detached from any calculations made by the consumer. Restaurants can run more efficiently and generate larger tip revenue without disturbing customer spending and patronage by effectively raising default options. The choice to tip the minimum, 20% for example, is a heuristic that humans employ to decide what to do when they do not know. Default options can be an effective nudge because they suggest what the typical or normative consumer would choose. Understanding the determinants behind tipping behavior is impactful because it gives employees and business owners better authority over maximizing tipping revenue.

Research has also shown that tips are a highly efficient method of monitoring and rewarding service staff. As explored by Michael Lahr, business managers "prefer tipping because it enables them (i) to advertise lower prices, (ii) to avoid undue customer-service monitoring, and (iii) to retain their best front-line workers" (Lahr, 2022, p. 3). Economists suggest that "tipping today exists because firms find it difficult to monitor and control the quality of intangible and highly customized services provided by their employees" (BeomCheol Kim et al., 2016, p. 3). In addition to the benefits of listing lower prices and attracting talented workers, the voluntary tip model has also been shown to benefit service firms through increased profits via price discrimination, motivation of staff to upsell and provide excellent service, and lowering social security tax payments (FICA) (Lynn and Withiam, 2008). Additionally, customers should advocate for tipping because, in the long run, it gives an incentive for servers to provide high-quality customer service. Finally, servers appreciate tipping systems because, nationwide, they

represent about 62% of server incomes and 43 states have a sub-minimum wage for workers who are tipped (Lahr, 2022). The tip model also incentivizes servers to work busier shifts because of greater earnings potential. If no tip model exists there would be no benefit to expending greater effort during busier shifts for the same fixed hourly wage and no tips. All of these are reasons behind the continued presence of tipping systems in the United States.

2.3. Altruism & Desire to Help Servers

The desire for consumers to help tipped workers remains a primary psychological and social motivation for tipping behavior. In 2015, Michael Lynn suggested that "desire to help servers, reward good service, and fulfill obligations emerged from the current analyses as the main drivers of tipping because they predicted the likelihood of tipping more strongly and for more service occupations than did the other motives for tipping" (Lynn, 2015, p. 69). He explains that social consumers derive utility from tipping because they want to demonstrate generosity toward servers (Lynn, 2015). In another paper, Damon Alexander, Christopher Boone, and Michael Lynn suggest that "tip recommendations that evoke larger tips could increase customers' satisfaction, repatronage, and spending because tipping activates" warm glow processes (Alexander et al., 2024, p. 4). The term "warm glow giving" was coined by economist James Andreoni in 1989 and 1990. He explains that warm glow giving describes the emotional reward and personal gain associated with giving to others (Andreoni, 1989). In the tipping environment, inducing customers to engage in the prosocial behavior of directly giving gifts to the human serving them may result in positive feelings of generosity and altruism. It may "enhance customers' evaluations of service and retail experiences, as well as their intentions to repatronize the firms that provide those experiences" (Giebelhausen, 2016; Giebelhausen & Chun, 2017; Giebelhausen et al., 2017; Alexander et al., 2024, p. 4). This suggests that if

consumers practice more generosity for their service, they may tip more for it. As *The Economics of Tipping* establishes, "tipping seems to be more prevalent in occupations where consumers feel empathy and compassion for the workers and want to show gratitude for good service" (Azar, 2020, p. 221). Moreover, "people are more apt to tip liberally to be perceived as generous or to display empathy for the server" (Lahr, 2022, p. 3). Tipping as a demonstration of generosity toward waitstaff has been shown before. Approximately 70% of U.S. consumers agree that the desire to help servers influences their own tipping behavior based on a web-based survey (Lynn, 2009).

Part of this sentiment is likely rooted in the automatic and unconscious work of the mirror neurons in our central nervous system, "mirror neurons respond to actions that we observe in others" (Acharya & Shukla, 2012, p. 1). When we observe others engaged in the process of tipping, as we mature or when spending time with peers, the mirror neuron system in our brain activates. It has been speculated that this "mechanism contributes to the capacities and tendencies of humans and other primates to take another's perspective and feel empathy for them, which in turn have been shown to increase helping behavior" (de Waal, 2008; Iacoboni, 2009; Lynn, 2015, p. 76). This helping behavior has been demonstrated by Nicholas Guéguen, a French researcher, and his team. They found that playing background music with prosocial lyrics versus no music or songs with neutral lyrics was associated with higher amounts and frequencies of tips left for French servers (Jacob et al., 2010). They also found a similar effect when an altruistic quotation was included on checks as compared to no quotation or a non-altruistic message (Jacob et al., 2013). Finally, Guéguen found that priming feelings of love by presenting patrons with the bill on a heart shaped dish versus a square or round shaped dish was associated with more and greater tips (Guéguen, 2013). These findings support the hypothesis that people

regularly empathize with servers and demonstrate tipping behavior as a means to help their server. It is important to note that these studies were conducted in France, outside of the U.S, where tipping culture is distinctly different. Nonetheless, empathy is universal across nations and cultures.

The veracity of altruism as a determinant of tipping is demonstrated by the resilience of tipping behavior during times of economic hardship, for example, the COVID-19 pandemic. Following the closure of restaurants and the stay-at-home orders beginning in March 2020, tipping behavior increased. Consumers' increased tipping behavior may be based on reasoning that tipped waitstaff needed and/or deserved greater tips. In a 2021 study, Michael Lynn found that, based on analysis of tipping records for one pizza delivery driver in Texas, the average tip-per-order increased during the pandemic (Lynn, 2021). Moreover, using data provided by Square, an integrated POS system, a differences-in-differences study found average tip percentages across the U.S. rose for takeout transactions at quick-service restaurants (QSR), full-service restaurants (FSR), and in-person transactions at QSRs. Conversely, the average tip percentage fell by one or two percent for in-person interactions at FSRs (Lynn, 2021). This effect may be partially explained by the increase in demand for takeout orders, which consumers are hesitant to tip for (Mayyasi, 2015; Walster, 2014; Lynn, 2021). Consumers may be reluctant to provide tip percentages at FSRs at the same level of pre-pandemic spending for takeout because there is a diminishing level of service compared to dining in before the pandemic.

Lynn illustrates that tipping remains a viable compensation model "even during periods of public health and economic crises as long as the nature of the services provided does not change" (Lynn, 2021, p. 130). Further, this pattern continues with findings that "[w]hen considering the impact of COVID-19 on tipping behavior, the regression results show an 8%

increase in average daily tips across the eleven regions (p-value < 0.01), suggesting COVID-19 caused an increase in altruistic behavior" for GoPuff delivery workers (Katta & Raune, 2021, p. 6). Restaurant servers and managers can anticipate that consumers will tip similarly generously during times of hardship and times of success, perhaps even better during times of hardship.
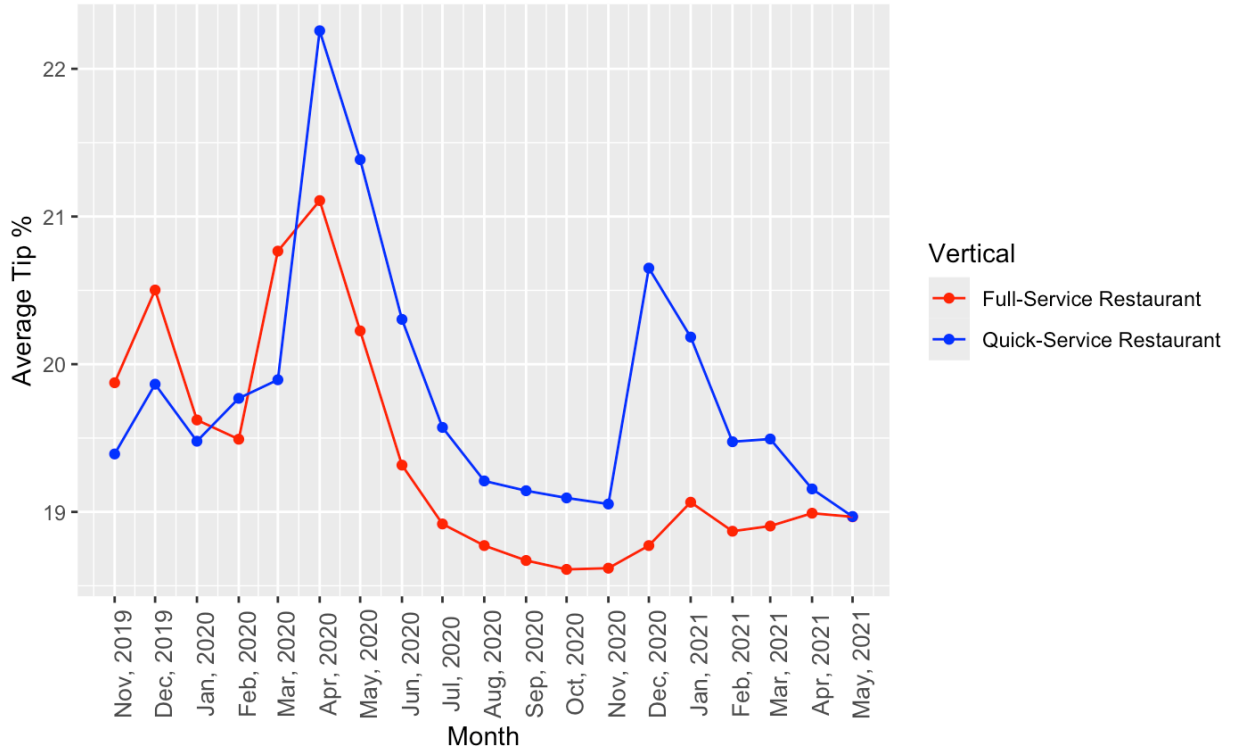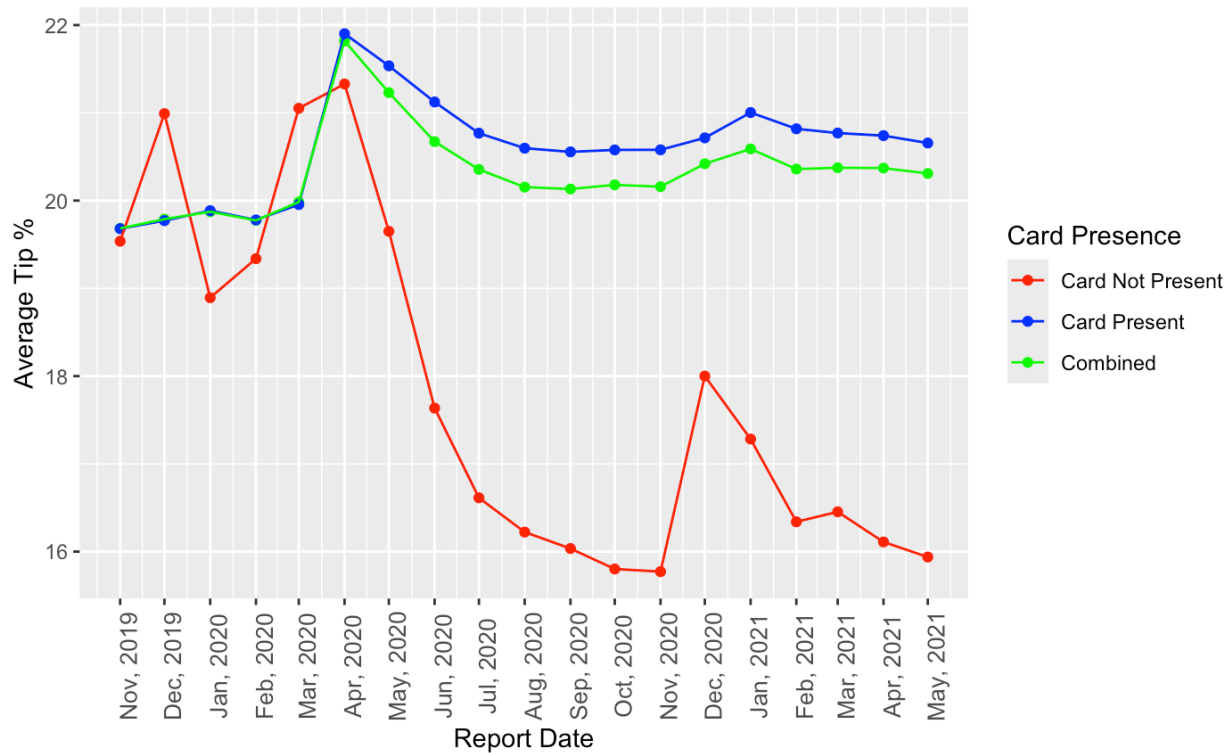
Figure 2

Figure 3

Figure 3 & 4 (Square)

Altruistic motivations for tipping may be enhanced during times of hardship, such as the pandemic. The pandemic forced many restaurants to pivot to a take-out model with reduced sit-down dining to safeguard sales, which dramatically reduced the opportunities to earn tips (Lynn, 2023). This transition also increased the moral hazard for employees working under daily health risk. The figures above depict this relationship using Square data from November 2019 to May 2021, the same data Michael Lynn used in his 2021 study *Did the COVID-19 Pandemic Dampen Americans' Tipping for Food Services? Insights From Two Studies.* We observe that the average tip percentage jumped dramatically during the beginning of lockdown and gradually dropped below pre-pandemic levels after approximately four months for both FSR and QSR establishments based on Figure 2. Figure 3 includes all transactions credit card present (CP) and credit card not present (CNP). Figure 3 depicts a similar pattern of increased average tip

26

percentage after March 2020. Transactions for CP and CNP/CP remained relatively robust, never

dropping below 20% for the entirety of the sample. CNP transactions, presumably takeout, saw a

dramatic decrease in average tip percentage, bottoming out below 16% in November 2020. The

effects of the COVID-19 pandemic on tipping behavior represent the resiliency of consumers to

continue to practice altruistic motivations behind tipping behavior during times of crisis. It is

unclear whether this effect is large enough to compensate for the increased challenges posed by

working during the COVID-19 pandemic, likely servers suffered overall.

2.4. State-level Differences

As discussed above, a tip credit is a federal law that allows employers to supplement a

portion of an employee's tips toward their minimum wage payment obligation. Tip credits are

not deducted from an employee's pay but rather, "employers may claim a certain amount of

gratuities the employer receives against their minimum wage requirement" ("What Are Tip

Credits…", 2024, p. 2). Federal law permits restaurants to compensate tipped employers with a

base wage of $2.13 and supplement the remaining difference in their wage with tips to equal at

least the minimum wage of $7.25. If not, employers are responsible for making up the difference.

However, this is rarely enforced. According to a U.S. Department of Labor Wage and Hour

Division (WHD) compliance investigation in 2010-2012, 7,542 out of 9,000 employers were

found in some type of violation. The WHD "recovered $56.8 million in back wages for nearly

82,000 workers and assessed $2.5 million in civil money penalties. Violations included 1,170 tip

credit infractions that resulted in nearly $5.5 million in back wages" (Allegretto & Cooper, 2024,

p. 21). Tip credits and subminimum wages have also been associated with higher levels of

poverty.

According to research done by the Economic Policy Institute, in states with subminimum wages of $2.13, waitstaff and bartenders face a poverty rate of 18%, more than twice the poverty rate non-tipped workers experience (Cooper, 2015). Moreover, in the 27 states that require restaurant employers to provide minimum wages greater than $2.13 but less than the full minimum wage, 14.4% of waitstaff and bartenders are in poverty versus 6% of non-tipped workers (Cooper, 2015). There is also evidence to suggest that tipped residents living in the 7 states that require compensation of the full minimum wage, regardless of tipping class, are much less likely to experience poverty. In the states of Alaska, California, Minnesota, Montana, Nevada, Oregon, and Washington, the poverty rate is 8% points lower than in states with a $2.13 subminimum wage for waiters and bartenders (Cooper, 2015). Although it is impossible to determine causation, the author explains that because the poverty rates of non-tipped workers are relatively the same among all three groups of states, the differences in tip credit policies "are likely driving the substantially different poverty rates of waitstaff and bartenders" (Cooper, 2015, p. 2).

Beyond differences in poverty rates among tip credit states and non-tip credit states, there is also evidence to suggest links to sexual harassment rates, restaurant earnings, and restaurant employment. As reported by the Restaurant Opportunities Centers United (ROC United), a non-profit organization founded by restaurant workers displaced by the 9/11 terrorist attacks, in the seven states without tip credit policy, sexual harassment is lower than in subminimum states. Employees living in these states "experience half the rate of total sexual harassment, compared to workers in unequal treatment (subminimum wage) states" ("Restaurants Flourish…", 2016, p. 1). Additionally, restaurant sales are higher in states without a tip credit. ROC United found that states without a tip credit policy had greater sales weighted by population, "over double the rate

of sales in $2.13 states and 13 percent higher than in New York" ("Restaurants Flourish…",
2016, p. 1). This point denotes that restaurants in states without a tip credit and subsequently
higher minimum wages for tipped employees, do not perform worse financially than those in
states with tip credit policy. Lastly, they also found restaurant employment rates were equal or
higher within states with one universal minimum wage. Between 2011 and 2016, full-service
restaurant employment grew by 20.4% in states without a tip credit, while states with tip credits
only saw a 16.37% growth during the same period ("Restaurants Flourish…", 2016, p. 2). In
states without tip credits, there is proposed reduced sexual assault, higher restaurant sales, and
equal or better employment rates.

Although restaurants in states with a higher minimum wage do not perform worse
financially than those with a tip credited subminimum wage, that relationship doesn't seem to
hold for employee tip income. In a 2022 study, Michael Lynn found that "eliminating tip credits
may not increase servers' incomes as much as expected and may even decrease those incomes"
(Lynn, 2022a, p. 2). As discussed above, Lynn posits that the altruistic desire to help servers
financially contributes to higher tipping. This would suggest that if consumers were more readily
aware of servers' wages, then "larger tip credits (i.e., lower server wages) may enhance altruistic
and/or reciprocity motivations for tipping and, thereby, increase tip amounts" (Lynn, 2022a, p.
4). Lynn's study confirmed the findings of several others (Lynn, 2020, Tang et al., 2019) when it
concluded that the public has some awareness of tip credits in their states and "that consumers
will tip more the lower the wages they believe servers are paid" (Lynn, 2022a, p. 5). Conversely,
raising wages for tipped workers decreases the tip percentages earned by those employees (Lynn,
2020). Following this line of reasoning, consumers who are driven to tip in hopes of helping their
server may tip less if they are aware of servers earning higher wages (Lynn, 2020). Moreover,

research suggests that a higher minimum wage for tipped employees would likely have small effects on employment but substantial effects on server earnings, likely benefiting those working along the poverty line (Allegretto et al., 2017). These findings contribute evidence to the case of altruism as a motivation for tipping behavior as outlined above. In this study we will explore the significance of variables such as tip credit and unemployment rate, as well as cost-of-living, state and local sales tax, and personal income per capita, in relation to average tip percentages by each state.

3. Methods

3.1 Research Goals

The goal of this study is to test whether independent variables measuring tip credit, cost-of-living, unemployment rate, state and local sales tax, and personal income per capita affect average tip percentages at the U.S. state level. Each states' tip credit and subsequent subminimum wage was included in this study to measure if a tip credit has a significant association with the tip percentage left on Toast transactions. Tip credits vary widely across states. As of January 1st, 2024, 43 states still maintain some level of tip credit. Of those, 16 states maintain a tip credit commensurate with the federal cash minimum wage of $2.13 established under the Fair Labor Standards Act of 1938. We would like to model how consumers react in terms of average tip percentages when minimum wages differ across states.

The cost-of-living index was included in this regression analysis because it may capture part of the effect of inflation and increased regular consumption on tipping. As reported in CNN Business, "people are tipping less in part because of inflation" (Meyersohn, 2023, p. 2). Moreover, it may provide evidence to test Michael Lynn's finding that "tip amounts were higher in states with higher costs-of-living" (Lynn, 2022a). The variable of unemployment rate was included to provide evidence to support or disprove the findings of previous studies that connected tipping behavior and tip credits to unemployment (Allegretto et al., 2017; "Restaurants Flourish…", 2016). The variable of state and local sales tax was included in the model to examine how consumers react when prices of their goods rise. Although many consumers ignore sales tax when they are not noticeably posted, the increased cost of goods may deter some consumers from leaving larger tip amounts (Chetty et al., 2009) Finally, personal income per capita is included in this analysis because it can offer clues about financial health and

future consumer spending by state. Moreover, the variable of personal income was included to test the findings of Nusrat Jahan in 2018 to conclude directionality and significance. Jahan found that "households' average monthly income has no influence on tip size" (Jahan, 2018). Hopefully, the inclusion of these selected independent variables will provide evidence to the validity of these previous findings.

3.2. Data Acquisition

Data for this study was gathered via public quarterly releases, *Trends Reports*, of data collected by Toast. The Toast POS system combines payments, operations, digital ordering and delivery, marketing and loyalty, and team management into one service ("The Most Popular…", 2023). The Toast software also tracks tips. *Trends Reports* from Q2 2022 through Q3 2023 featured a list of all 50 states ranked based on average tip percentage. All quarters but Q2 2022 also featured full-service restaurant (FSR) average tip percentage and quick service (QSR) average tip percentage. According to Toast, this data was gathered from applicable restaurants on the Toast platform with tipping enabled where a tip was added to the order via a card or digital payment. Cash tips are not included in the analysis. As of June 30, 2023, the Toast platform hosts approximately 93,000 locations ("The Most Popular…, 2023). For the purposes of this undergraduate thesis, variables that were measured on a yearly basis, such as cost-of-living, sales tax, and tip credit, were converted to quarterly values to maintain consistency in the panel data set.

Tip credit information for 2022 ("2022 - Minimum Wages for…", 2022) and 2023 ("2023 - Minimum Wages for…", 2023) was gathered directly from the U.S. Department of Labor. Minimum cash wage was calculated by averaging the different wages among business types for the states of Minnesota, Montana, Nevada, Connecticut, and New York without

weighting by population of workers in each category. The tip credit information detailed in Figure 2 reflects current tip credit policy at the time of writing this paper as of January 1st, 2024. The simple average of each business type for the states listed above was conducted to create the information in Figure 2. The information used in this study maintains the tip credit information for 2022 and 2023.

Cost-of-living was gathered on a yearly basis by state as surveyed by The Council for Community and Economic Research ("Home - C2ER…", 2022). The publisher of the research, the Missouri Economic Research and Information Center (MERIC) derives the cost-of-living index for each state by averaging the indices of participating cities and metropolitan areas in each state, as reported to the C2ER. Cities across the nation participate in the C2ER survey on a voluntary basis. The composite index of cost-of-living is based on six economic components: housing, utilities, grocery items, transportation, health care as well as miscellaneous goods and services. The national average for all 273 participating areas is given a benchmark of 100. Therefore, states that have an index score above 100 are more expensive on average and states with an index score below 100 are cheaper on average. MERIC found that in 2023, the most expensive areas to live were Hawaii (180.3), Alaska (125.2), the Northeast, and the West Coast. The least expensive areas were the Midwest and Southern states ("Cost of Living Data…", 2023). 2022 data was also gathered ("Composite Cost of Living…", 2024).

The independent variable of state unemployment rate was gathered by the U.S. Bureau of Labor Statistics, specifically the Local Area Unemployment Statistics (LAUS) program. LAUS is a federal-state cooperative effort that estimates monthly total employment and unemployment for over 7,600 areas ("Local Area Unemployment Statistics Overview", 2023). The underlying data of LAUS is from the Current Population Survey (CPS), the household survey that is the

source of the national unemployment rate. This data is seasonally adjusted and includes monthly unemployment rates by state ("Local Area Unemployment…"). In order to quantify data into quarters, unemployment percentages were averaged across the three months in each quarter. For example, the unemployment rate was gathered for April, May, and June of 2022 and then averaged across each to find a Q2 2022 average estimation.

State and local sales tax are measured on a yearly basis as they are adjusted each fiscal year. This variable was measured by The Tax Foundation, the world's leading nonpartisan tax policy 501(c)(3) nonprofit, and published for both January 1, 2022 (Fritts, 2022) and January 1, 2023 (Fritts, 2023). The combined sales tax represents the real percentage of each sale that is government revenue and taken out of each transaction. Combined sales tax rate is calculated by adding the state rate and average local tax rate. Local tax rates vary across cities, counties, and municipalities. For this reason, The Tax Foundation weights local sales tax rates by population to compute an average local tax rate across the state. Five states, including Alaska, Delaware, Montana, New Hampshire, and Oregon, have no statewide sales taxes. Of these, Alaska is the only state that allows localities to charge additional sales tax.

Personal income per capita was obtained from the U.S. Department of Commerce Bureau of Economic Analysis. Personal income is the income that people derive from wages and salaries, Social Security and other government benefits, dividends and interest, business ownership, and other sources. Personal income is calculated by taking the total personal income divided by the total quarterly population estimated. This data is seasonally adjusted at annual rates and all dollar estimates are in current dollars (not adjusted for inflation) ("Regional Data GDP and Personal Income").

3.3. Model Specification

This study employs the principles of econometrics, a test of statistical significance favored among economists. Often, economists are attempting to estimate the effect on one dependent variable of potentially multiple independent variables. The linear regression model is the simplest such model used in econometrics, and we present it here to build intuition:

$$Y_i = \beta_0 + \beta_1 X_i + u_i$$

where

The subscript i represents each observation, $i = 1, \ldots, n$;

Y_i is the dependent variable, the regressand;

X_i is the independent variable, explanatory variable, the regressor;

β_0 is the intercept of the population regression line;

β_1 is the slope of the population regression line; and

u_i is the disturbance, error term

This model is the most basic regression model and captures the relationship between one dependent variable and one regressor. The slope of the regression, β_1, is interpreted as the change in Y associated with a one-unit change in X, on average across the sample. The error term, u_i, contains "all the other factors besides X that determine the value of the dependent variable, Y, for a specific observation, i" (Stock & Watson, 2020). It is almost impossible to obtain a 100% valid and accurate estimation of the true return of an independent variable due to the inherent presence of bias in every model. Omitted variable bias is a common concern when determining the quality of an estimated coefficient of a regressor. Omitted variable bias is the bias found in an OLS estimator when the regressor, X, is correlated with a variable not included in the regression. This omitted variable is a determinant of the dependent variable Y and part of

its effect is lumped into the estimate of regressor X. Therefore, this clouds the true estimate of our included dependent variable, adding bias. It is impossible to remove omitted variable bias because it is unfeasible to include every independent variable that influences the dependent variable. Sometimes omitted variables are immeasurable and therefore impossible to control for. Often, the typical regression model can be boiled down to the following:

$$\text{Estimate} = \text{True Return} + \text{Bias} + \text{Noise}$$

The concept of noise is captured by the error term and standard errors. Error terms describe how much estimates are expected to vary across different samples. Our estimate coefficient is a dependable product of the true effect or return combined with bias and noise. Economic theory rarely suggests a relationship between a dependent variable and only a single independent variable. To account for the presence of other variables and control for some bias, economists employ regression analysis with more than one explanatory variable, called multiple linear regression analysis. To interpret a regression with multiple independent variables we must engage the econometric assumption of *ceteris paribus*. *Ceteris paribus* is a Latin phrase meaning "all else being equal" which helps isolate variables affecting the dependent variable within a regression model. The slope coefficient of a dependent variable in a multiple linear regression model is interpreted as the change in Y associated with a one-unit change in X, on average across the sample holding all else constant. This study, for example, can be modeled using simple multiple linear regression to determine the effect of a variety of regressors on tips as outlined below based on real data:

$$\text{tip\_percentage}_i = \beta_0 + \beta_1 \text{tip\_credit}_i + \beta_2 \text{cost\_of\_living} + \beta_3 \text{unemployment\_rate} +$$
$$\beta_4 \text{salextax\_perc} + \beta_5 \text{personal\_income}_i + u_i$$

Estimation of this model yields the results presented in Table 2:

Table 2

Results of Multiple Linear Regression Model Analysis of IV Tip Percentage

Variable	Estimate	SE	T-value	P-value	
Intercept	21.173	0.3318	65.514	$< 2 \times 10^{-16}$	***
Tip Credit	-0.09932	0.01093	-9.091	$< 2 \times 10^{-16}$	***
Cost-of-Living Index	-0.01061	0.002253	-4.711	3.81×10^{-6}	***
Unemployment Rate	0.0849	0.04178	2.032	0.043	*
Sales Tax %	-0.1569	0.01290	-12.165	$< 2 \times 10^{-16}$	***
Personal Income	0.000002336	0.000004064	0.575	0.566	

*Significance Note. '***' p < 0, '**' p < 0.001, '*' p < 0.01, '.' p < 0.05*

At close to the 0% significance level, a relationship between tip percentage and variables of tip credit, cost-of-living, unemployment, and sales tax percent is demonstrated by the OLS model. The slope coefficient on tip credit indicates a \$1 increase in tip credit is associated with a 0.099 percentage point reduction in tipping percentage, on average and all else equal. In the same direction, if cost-of-living rises one index point (more expensive) then tip percentage is predicted to fall by 0.012 percentage points, on average and *ceteris paribus*. The beta coefficient on sales tax percent represents the largest effect on tip percentage at p-values near 0. This model suggests that on average, holding all other variables constant, a one percentage point increase in sales tax is associated with a -0.1569 percentage drop in tipping behavior. For context, the average tip percentage in Quarter 3 2023 was 19.38%. Therefore, if sales tax were to increase by 1%, the OLS model predicts the average tip percentage to fall to 19.22%. Although small, this effect quickly adds up over hundreds of transactions at restaurants each year.

3.4. Panel Data, Fixed Effects, & Model Estimation

This study features a panel dataset. A panel, or longitudinal, dataset is characterized by two dimensions: cross-sectional data and time-series data. Panel data includes measurements for n different entities observed at T different time periods. In fact, this study is a balanced panel with complete observations for each entity (state) and each time (quarter). There are observations of all 50 states in the United States over the course of a six-quarter time period (Q2 2022, Q3 2022, Q4 2024, Q1 2023, Q2 2023, and Q3 2023) for a total of 50 (n) x 6 (T) = 300 observations. Panel data allows for differences in tipping behavior between states, for example, California and Delaware to be compared to each other over time. Sometimes, OLS models such as those regressed above are not optimal to model data that may have inherent differences among entities, in this case, states. Suppose due to factors that are difficult to measure, tipping is higher on average in one state versus another state. In the OLS linear regression model, such factors are omitted variables and can lead to bias. However, with panel data we can control for these differences in average tipping across states, which reduces omitted variables bias. Specifically, economists harness a method of reducing bias called fixed effects. Fixed effects control for any differences among states that do not differ over time.
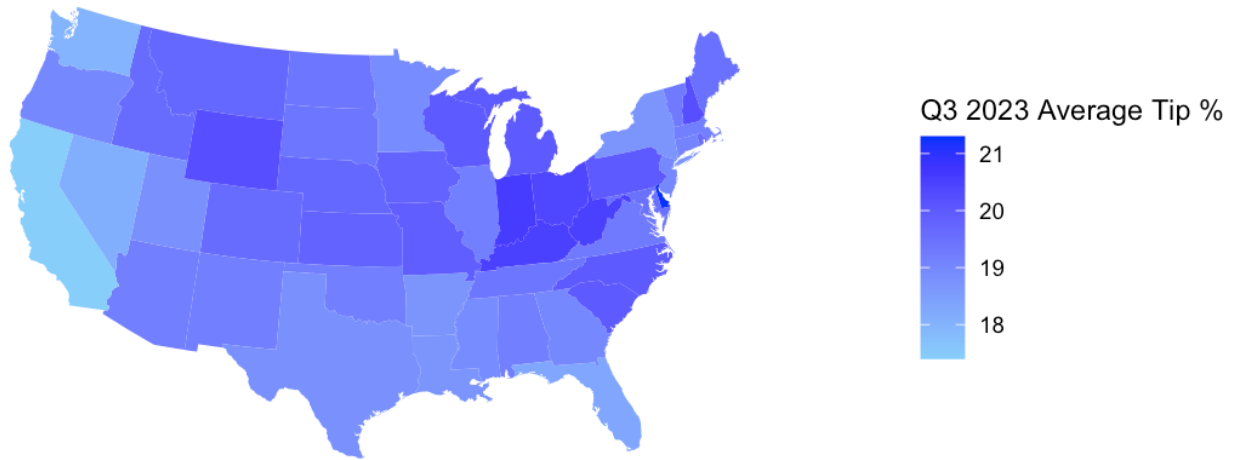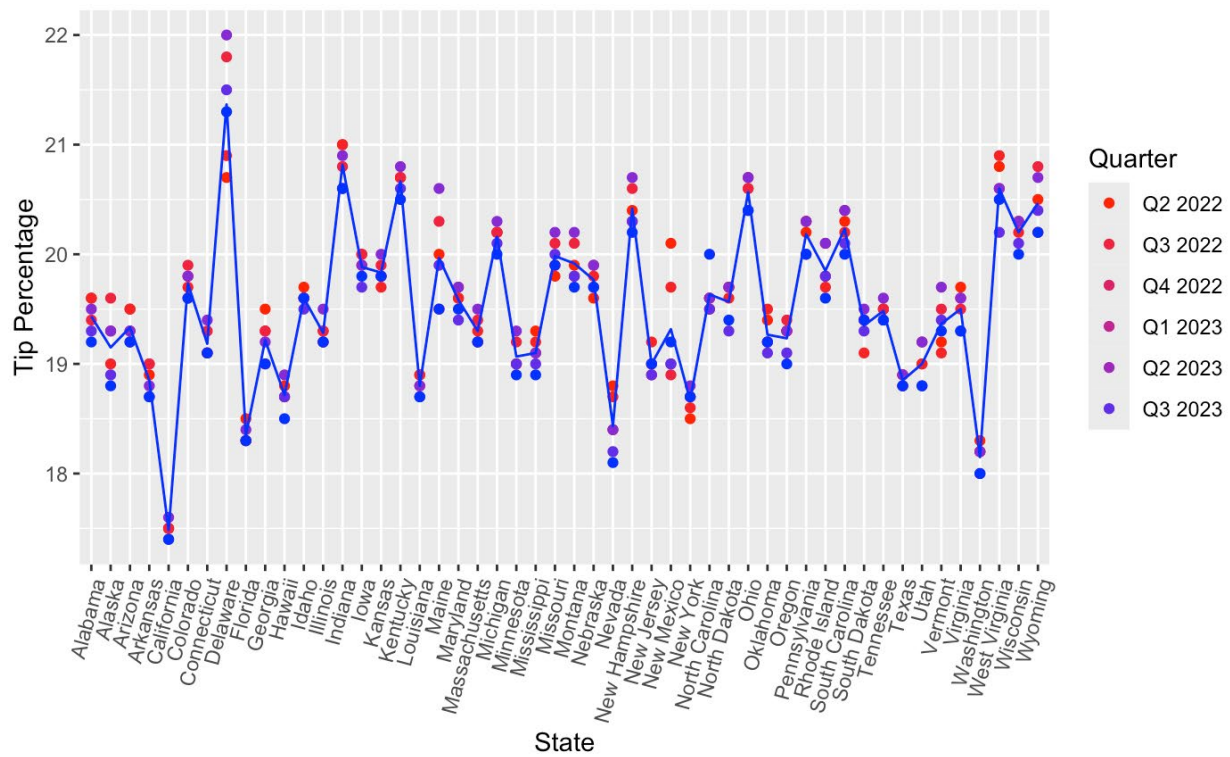
Figure 5

Figure 6

As demonstrated by Figure 5 and 6, there are clear distinctions in tipping behavior among

states across the U.S. For instance, people in California seem to be worse tippers (17.48%

average tip percent) than tippers in Delaware (21.37% average tip percent), on average across the

sample. Fixed effects allow the model to wash out differences among states that are impossible to fully control for by including variables in a linear regression model. If the differences between states are not controlled, any time invariant contrast among states is captured in the estimates for our variables. If you included any variables that distinguish residents in Delaware and California, it will be statistically significant because it explains the mean differences between states' tipping behavior. For example, imagine there are more people who knit in Delaware than California. If you set up a regression with variable for number of knitters per capita as a predictor for tipping behavior between Delaware and California, you would find a nonsensical relationship that predicts increased knitting associated with increased tipping. Omitted variable bias says there is a relationship between knitting and tipping when there is no logical connection. Fixed effects help control for omitted variables that are different between states and constant over time. Instead of controlling for all variables that are different between Delaware and California, we control for these with the use of fixed effects. It is impossible to control for all the differences between tips. Fixed effects within panel data allow the model to estimate coefficients by exploring variation in both time and across entities.

To test whether the fixed effects model is preferable to OLS we will run a F test for individual effects. The null hypothesis of the F test is that the OLS linear regression is a better model than the fixed effects model. The results of the F Test are presented in Table 3:

Table 3

F Test for Individual Effects

Data: $tip\_percentage_i = \beta_0 + \beta_1 tip\_credit_i + \beta_2 cost\_of\_living + \beta_3 unemployment\_rate + \beta_4 salextax\_perc + \beta_5 personal\_income_i + u_i$

F	DF1	DF2	P-value
45.884	49	245	$< 2 \times 10^{-16}$

We reject the null hypothesis that there are no fixed effects because p-value

0.0000000000000002 < 0.05. We conclude that the fixed effects model is a better suited model

than OLS multiple linear regression. This is supported because OLS forces every state to have

the same intercept term; fixed effects allow each state to have their own variable and properly

control for recurring differences among states that do not shift over time.

Additionally, we will test other models suited for panel datasets, such as random effects

that allow model regressors to be random variables. Random effects and fixed effect models

attempt to capture the same effect using different methods. Random effect models are best suited

to model the effect of individual-specific features on the response variable of a panel data set

because variation across entities is assumed to be random and uncorrelated. In contrast, fixed

effects models assume that individual heterogeneity of a specific entity may bias our variables.

We will conduct a Hausman Test with the null hypothesis that random effects are better suited

than fixed effects. The results of the Hausman Test are presented in Table 4:

Table 4

Hausman Test

Data: $tip\_percentage_i = \beta_0 + \beta_1 tip\_credit_i + \beta_2 cost\_of\_living + \beta_3 unemployment\_rate + \beta_4 salextax\_perc + \beta_5 personal\_income_i + u_i$

Chi-Sq. Statistic	Chi-Sq DF	P-value
15.154	5	0.009726

We reject the null hypothesis that random effects are a stronger model than fixed effects because

p-value 0.009726 < 0.05. We conclude that the fixed effect model is a better model than random

effects for this sample.

3.5. Results

By ruling out OLS and random effect models, we can conclude that the fixed effects model is appropriate to model the panel dataset of tip percentages and independent variables across state and six quarter time periods. Fixed effects allow for manipulation of data to provide a model that is close to the best linear unbiased estimated (BLUE) model. The regression output of the fixed effect model is presented in Table 5:

Table 5

Results of Fixed Effects Regression Model of IV Tip Percentage
Balanced Panel: n = 50, T = 6, N = 300

Variable	Estimate	SE	T-value	P-value	
Tip Credit	-0.034767	0.040638	-0.8555	0.3930934	
Cost-of-Living Index	-0.030575	0.0087364	-3.4997	0.0005531	***
Unemployment Rate	0.23342	0.042813	5.4522	0.0000001213.	***
Sales Tax %	0.18864	0.31189	0.6048	0.5458477	
Personal Income	-0.000031468	0.0000096353	-3.2659	0.0012470.	**

*Significance Note. '***' $p < 0$, '**' $p < 0.001$, '*' $p < 0.01$, '.' $p < 0.05$*

After controlling for fixed effects, we see a loss of statistical significance on the independent variables of tip credit and as well as sales tax. However, at 0.1% significance level, we see that personal income remains a statistically significant explainer of tip percentage. The coefficient on personal income switched direction between the linear regression model and the fixed effects model. In the linear model, without significance, an increase in personal income of $1 predicted an increase in average tip percentage. In contrast, the fixed effects model finds that a $1 rise in personal income per capita is associated with a -0.000031 percentage point reduction in average tip percent, on average, all else equal. This coefficient sign switch highlights the value of

conducting fixed effects estimation. The fixed effect model assumes variations within a cross-sectional data frame due to inherent characteristics of that state. We control for these time-invariant characteristics and study the net effect of the regressors on the outcome variable of tip percentage in our dataset.

The coefficient on cost-of-living indicates how tip percentage changes over time, on average per state, when cost of living increases by one index point (cost-of-living rises), holding all other variables constant. This suggests that if cost-of-living increases by one index point, tip percentage is expected to decrease by -0.030575 percentage points, on average and *ceteris paribus*. This may be because we see that when goods cost more, such as menu items at a restaurant, consumers are hesitant to tip more. This may explain part of the reason why states such as Hawaii and California have such high costs-of-living but relatively low tip percentages when compared to other states. This finding is significant at any level.

Additionally, the coefficient on unemployment percentage indicates how much tip percentage changes over time, on average per state, when unemployment increases by 1% point, holding all other variables constant. This suggests that if unemployment increases by 1% point, tip percentage is expected to rise by 0.23342 percentage points. This association is significant at any level. While speculative, this may provide documentation that if unemployment rates go up, likely those without jobs are not visiting restaurants and those who kept their jobs may be more generous. During recessions (when unemployment rises), prices fall; therefore, consumers with jobs would be happy to spend. While small, this effect can add up over the course of a year. According to a US Foods Survey of 1,000 Americans, the average American spends $166 per month per person on dining out ("The Diner Dispatch…", 2023). Extrapolated out for a full year, this suggests that a family of four spends nearly $8,000 eating out at restaurants per year.

Therefore, if we assume an average tip of 20%, the average American family of four tips somewhere around $1,600 per year. Intuitively, the coefficient on unemployment percent suggests that if unemployment percent goes up by 1%, tip percentage is predicted to rise by 0.23342 percentage points. This constitutes a small difference of a 20% tip versus a 20.23342% tip. Over the course of a year a difference of tipping $1,618.67 versus $1,600, although a difference of only $18.67 per year, this change affects millions of consumers across the U.S. The full-service restaurant market alone grossed an estimated total of over $76.5 billion in 2022. The restaurant industry employs 12.5 million people in the U.S. ("Topic: Restaurants…", 2023). In the food industry alone, there is an estimated annual tip revenue of $47 billion (Azar, 2011). Considering this effect over the nation, the difference in tipping behavior predicted by increases in unemployment could have the effect of hundreds of millions of dollars in the United States each year.

The coefficient on personal income represents the association between tip percentage over all quarters, on average per state, with tip percentage. The coefficient of -3.1468 x 10^5 represents a real number of -0.000031468. This suggests that if personal income were to rise by $1, on average and holding all other variables constant, that tip percentage would fall by -0.000031468 percentage points. This finding is significant at the 0.001 significance level. In the opposite direction, this finding of significance suggests that if personal income per capita falls (people are earning less), then average tip percentage increases, on average per state. This finding is consistent with the story of altruism and generosity, as we see that when average personal income per capita decreases such as during a recession, consumers tend to tip larger percentages.

3.6 Discussion

The important findings of this study confirm that tipping remains a robust compensation model during times of hardship, including public health and economic crises. Consumers appear to be aware of the need to help service employees through gifts directly given to employees. We found that when the cost-of-living index rises across states, tipping behavior falls. Conversely, when unemployment increases and personal income per capita falls, as is typical during economic downfalls, tipping behavior increases. Holding all other variables constant and controlling for fixed effects across states, we associate a 1% increase in unemployment with a ~0.23 percentage point increase in average tip percentage. This finding agrees with previous research and supports the conclusion that consumers are motivated to help servers through altruism and feelings of empathy.

No relationship of significance was found between independent variables tip credit or state and local sales tax and dependent variable tip percentage. The findings of this study confirm the previous research that suggest consumers may be tipping less because of inflation. However, we find that, in contrast to previous research, that states with higher costs-of-living had lower tip percentages, on average. Moreover, the results of this study disprove previous findings that found that household's average monthly income has little influence on tipping behavior. Finally, this study finds that when unemployment rate increases, tipping behavior increases correspondingly.

3.7 Limitations & Further Research

There are several limitations to this study. For one, the source of the independent variable tip percentage was gathered by Toast and only included card or digital payment transactions. Cash tips are not included in the analysis. As found in 2016, patrons who paid with credit cards

tended to leave larger tips than those who paid in cash (BeomCheol et al., 2016, p. 4). All the

data regarding tip percentages in this study stemmed from non-cash transactions, so there is

potential that tip percentage may be overstated. It is likely the case that if cash tips were

included, tip percentages would fall, by how much is unknown and difficult to measure.

Additionally, the Toast data included average tip percentages for both FSR and QSR. It would be

valuable to conduct similar regression analysis to differentiate the effects of the included

independent variables on the dependent variable of tip percentage at both FSR and QSR

establishments.

Another limitation of this study is that sample size is relatively small, including 300 data

points spanning 50 states over 6 time periods (Q2 2022, Q3 2022, Q4 2024, Q1 2023, Q2 2023,

and Q3 2023). The variable of tip percentage was accumulated via *Toast Trends Reports*. The

Quarter 4 2023 report has been released and includes data regarding total average tips left on the

platform across all 50 states. Due to time constraints, this Q4 2023 data and any future

publications of Toast consumer data have not been included in this analysis ("Q4 Trends

Report…", 2024). It would be a valuable exploration to gather updated average tip percentage

data and remodel this analysis to reduce noise. Moreover, several variables in this study were

measured on the yearly level (2022 versus 2023) rather than quarterly. The independent variables

of tip credit, cost-of-living, and sales tax were all measured yearly. It would be instructive to

measure these variables on the quarterly basis to compare to other variables measured quarterly

such as tip percentage, unemployment rate, and personal income. It is impossible to say how this

adjustment might affect any findings of statistical significance and directionality.

Finally, there are a variety of specific variables that may have suited the model better. For

example, instead of utilizing statewide unemployment rate for all occupations, it may have been

more valuable to employ restaurant unemployment rate specifically to more aptly capture the effect of restaurant unemployment on tipping behavior. Including variables such as poverty rate, restaurant sexual harassment rate, and restaurant earnings may provide evidence to support previous findings of other research outlined in the literature review. On top of that, to truly test the effect of altruism and helping servers as a significant reason for tipping, it would be valuable to increase the salience of helping motives. This could be done by emulating research on dictator games that better personify the relationship between a server and a patron (Forsythe et al., 1994) As summarized in *Service gratuities and tipping: A motivational framework,* when individuals are asked to split a sudden sum of money between themselves and a stranger, a substantial minority often gives some money to the stranger despite anonymity in decision making (Lynn, 2014, p. 76). This effect increased under conditions likely to enhance empathy such as when the stranger is identified ahead of the allocation decision (Small & Loewenstein, 2003), named or pictured (Burnham, 2002; Charness & Gneezy, 2008), more needing or deserving of help (Brañas-Garza, 2005), and able to communicate with the stranger making the allocation decision (Andreoni & Rao, 2011). It would be valuable to know what effects similar treatment of heightening empathy would have on personifying a tipped server and consequently tip amount or percent. For example, likely describing a situation or telling a story of hardship may encourage greater tips by way of eliciting higher levels of altruism and generosity. This is likely part of the reason behind the success of servers who introduce themselves by name during service interactions.

Another beneficial area of potential research could be exploring the effects of manipulating default options using digital point of sale systems. Previous default options research has focused on NYC Taxicab, Uber ride, and laundry service data to find that

recommending default tip options is associated with lower likelihood of tipping but increased sizes of tips and tip revenue overall without negatively effecting customer satisfaction, patronage frequency, or spending. Although challenging to implement it would be powerful to manipulate default tip options in a restaurant setting to verify or disprove the findings of previous research on default options.

Finally, the story of altruism may be able to be explained by who falls into unemployment first during times of hardship. Typically, during a recession, those who lose their jobs first are employees who do not have firm-specific skills that make them professionals or managers. Additionally, workers who have lower levels of education and "younger workers (aged 16 to 24) are often the first cohort to lose their jobs during recessions and stay unemployed longer" (Steemers & Baltrus, 2023). It may be assumed that younger, less-experienced workers in this cohort may also, on average, tip less at restaurants. During times of hardship when the unemployment rate rises (job loss) and personal income per capita fall (income lose), workers in this category lose their jobs and are less likely to visit restaurants. Therefore, it may be that during times of economic hardship that average tip percentage does not increase but rather those tipping on the lower bound of the average tip percentage may no longer be participating in the behavior of tipping by not visiting restaurants, consequently inflating the average tip percentage. Simply, the effect of larger tip percentages may be explained by reduced patronage of restaurants by those who inherently tip less.

4. Conclusion

The key findings of this study are that increases in the variable cost-of-living index are associated with reductions in tipping behavior. On the other hand, increases in the unemployment rate and reductions in personal income per capita are found to increase tipping behavior. This evidence is congruent with previous studies and affirms that empathy and altruism inform consumers' decision on optimal tip percentage. While speculative, the results of this study may be explained by customers' perceptions of need among service staff during times of hardship, especially those working for a subminimum wage. At the root of every tip left there are three parties. Consumers feel positive about helping their server through altruism and generosity. Employers can pay their servers less and advertise lower costs while effectively monitoring service staff. Finally, servers are better off because they can earn more through tips than they would through a standard wage.

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