# Unveiling Gig-Economy Realities:
## *Analyzing Food Delivery Driver Earnings through NLP-Parsed Reddit Comments in Comparison to BLS Occupational Statistics*

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***Author's Note:***
*This is an excellent dedication to the hard-working drivers and backend support staff who run the food delivery industry. The COVID-19 pandemic has highlighted the industry's importance within the broader food sector and society. It is an honor to highlight their contributions and quantify their economic significance. This research will inspire government agencies and scholars globally to reconsider how we track and report this growing sector of the economy. Thank you for taking the time to review the work prepared.*

**Abstract**

Amidst the U.S. food delivery market's surge, accelerated by pandemic necessities and technological advancements, this research confronts the absence of standardized national wage metrics for the gig delivery sector. This study leverages NLP, mining Reddit data via Python's PRAW library, to untangle gig economy wage complexities and establish precise food delivery pay benchmarks. This study dissects remuneration structures and scrutinizes discrepancies in governmental worker classifications, shedding light on the dichotomy between traditional hourly wage measurements and gig economy pay reporting.

Gaining a better understanding of the gig economy's pay structure and industry factors influencing wages will allow all stakeholders to make more informed decisions. The rapid adoption of food delivery systems, combined with the industry's novelty, creates several areas to improve industry efficiency. This investigation aims to rectify occupational definitions, ignite further research into resolving issues highlighted, and establish more accurate wage expectations within the dynamic food delivery landscape.

***Keywords*: Reddit, text mining, gig economy, labor policy, sentiment analysis**

## Introduction

***Gig work*** is temporary employment contracted through digital platforms such as websites or apps. This type of work entails completing tasks on demand, such as driving for ride-sharing services, delivering goods, running errands, completing specific tasks, and providing similar services to earn an income. ***Digital platforms*** connect service providers with end users for ride-hailing, delivery, on-demand labor, and repair services. Although the gig economy spans several industries, this study focuses on food delivery and food delivery gig workers, which has enabled a U.S. market worth more than $30 billion (McKinsey Insights, 2021).

The proliferation of app-based ridesharing and delivery network platforms has sparked significant public debate about driver compensation and the appropriate classification of workers (CEFD, 2022). However, government agencies require assistance quantifying the number of gig workers and monitoring their earnings for several reasons. Labor market policies are critical, traditionally tailored to long-term employment rather than short-term gig work. Independent contractors and on-demand platform workers, considered self-employed, are excluded from current labor market minimums, including wage and hour laws (U.S. Dept of Labor). As a result, there needs to be more uniformity in how independent contractors report their earnings compared to traditional employees, making it challenging to measure wages accurately.

Information on employment and hours of work is crucial for decision-makers to assess the state of the economy. Determining how much food delivery gig work pays can be quite complex, particularly when considering various factors such as pay per trip, earnings per hour, and tip earnings per hour. The gig economy typically operates on a pay-per-order or per-trip model, so traditional hourly wage rates may not accurately reflect actual earnings. Most drivers (80 percent) are part-time, with lower total pay distorting the national average, especially for

higher-output drivers. This paper argues that gig-economy pay reporting requires a different approach to measuring and analyzing wages accurately.

This study brings greater attention to the misalignment of industry occupational definitions at the federal level and establishes an ideal expectation of "productive" pay rates for the food delivery industry. Here, the term productive means drivers with more than 70 percent workday utilization, regardless of factors impacting driver productivity. Accurate earnings data is crucial for organizations, governments, and workers. For workers, it determines purchasing power and standard of living.

On the other hand, labor costs represent the expenses employers incur for their workforce. Wages are a significant aspect of labor costs and serve as an indicator of such costs as they reflect the two primary components of employment-related income measures: earnings, which measure the income of employees, and labor costs, which show the costs associated with their employment (ILO, 2023)

To determine the current wage expectations of gig drivers, this study compared publicly available wage data from three data sources: government, industry, and consumer level. The study focused on wages reported through the U.S. Bureau of Labor Statistics (BLS) Occupational Outlook Handbook publication from 2018 to 2023 for driver job classifications most similar to food delivery gig workers. Industry data is collected from GridWise Industry Insights and DoorDash New Driver's advertised wage. Applying natural language processing techniques facilitated the extraction of consumer wage data from DoorDash and UberEATS earning subreddits. The data gathered from drivers' comments on Reddit's public forum was analyzed for sentiment, and the photos collected served as income validation. This technique enabled efficient identification of driver earnings data from publicly available subreddit

testimonies. DoorDash and UberEATS earnings were exclusively used for this review as an industry benchmark, comprising 75 percent of the U.S. app-based food delivery market (McKinsey Insights, 2021).

## Literature Review: Understanding the Gig Economy and Pay Dynamics

### Industry Wage Model and Common Terms

*Active Time vs Engaged Time*

The most crucial distinction between traditional employee hourly wage data and gig workers' hourly wages is the significance of work time productivity on workers' earned pay. The utilization rate is a critical metric that indicates the percentage of a driver's total work hours devoted to order-related tasks instead of being active on the app but not performing delivery requests. This report uses "*Online Time*" or "*Active Time*" to refer to the total number of minutes a driver logs onto an app platform. Specifically, this includes both "Engaged Time" (the interval between a driver accepting a trip offer and completing it) and "*Active Time*" (the total time that a driver is logged in to the app and available to receive or accept trip offers, including trip time). *Trip Time* encompasses the time to travel to a restaurant, any subsequent waiting involved in the preparation and pick up of an order, the transit time to the delivery destination, and the final drop-off with the consumer.

The System of National Accounts (SNA), a publication by the International Monetary Fund, the United Nations, and the World Bank, offers a comprehensive accounting framework for the national economic accounts of the United States. According to the SNA, "*hours worked*" refers to the total time an individual spends on productive activities. Hours worked encompasses the time spent on job duties (*direct hours*), activities that maintain or facilitate productivity (*related hours*), time lost due to process breakdowns, accidents, or lack of supplies (*downtime*),

and brief periods of rest, relief, refreshment, coffee, or prayer breaks, which are generally practiced per established norms and national circumstances (*resting time*) (ILO). Chapter 8.39 of the City of Seattle Municipal Code states that when an app-based worker logs into the network company's platform, they are considered on duty (Seattle et al., 2023).

When considering drivers' compensation, it is essential to note that the term "wage" refers to the remuneration paid by the app, exclusive of gratuities. In contrast, "earnings" encompasses both wages and tips. Meanwhile, "net pay" and "net earnings" refer to the salaries after expenses. When assessing gig work earnings, quantifying per engaged hour or active hour can be helpful depending on the application. Nevertheless, the interpretation of actual hourly pay can become obscured when presented to an audience not intimately acquainted with the subtleties of these calculations. Considering these distinctions, evaluating drivers' earnings is essential, as they affect policy decisions and industry practices. With a precise understanding of these concepts, the study can guarantee that discussions relating to driver's income are fully informed and accurate.

**Drive Pay Model**

The DoorDash compensation model in Exhibit 1b represents the typical wage incentive structure prevalent in the food delivery industry. The compensation for delivery drivers is a function of three components: base pay, promotions, and tips, as depicted in Exhibit 1. The base pay rate is contingent upon three factors: the estimated distance, duration, and desirability of the order, and ranges between $2 to $10 or more per delivery. In contrast to traditional employment models, gig-work is compensated per delivery or task rather than per hour. This fundamental distinction is the basis for this research and will later be pivotal as a leading contributor to wage reporting inaccuracies in the gig economy.

Deliveries that necessitate a more significant investment of time, require *Dashers* (DoorDash Drivers) to travel longer distances, and are less sought-after by couriers are associated with a higher base pay. DoorDash introduces promotions such as Peak Pay and Challenge Bonuses at various times throughout the year to motivate drivers. Dashers can augment their earnings through these promotions geared towards active drivers as a reward for meeting predetermined delivery goals during the week.

Every dollar a customer tips represents an additional dollar for their Dasher, and tipping can occur both during checkout and after the delivery. DoorDash's base pay and promotions remain constant, regardless of the tipped amount. All tips, irrespective of whether given before or after delivery, go directly to drivers and will be listed in the Dasher's earnings breakdown. (Door Dash, 2023). The advertised wage for new drivers by DashDash is above $23.50/per hour, see exhibit 1, based on an estimated utilization rate of 94%.

**Defining a Gig-Delivery Driver**

A driver is one of the most popular freelance jobs within the gig economy. Being a driver is a popular gig job due to schedule flexibility and the type of work; from delivering food and packages to driving passengers, many options exist (WGU, 2023). The requirements for certain types of drivers can be relatively minimal. While the operation of large trucks necessitates an individual to undergo specific training and acquire appropriate licensure, the same does not hold for those who serve as delivery, personal, or passenger drivers. According to the applicable regulations, these individuals do not need a standard driver's license.

This study focuses primarily on food delivery workers. However, apps like Uber offer the rideshare component of Uber and UberEATS from the same platform, so qualified Uber drivers automatically qualify as UberEATS drivers. There are no additional hurdles or online forms to

fill out besides a self-indication that the driver wants to receive orders from Uber Eats. In the marketplace, therefore, there is minimal distinction between food delivery drivers and drivers of other gig industries, which causes wage data to sometimes overlap.

The industry definition of a *Driver* collectively refers to independent providers of ride or delivery services who use web-based platforms to provide Mobility or Delivery services, or both (Uber, 2023). The NYC Department of Consumer and Worker Protection (DCWP) offers a broader definition of delivery drivers, encompassing workers who procure paid delivery assignments through an app platform and utilize bikes, scooters, or cars to execute their responsibilities. The Seattle Municipal Code Chapter 8.39 defines "App-based worker" as any person who has agreed with a network company governing the terms and conditions of use of the network company's platform to perform services for compensation via a network company's worker platform. Though many of these definitions are related, nuisances and exclusions are available in all terms.

Wage reporting in this sector is often scarce, and there currently needs to be a consistent definition of what constitutes a driver at the national level. This report aims to examine the various classifications of drivers as established by industry firms and governmental labor agencies. Although the study does not delve into causative factors and solutions for the varying classifications, it exemplifies how the current occupational terminology for reporting earnings impacts current wage estimates for drivers. Through an exploratory review of current occupational terminology, this report provides a comprehensive understanding of the impact of current methodology on driver wage estimates.

**Federal Agencies Definitions**

*U.S. Bureau of Labor Statistics (BLS)*

The Bureau of Labor Statistics (BLS) tried to capture the gig workforce through the Contingent Worker Supplement (CWS) to the Current Population Survey (CPS), a monthly survey of U.S. households conducted by the U.S. Census Bureau for the Bureau of Labor Statistics. The CPS is the primary source of labor force statistics for the population of the United States (U.S. Census Bureau, 2023). The CPS is an essential tool for evaluating workers employed in non-standard employment arrangements, including independent contractors, on-call work, and employment via temporary agencies or contracted firms.

In May 2017, the CPS Contingent Worker Supplement included four additional questions to identify individuals who secured short-term tasks or jobs for payment through a mobile application or website. By including these questions, the CPS aims to obtain a more comprehensive understanding of the nature and extent of gig work arrangements in the United States. With the addition of questions in the CWS, the government has taken a significant step towards recognizing the relevance of gig wages to the economy. 2017 marked the agency's first notable attempt to collect data for app-based workers, underscoring the growing importance of the gig economy in contemporary society.

The CWS estimate includes all people who did electronically mediated work, whether for their primary job, a second job, or additional work for pay (BLS, 2023). In May 2017, The BLS stated there were 1.6 million electronically mediated workers, accounting for 1.0 percent of total employment. These workers obtained short jobs through websites or mobile apps that connected them with customers and facilitated payment. Electronically mediated workers were more likely than traditional employees to work part-time. Part-time workers usually work less than thirty-five hours per week at all jobs combined (BLS, 2018). Workers in transportation and utilities had the highest rate of electronically mediated work at five percent.

The measure of employment in the Current Population Survey (CPS) includes electronically mediated workers. As such, it is not feasible to determine the exact number of these workers in the survey each month. The estimates for industry and occupation include workers who do not engage in ridesharing activities, such as delivery drivers. Furthermore, these estimates do not encompass individuals who perform ridesharing activities as a secondary occupation. The survey only captures the occupation and industry details of multiple jobholders from a quarter of the sample each month. Consequently, the identification of specific work types for secondary jobs is restricted.

The BLS Occupational Outlook Handbook (*OOH*) covers about eighty-three percent of the jobs in the U.S. economy. The BLS acknowledges they have no official definition of the "gig economy" or "gig workers." Researchers use many definitions, many likely to include 'electronically mediated workers' referring to app-based delivery drivers (BLS, 2023). The Bureau of Labor Statistics (BLS) provides relevant data about workers employed in contingent or alternative arrangements and those in electronically mediated roles. It is worth noting that gig workers are a type of contingent workers. The BLS categorizes alternative employment arrangements to include independent contractors, on-call workers, temporary help agency workers, and workers provided by contract firms (BLS, 2023).

*Internal Revenue Service (IRS)*

According to the IRS, delivery drivers who work on app platforms from a tax perspective are categorized as self-employed since they are compensated for services by employers as independent contractors. The earnings of a person working as an independent contractor are subject to self-employment tax. The IRS offers several resources for food-delivery drivers, including the "*Manage Taxes for Your Gig Work*" website (IRS, 2023, What is Gig Work?).

According to the Internal Revenue Service (IRS), there has been a notable increase in the proportion of the workforce earning income through alternative, nonemployee work arrangements. Growth in nonemployee work correlates to the rapid increase of gigs mediated through online labor platforms. The rising demand for labor on these platforms is resulting in supplementary and ancillary sources of income for workers. Many of these jobs remain unaccounted for in self-employment tax records, with almost forty-four percent of the overall growth in the 1099 economy attributed to individuals who do not file self-employment taxes ( Collins et al.., 2019).

**Worker Classification Debate**

The legal identity of workers who provide services through on-demand platforms has been a heated discussion between labor and industry. Currently, workers in the United States are categorized as employees or independent contractors, established during the New Deal era and a crucial element of employment law. It introduced legislation such as the National Labor Relations Act (NLRA) and the Fair Labor Standards Act (FLSA) to ensure workers' rights to minimum wages, benefits, and collective bargaining.

In 2019, the California Assembly passed Assembly Bill 5 (AB5) to reclassify independent contractors, specifically app-based drivers, as employees. The legislation mandated that app-based platforms demonstrate that individuals were, in fact, independent contractors—in response, DoorDash, Instacart, Lyft, Postmates, Uber, and other industry stakeholders collaborated with their drivers to devise a new framework. Proposition 22 (Prop 22) proposed that drivers retain their status as independent contractors. On November 3, 2020, Prop 22 was approved, with nearly 60% of California voters in favor. Prop 22 categorically classifies app-based drivers as independent contractors while ensuring couriers receive earnings

guarantees, benefits (including health care stipends), and insurance coverage from their respective app-based platforms (CEFD, 2022).

The revised International Classification of Status in Employment (ICSE) adopted by the 20th International Conference of Labour Statisticians (ICLS) brought about some significant changes, including introducing a new status in the employment category called dependent contractors. Various terms, such as "dependent self-employed" or "disguised employment relationship," have been used to describe the status of workers in the grey area between independent workers and employees. Their "in-between" situation posed a significant challenge for many statistical agencies in the developed and the developing world. It is imperative to note that historically, own-account workers and employees are not distinct groups in statistics (ILO, 2023).

However, the 20th ICLS proposed change contributed significantly to countries' ability to provide statistics on this group. Given mounting economic inequality, labor representatives and workers advocate extending employee benefits and safeguards to platform workers, ensuring minimum wage rights. Platform industrialists, meanwhile, have proffered a new regulatory category of worker—neither employee nor independent contractor—that limits the protections available to the workforce, legalizes unpredictable, digitally personalized piece-pay, and constricts a worker's right to negotiate different terms. To date, legal and socio-legal scholars have primarily analyzed this third category of worker as a Dependent Contractor, codified by Proposition 22 in California (Dubal, 2022).

**Economic and Industry Forces Impacting Wages and Reporting**

The Industry Life Cycle (ILC) is a well-researched concept highlighting the connection between wage growth, economic regulations, and labor demand. The ILC is a fundamental determinant of the nature and scope of forces in an organization’s environment. This term refers to the changes an industry undergoes as

it progresses through various stages, including birth, growth, maturity, and decline. Each life cycle stage is associated with particular forces that serve as leading indicators of the industry's evolution and provide evidence of change. While the IFC effectively captures how many industries evolve during their formative years, regular patterns emerge as the industries mature, and outcomes become less predictable. Understanding the forces governing the industry life cycle is crucial for businesses and academics seeking to navigate the complexities of the modern business landscape (Klepper, 1997). This review highlights some of the critical forces impacting gig-related food-delivery wages.

## Industry-Factors

### *Speed, Throughput, and Local Demand Density*

The rapid adoption of food delivery systems, combined with the industry's novelty, create several areas to improve operational efficiency. Driver throughput, a measure of the number of deliveries a driver performs per hour, is a crucial metric to the industry, significantly impacting wage data. The industry's standard delivery time is the industry's most significant factor driving a gig worker's throughput and hourly wage. The remuneration structure for drivers identified in the base pay model (see exhibit 1) is calculated by the total number of deliveries completed, typically measured per hour. However, drivers' maximum hourly earnings depend on the number of deliveries they can logistically complete within 60 minutes (Liu, Li., 2023).

In densely populated urban areas, a courier on a bicycle may be able to complete 4-5 deliveries per hour, while in more sparsely populated rural markets, drivers may only be able to complete 2-3 deliveries per hour. Demand and density concerns drive gig-economy hourly wage data and factor into total earnings (see Reddit comments exhibit 2). Lower deliveries per hour can also result from traffic delays during delivery, restaurant food availability, or pick-up delays due to diner issues (wrong address, phone died, prank orders).

The widespread promotion of scheduling algorithms in retail and other service industries has meant that firms can better match workers' hours to the company's needs. The resulting variability and

unpredictability in work hours shifts scheduling and income risk from the firm onto the workers. An unpredictable and inconsistent work schedule can pose significant challenges for drivers despite the consistent work hours. Such a scenario can make personal responsibilities like childcare particularly difficult, as workers may need help to meet their working hours. Consequently, the resulting unpredictability can be a significant source of stress and anxiety for workers (NASEM, 2020).

Furthermore, scheduling and working hours can be affected by other factors, such as weather conditions and local events. Any disruption caused by unforeseeable events like a snowstorm, hurricane, holiday parade, or sporting events can significantly impact a city's schedule from one day to one week. Such events can lead to reduced earnings for drivers who rely on weekly or daily order patterns and impact earnings because of their unpredictable nature.

## Driver Behavior

### *Work Ethic*

When examining the wage rates of gig workers, one must consider the individual's professional goals and work ethic. In contrast to traditional hourly-wage employment models, gig-economy jobs are predicated on the performance of specific tasks per trip or order, resulting in a lack of fixed weekly earnings. Instead, compensation is contingent upon a driver's entrepreneurial spirit and total productivity. As such, a worker's career aspirations and work ethic play a pivotal role in determining their earnings in the gig economy. A driver who works 40-50 hours per week will earn more than a similar driver in a similar area, working 5-10 hours per week. Utilizing DoorDash's advertised pay rate for new drivers, the study highlights the advertised utilization rate at 94 percent to accomplish a wage rate of at or above $23.5/hour (see exhibit 1b).

### *Meal Time*

The time of day and mealtime are critical factors that significantly impact the demand for delivery orders. Typically, the demand for orders is highest during lunch and dinner, as they coincide with the general public's standard food consumption patterns. During these periods, there is a substantial influx of

delivery demand, and order size tends to be larger, resulting in higher tips that are usually a percentage of the order's value. Having availability to work 11 am-10 pm, especially Fridays and Weekends, is ideal for immense order traffic and the potential for higher wages. For example, two drivers work in the same city and on the same route; Driver A, who works 4 am-10 am, will likely earn less than Driver B, who works 4 pm-10 pm, even though they work the same amount of time in the same area.

*Driver Intentions*

Intentions represent the motivation and the attitude behind a person's actions, but data collection is the function of repeated behavior, not to be confused with intent. According to the Theory of Planned Behavior (TPB), the probability of an individual partaking in a healthy behavior, such as exercising regularly, depends on the strength of their intention to do so. A behavioral intention measures an individual's willingness to act, influenced by various factors. According to the International Encyclopedia of Public Health (Kagee, Freeman, 2017), the factors that directly influence intentions to engage in healthy behavior include

- *the person's attitudes toward the behavior*
- *the person's perception of subjective group norms concerning the behavior*
- *the extent to which the person perceives to have control concerning the behavior*

In the gig economy, one unique metric of driver behavior is the *Acceptance Rate.* The *Rideshare Guy*, a popular rideshare industry research website, explains that UberEATS and DoorDash will *not* penalize drivers for a low acceptance rate. Both services "encourage" via email, text, or mobile push messages to increase the acceptance rate, but it does not affect the status as a driver (Fike, 2023, Driving For Multiple Delivery Apps At Once [Multi-Apping]). Drivers who are selective with delivery requests and remain firm in desired trip earnings alter wage data for earnings per hour, as potential earnings may differ from actuals. The variance between "engaged time" and "active time" can result from a *driver's unwillingness to accept* an order (see Reddit blog comment examples exhibit 3).

*Multiple-App Strategy*

One consequence of the gig economy is the ability to provide services for multiple platforms, even competitors. The practice has given rise to a gig strategy, coined *multi-apping*, wherein drivers use two or more delivery apps during the same shift or work week. Multi-apping has become prevalent due to the heightened competition among the labor force and consumers' demand for alternative platforms. Multi-apping strategies are commonly discussed on gig-economy websites and social media communities (GridWise, 2022)(*see exhibit 4 for Reddit comments examples on multi-apping*).

The phenomenon of multi-apping, or working for multiple delivery platforms, presents a challenge for logistics optimization concerning driver placement for pick-up and drop-off locations. This practice has been found, through a review of literature and industry occupational wage reporting, to potentially impact the accuracy of gig companies' hourly wage calculations. The reason is that drivers may devote some of their "*active" time* to fulfilling orders for another platform. Therefore, researchers need to consider the practice of multi-apping when calculating hourly wages to ensure the accuracy and fairness of their compensation analysis. For this reason, driver productivity or utilization becomes a vital metric to measure driver's intent correctly.

The NYC Department of Consumer and Worker Protection (DCWP) used the record-level data it obtained from Uber Eats, DoorDash, and Relay to analyze the login and logoff times of workers who used the same phone number with multiple apps, then extrapolated to the fifty-six percent of the workers who maintain numerous accounts (NYC DCWP, 2022). Using this method, the Department estimates that workers spend 18 percent of their working time connected to more than one app.

An analysis by the UC Riverside Center for Economic Forecasting and Development (CEFD) acknowledges that while the State of California understands that drivers register across various apps, the extent of this phenomenon has yet to be fully understood. The CEFD does reference two independent studies of Transportation Network Company Drivers in Seattle, in which they tracked multi-apping across Lyft and Uber, showing anywhere between 33 percent and 52 percent of drivers work with both platforms (CEFD, 2022).

## Research Methods and Procedure

### Research Design

Equipped with a deeper comprehension of the behavioral factors influencing gig wages, the time-related issues prevalent in the industry, and the different classifications of drivers identified through a study of federal and state wage literature this research delves into the varying levels of wage data that are accessible, and the differences that arise when comparing wage data provided by the US Bureau of Labor Statistics (BLS) with earnings reported by industry and consumer sources. Based on BLS Occupational Outlook Handbook publications from 2018 to 2023, this review focuses on wages for driver job classifications similar to food delivery gig workers.

The current research uses two methods to validate federal pay percentiles from the Bureau of Labor Statistics (BLS). The first method identifies leading industry data and pay rates, while the second involves identifying wage data through gig drivers' public testimony. *Industry pay data* collated from two primary sources: GridWise Industry Insights and DoorDash New Driver advertised wage. Through natural language processing techniques, *consumer wage* data have been extracted from comments and driver-earning photos posted on DoorDash and UberEATS subreddits.

This review focuses exclusively on DoorDash and UberEATS to benchmark earnings, as these two companies represent 75% of the app-based food delivery market in the United States (McKinsey, 2021). In no way is the analysis validation of DoorDash or UberEATs, historical or current pay, but rather a conceptual example provided by public Reddit blog parsed text. Conducting a more detailed analysis is imperative to identify the specific wage growth, historical wage, and the source of the wage data, whether from DoorDash or UberEATS.

With order volume as the predominant variable leading to driver pay, this analysis ignores annual wage data. It solely utilizes hourly pay reporting to standardize earnings across data sources. The analysis assumes yearly earnings are a function of driver behavior, and most food delivery drivers use gig work for secondary income. The present study takes into account all descriptive measures. Nevertheless, the

median hourly wage is the primary data point for this study to account for a wide distribution of values and align with BLS measurements.

## Data Collection and Sample Size

### *Federal Data*

For analytical purposes, the Bureau of Labor Statistics (BLS) data is a chief benchmark owing to its extensive documentation, historical structure, and data availability spanning several years. This research incorporates wage data from four Standard Occupational Classification (SOC) titles, namely Taxi Drivers (533054), Driver/Sales Workers (533031), Shuttle Drivers and Chauffeurs (533053), and Material Moving Workers (537199). The study analyzed 20 occupation groups, comparing driver occupations to understand earning norms and the potential earnings availability of alternative occupations for workers in the industry.

The Occupational Employment and Wage Statistics (OEWS) program produces wage estimates annually for eight hundred varying professions, including Drivers (BLS, 2023). Hourly wage estimates, including median, 10th, 25th, 75th, and 90th-percentile wage data, are available in downloadable Excel files on the BLS website and serve as this study's chief federal wage benchmark. Data represents earnings before taxes and other deductions, including overtime pay, commissions, or tips usually received. The definition of wage and salary workers for earnings purposes is narrower in scope than the general wage and salary definition used with labor force, employment, and unemployment data from the CPS, as the latter includes the incorporated self-employed.

### *Industry Wage Data*

This study collected engaged and online time data for industry and consumer sources. However, the focus was on earnings per hour of online time, as there is potential for variance in productivity for traditional employees, who are subject to tighter control and regulation by their employers. Previously, only gig service companies such as Uber, DoorDash, Instacart, and Amazon had access to wage data,

creating a gap in knowledge for other industry stakeholders. GridWise is a private analytics firm whose mission is to increase the availability of industry pay data.

GridWise specializes in the industry, and their wage information is this study's primary industry data source, supplemented by DoorDash's advertised earning rate as a secondary benchmark. Today, GridWise provides organizations with anonymized first-party data that helps them understand how people and goods move across on-demand delivery and ride-hailing services. Every month, GridWise ingests and processes millions of anonymized location, trip, and earnings records from ride-hail and delivery drivers on platforms like Uber, Lyft, DoorDash, Instacart, and others. GridWise specialization gives the firm an unparalleled view into gig-mobility activity across the US.

*Consumer-Sourced Wage Data*

With advancements in data extraction technology and natural language processing tools, more businesses are seeing the benefits of unstructured data, like open-ended responses, social media comments, user experience reviews, and much more. Unstructured data comes with challenges but holds valuable insights that help firms understand the 'why' behind the numbers. Nicholas Proferes, an Assistant Professor at Arizona State University, published a systematic analysis of 727 manuscripts that used Reddit as a data source between 2010 and 2020 (Proferes et al., 2021). The analysis reveals the increasing growth in the use of Reddit as a data source, the range of disciplines this research is occurring in, how researchers are getting access to Reddit data, and methods researchers are engaging in this space.

This study employs user comments from prominent earning subreddits for DoorDash and UberEATS, as evidenced in Exhibits 2, 3, 4, and 5. The comments were compiled and organized into a *pandas* data frame using Reddit's Python Reddit API Wrapper (PRAW) library, specifically designed to access Reddit's API in compliance with all API rules (*see technical notes for subreddits and PRAW details*). PRAW is more reliable and represents a better reflection of the user community. Although Reddit comments contain valuable insights, they risk being corrupted by users who disseminate false information, promote clickbait advertisements, or propagate negative information for personal gain.

This study collected and analyzed 387 separate Reddit comments from September 2022 to April 2023 to locate wage earnings. The variance in time compared to BLS and GridWise data assumes sufficient time for 2022 earnings to flow through to user submissions (i.e., Jan 2022 posts likely reflect the driver experience from the prior six months). Data collected from Reddit includes user comments, profile ID, date, number of upvotes, sub-comments, city, state, engaged time, active time, average pay per hour – generally consisting of a high estimate and low estimate – and driver earnings photos when available.

The final benchmarking comments (see Exhibit 5) are segmented and analyzed into *verified, range, and rate-only estimates*. *Verified* comments represent user submissions, which include the app platform's driver earnings page. *Range* comments represent submissions that allude to wage estimates, typically in a range (i.e., $14-$16). Rate Only refers to posts that did not provide verified earnings photos and did not provide a range estimate, simply a flat rate. This analysis will only feature posts that offer an hourly wage estimate while excluding those that do not indicate a time frame.

An "Upvote" is a method on Reddit by which users can signal their approval or support for a post. Some Reddit segments called subreddits provide specific rules for using upvoting. Upvotes move a post toward the top of the site and measure how many people approve of the post's content. The cumulative upvotes and sub-comments created a "total response rate" metric for accurate evaluation. This metric is instrumental in the precise weighting of submissions, thereby enhancing the overall accuracy of the study.

Throughout this study, the final data retrieved from Reddit for analysis totaled 66 posts for consumer-level wage benchmarking. These 66 posts were submitted by 63 distinct user profiles, generating 2,116 upvotes and comments. Of the 66 posts analyzed, 32 were from UberEATS subreddits, while 34 were from DoorDash. Of these, 17 submissions included driver-earning photos from the service platform, with 11 containing complete work time and wage details, with a response rate of 256 upvotes or comments.

## Data Processing and Diagnostics

*Statistical Techniques for Exploratory Data Analysis*

The critical objective of the study, is to identify the median wage rates for food delivery drivers. To summarize findings, the study focuses on the median wage across Reddit-provided earnings, verified with app-platform dashboard photos. Looking at numbers on a median basis helps to eliminate the outliers, those drivers who are either underperforming or overperforming for whatever reason. It provides a better picture of what the majority of drivers are earning. From there, the study benchmarks the findings supplied by Reddit submission against the BLS and industry wage expectations.

*Natural Language Processing*

This study leveraged Natural Language Processing (NLP) and visualization methods to interpret, manipulate, and comprehend driver wage comments extracted from Reddit user comments. While wage data sourced from BLS and GridWise is structured and provided in a helpful format for immediate use, extracting wage data from unstructured public review textual content requires NLP and visualization techniques. Our predictor variable is wage rate, and the study seeks to compare means across sample observations.

Text Analysis, which aims to create structured data from unstructured public review textual content, was utilized to thoroughly analyze all Reddit comments and extract valuable machine-readable data and pay insights. Slicing and dicing heaps of unstructured and heterogeneous free text into easy-to-manage and interpretable data pieces is crucial for collecting data. This process involved transforming vast amounts of unstructured information into structured, well-organized data that can be interpreted accurately and used to gain valuable insights. The extracted data can be analyzed, presented understandably, and utilized using advanced algorithms and machine-learning techniques. This approach saves time and effort, enhances productivity, and streamlines data collection.

Sentiment analysis, a sub-field of NLP, is often used to classify whether a text block is positive, negative, or neutral. It aids researchers in analyzing people's opinions in a way that can assist in their expansion by analyzing textual data to monitor brand and product sentiment in consumer feedback and comprehend customer needs (Eisenstein, 2019). Segmentation of user posts into distinct

groups, *Verified* and *Non-Verified,* ensured practical analysis of Reddit submissions. Verified comments included information on engaged time, online time, and earnings, while comments without complete wage data were grouped and labeled as Non-Verified. The stated grouping methodology allowed for a clear understanding and comparison of wage data across these two groups.

*Visualization and Statistical Application*

The central objective of the study was to identify the median and average wage rates for food delivery drivers. The median wage was calculated across Reddit earnings subreddit blogs verified with app-platform-earning photos to reach a logical and sound decision. Looking at numbers on a median basis helps eliminate outliers or drivers who are either underperforming or overperforming for whatever reason and provides a better picture of what most drivers earn. The findings provided by Reddit submissions were used as a benchmark pay rate compared with BLS and industry wage expectations to contrast differences.

Descriptive Statistics offer valuable insights into the characteristics and distribution of values in one or more datasets. Measures of central tendency (mean, median, and mode) and measures of variation (range, standard deviation, and variance) are the primary tools used to generate summary statistics. It is important to note that, in this study, references to "averages" signify weighted averages unless otherwise indicated, and the arithmetic mean is referred to simply as "mean." The use of Descriptive Statistics is a crucial step in analyzing wage data, as it helps to identify trends, patterns, and outliers that may be present in the dataset.

A *t-test*, assuming equal variances, was utilized to calculate the means of wage data obtained from BLS compared to Reddit and GridWise. This test, known as a homoscedastic t-test, helps to determine whether the two samples likely originated from distributions with equal population means. This test assumes that the populations have identical variances. The t-distribution is used instead of the normal distribution because the study collected less than 30 verified earning photos (small sample size).

Analysis of Variance (ANOVA) is a statistical method employed to examine the influence of occupation groups on median hourly wage estimates. By rigorously testing the main effect of each

independent factor, this approach confirms if the factors are from the same underlying population. ANOVA is a robust tool used in academic and business settings to analyze large datasets and determine the relationship between variables. The study analyzed wage responses based on sentiment, positive versus negative, and verified posts compared to non-verified earnings submissions. The comparison helps to asses data quality and variances amongst drivers post reviews.

Finally, to better understand potential wage momentum or systemic patterns over time, the study utilized time-series analysis modeled BLS occupational median hourly pay data for five years (2018-2022). The data visualization tools outlined earlier were used throughout this study to understand the relationship between the variables causing pay rates to best fit the observations collected: Engaged time, online time, utilization percentage, and response rate.

## Research Findings

### 2022 Federal Wage Benchmark Estimates

We conducted a macro-level analysis to establish and compare minimum wage expectations for entry-level driver occupations and similar roles. The Fair Labor Standards Act (FLSA) set the federal minimum wage at $7.25 per hour effective July 2009, and many states also have minimum wage laws. In cases where workers are subject to state and federal minimum wage laws, the law states that workers are guaranteed the highest minimum wage. There are 29 states plus the District of Columbia, Guam, and the Virgin Islands with minimum wage rates higher than the federal minimum wage. There are 16 states plus Puerto Rico with a minimum wage requirement that is the same as the federal minimum. The remaining five states do not have an established minimum wage requirement (U.S. DOL, 2023).

*Driver/Sales Workers* (NACIS 53-3031) is the primary federal wage benchmark. These workers drive vehicles over established routes or within an established territory, delivering goods such as food products, including restaurant takeout, pick-up, or delivery items. They may also use their vehicles to deliver goods to customers and accept payment. Freelance or independent workers may use smartphone apps to find specific delivery jobs.  According to BLS data from May 2022, the median annual wage for

driver/sales workers was $32,690, and the median hourly wage was $15.72. The top industry in this segment is "*Restaurants and other eating places*" workers, with a median hourly wage of $13.30. *Local Messengers* and Local Delivery workers have a median hourly wage of $17.50. (See Exhibit 6 for wage estimates per occupation classification.)

Our secondary federal wage benchmark is the median hourly wage for *food and beverage serving and related* workers, which was $13.52, with an annual income of $28,130 per year in 2022. The lowest 10 percent earned less than $10.14, and the highest 10 percent earned more than $17.26. The lowest earning occupation group is "*Hosts and hostesses, restaurant, lounge, and coffee shop*" workers at a median of $13.33 (U.S. BLS, 2023) (see Exhibit 7).

The food service industry is a benchmark due to its similarities to gig employment. This comparison is standard because there are typically no formal education or work experience requirements to enter either occupation, as workers learn their skills on the job. Food and beverage servers (FBS) ensure seamless service and customer satisfaction in various dining venues such as restaurants and schools. They work shifts that often involve early mornings, late evenings, weekends, and holidays, similar to the food delivery drivers' schedule. Part-time work is typical in this field, and FBS workers are responsible for preparing orders, clearing tables, and performing other tasks associated with providing food and drink to customers.

*GridWise*

GridWise (GW) analyzed driver earnings, base pay, and tips from August 2022 through January 2023 on an average basis. The average hourly earnings reached $24.50 for DoorDash and $25.60 for UberEATS per GW research collected. Using GridWise data for Q4 22', GW found enough overperforming drivers for DoorDash and UberEATS services to push the average earnings higher. These earnings are comparable to what rideshare drivers earn per GridWise. The median hourly rate during 2022 was $14.74 for DoorDash and $14.01 for UberEATS. The median pay per order was $7.95 for DoorDash and $9.28 for UberEATS. DoorDash drivers received the highest tips at $7.43, with UberEATS median tip amount at $6.34.

It is important to note that pay models are similar, but the exact bonus structure of promotion and base pay rates vary across companies. Although UberEATS earnings per trip are 18 percent higher than DoorDash, dashers completed 1.5 trips for every trip by an UberEATS driver (GridWise, 2023). The report does not site online or engaged time; however, based on Reddit driver wage comparisons, this analysis assumes these estimates are online time pay-per-hour rates. These numbers consider all drivers for both services, representing drivers who make ten deliveries a night, five nights a week, and drivers who run the app on their way home from work and might make one or two deliveries three nights a week. GridWise reports that the remuneration earned by drivers who implement a strategy and leverage incentives is significantly higher than the industry average wage.

Moreover, the industry data from GridWise needs to account for regional variations, utilization, and demand density. The advertised wage for new drivers by DashDash is above $23.50/per hour, see exhibit 1, based on an estimated utilization engagement rate of 94%. Comparing drivers with low output to drivers who strive to reach maximum productivity is not a fair comparison, as wages will differ, and low-output drivers are the majority of the driver population. Therefore, looking at average wages can distort the wage perspective for the occupation, as the average driver is low productivity and well below 90% utilization.

*Reddit*

Earnings estimates were determined based on the amount of information a user-provided. Twenty-nine percent of the sample population provided an exact pay estimate without context regarding engage time, active time, meal period, or regional area. Seventeen percent of submissions collected provided full details, allowing for a precise measurement of driver wage. Whereas most comments, 55 percent, provided a range for earning estimates see Exhibit 5. Based on free-text extraction, the study found that the median hourly wage for all comments was $21.31, and the average was $18.61.

Statistical analysis shows that the median hourly wage earned by DoorDash drivers was $24.08, whereas the median hourly wage earned by UberEATS drivers was $20.90. The average hourly wage earned by DoorDash drivers was $20.88/hour, while the average hourly wage earned by UberEATS

drivers was $16.64/hour. According to recent reports from various subreddits, drivers' remuneration for food delivery varies significantly, with hourly pay ranging from $9 to $48. The spread between the lowest and highest values is $14, as demonstrated in Exhibit 8. Verified drivers had a median hourly wage of $22.06 and an average hourly wage of $22.67.

Engage and active time captured for verified drivers totaled 436 active hours, which includes 243 hours of engaged time, verified by photo submissions (see reference Exhibit 9). A metric labeled "Driver Utilization" for this analysis measures total engaged hours as a ratio of total active hours. Driver utilization refers to the amount of working time used for billable earnings. The worker utilization rate is often used in service-based organizations and is a critical measure of productivity (30- AiHR, 2023). Drivers who reported a minimum of 70 percent utilization earned an average of 34 percent higher earnings, which equates to $7 more per hour than drivers with lower efficiency (see Exhibit 10). It is imperative to note that of the sample collected from Reddit earnings blogs, no driver reported a workday utilization above 90%, despite the advertised benchmark from Doordash.

### Comparison of Three Data Types: Consumer, Industry, and Federal

Of the three data sources for driver pay collected, GridWise estimates were the lowest at an average of $14.38/hour. In contrast, Reddit consumer comments provided the highest wage estimate, with an average pay reported of $22.73/hour. The mean variance between consumer data and industry averages is $8.35, whereas the variance between federal and GridWise estimates is $0.86. Other occupations related to food services or similar driver occupations earned an average wage of $15.71, roughly $1-$1.6 above GridWise industry estimates (See Exhibit 8 ). Reddit driver earnings fall between the 75th and 90th percentile compared to BLS occupational pay estimates.

The wage data collected and measured is at the national level, which is critical as regional location can drastically affect earnings. With higher driver populations in urban cities, averages can lean towards dense regions and may not correctly reflect trends in all regions. Except for the Reddit wage data measured, no other earning measurement accounted for direct time on the job or workday productivity. For example, a typical food service worker may have seven hours of direct or indirect work during a shift,

with two 30-minute rest breaks. Data collected shows food delivery drivers are typically only engaged 40 percent to 75 percent of their workday, equating to 3.2 hours to 6 hours of direct time and 2 hours to 4.8 hours of rest time compared to a typical food service worker's 8-hour shift.

Apart from regional pay variances and issues with work productivity measurements, there are opportunities to improve upon the wage data sourced. The following section highlights some critical voids in the data collected and calls for greater data transparency in the industry to alleviate wage reporting inaccuracies.

*Federal Data*

The Bureau of Labor Statistics (BLS) does not provide wage estimates for independent contractors and self-employed individuals, and earnings data are collected only from approximately one-fourth of the sample. Furthermore, there are relatively few electronically mediated workers included in these estimates. The data collected by the BLS are intended to represent W2 wages and reflect salary labor more accurately. Notably, around 80% of gig workers report that their app-based service constitutes part-time or secondary income, which may result in underestimating the number of actual drivers in federal estimates.

*GridWise Data*

GridWise's earnings estimates for DoorDash and UberEATS drivers are averages and include all drivers, regardless of their utilization rate, location, number of hours worked per week, or preferred meal time. It is important to note that there are more part-time drivers than full-time drivers, and most couriers use multiple apps or employ highly selective order acceptance criteria. As a result, a driver who works only 1-2 hours per week with relatively low engagement will not accurately reflect the earnings of a driver working 40-50 hours per week with moderate to high utilization rates. GridWise's estimates assume equal weighting amongst all drivers, which can lower the national average.

In contrast to federal data sources, GridWise needs more publicly available information about the analytical methodology and underlying assumptions employed to measure earnings. The lack of

transparency hinders comprehension of the procedures and criteria utilized to generate the data, thus potentially limiting the utility of GridWise data for informed research. GridWise offers an option for paid insights. However, the data analyzed in this study stems from the public earnings summary of FY2022, as made available on the company's official website. (GridWise, 2023).

*Reddit Data*

As for the Reddit estimates, it is essential to note that the timing of the posted samples could be more consistent than other estimates. Comments collected range over six months and could result from more recent promotions, driver incentives, or government intervention. The time of Reddit response is crucial regarding industry demand as a factor for wage estimates, as the relaxation of pandemic restrictions on restaurants has allowed consumers to dine on-site more regularly rather than pursue at-home food delivery. The lower order demand expected in FY23-FY24, driven by loosened COVID mandates since FY21, ultimately impacts drivers as earnings are a product of total order volume.

Another essential factor to consider is the sentiment of comments posted. Some drivers post to brag or boast about abnormally high pay or wages that vary from the norm. Most post-provided wages are for less than seven days. Eighty-four percent of posts, see Exhibit 5, reflected wages for only one day, and sixteen percent were regarding a single trip. In addition, some Reddit comments may identify or highlight earnings with extremely low or below-average pay. Some drivers are in areas with few restaurants; therefore, the number of orders per courier is lower than in more densely populated cities.

## Research Implications and Value

### Wage Measurement Specific to Gig Workers

The federal wage reporting system is biased towards traditional W2 employment, requiring redress to ensure equitable treatment. To that end, federal agencies must adopt a more precise measurement of freelance worker utilization. It is erroneous to measure the compensation of workers who exhibit sub-optimal utilization against those who maximize their earning potential. In the traditional W2 hourly employment model, workers lack the option to decline unfavorable assignments while on the

clock. Conversely, gig workers frequently exhibit acceptance rates below 60 percent (as evidenced in Exhibit 3). Low acceptance rates indicate that possibilities for higher income existed, but the driver opted not to accept the trip for reasons such as distance, insufficient tips, or excessive traffic.

Many sources of pay data currently, Reddit and GridWise public data, for example, rely on averages across the entire occupation rather than a tiered hour formula that considers the complete working day (see Exhibit 10 to understand how productivity impacts wages). "Workday," in general, means the period between the time on any day when a worker commences his/her "principal activity" and the time on which he/she ceases such principal activity or activities. The Department of Labor states that employees "Suffered or Permitted" work, which is work not requested but suffered or permitted, is work time that is compensable by the employer (U.S. DOL, 2008). However, current wage reporting lacks a reasonable utilization expectation industry-wide, as traditional employees must meet higher productivity levels.

Productivity measures services produced (*outputs*) by individual workers with the amount of inputs as a ratio to produce those services. Productivity is already in use by the BLS and other statistics agencies, which compares the number of outputs (deliveries) to the number of *inputs*, which, according to the BLS, includes labor (workers' time) (BLS, 2023). Driver behavior can influence direct time, downtime, and related time but are generally factors outside the driver's control. However, resting time is directly controlled by drivers, and combined with the fact that 80 percent of drivers are part-time, those who elect to abuse resting periods dilute the average hourly earnings rate for the entire workforce. Bucketing drivers by utilization, as in Exhibit 10, provides a more transparent view of pay as productivity partially captures driver behavior.

### Disseminating Open Data

Earnings data is essential from the workers' point of view and represents a measure of their purchasing power and an approximation of their standard of living. At the same time, labor cost provides an estimate of employers' expenditure toward the employment of their workforce. The indicator complements labor costs because they reflect the two main facets of existing employment-related income

measures: earnings aim to measure employees' income. In contrast, labor costs show the costs incurred by employers for employing them ( ILO, 2022). Like all other occupations tracked by federal agencies, detailed earning reports considering both part-time and full-time employment, tiered by earning quartile, and at region-state-level are vital for wage statistics.

In a 2020 study, the World Bank agrees that open data dissemination throughout the complex food system is also essential to correct information asymmetries, encourage innovation, and increase the efficiency of public spending. Think of the impact of releasing the genetic sequence of coronavirus COVID-19. The private and public sectors are now developing more than 150 possible vaccines, some using traditional technologies and others unproven. Open Data enables information sharing between different public agencies, improving the performance of shared processes and increasing the efficiency of providing public services (World Bank, 2020).

## Further Research Implication

*Gig-Work Classification and Historical Review of Earnings*

The present study aims to establish a viable wage range for drivers in the period ranging from Q4 2022 to Q2 2023. However, conducting a more comprehensive analysis by measuring industry variables is imperative to determine the wages for the preceding five to ten years. Notably, wage growth in an occupation can predict or represent growth in a similar sector. Therefore, the findings of this study aim to assist in understanding wage growth patterns in the driver occupation and other related sectors.

Exhibit 8b presents BLS wage data for similar driver occupations from 2019 to 2022, indicating that food-related drivers experienced a 20% wage growth compared to a 5% wage growth for taxi drivers' before the COVID-19 pandemic. Although the measurements are inconsistent, this study assumes that similar companies in similar industries compete for labor in the marketplace, and electronically mediated workers are aware of alternative employment opportunities.

A more precise measurement of drivers in the broader gig economy, encompassing categories outside of restaurant take-out delivery, should also be measured as many drivers use multi-app strategies

across industries. There are rising sectors in the gig-delivery world with various consumer offerings. Grocery Delivery is becoming a common practice driven by app-based platforms such as Instacart, Shipt, and GoPuff. Alcohol and Cannabis delivery is also becoming a newly adopted offering led by companies such as Saucey and Eaze. Evolving labor and tax implications of such newly created industry sectors will demand more significant classification and study by economists, academia, and federal agencies.

To elevate the exploration one novel approach is deploying a machine-learning-based model, rather than rule-based sentiment analysis, to refine bias measurements using more sophisticated methods such as Bayesian classifiers, Neural Networks, and RNN derivatives (LSTM and GRU). The objective is to learn the correlations among textual and numerical data to develop a more precise wage estimate accounting for stochastic variance in parameters over time. The challenge lies in leveraging uncertainty to make informed predictions and implementation in a distributed way for large-scale complex networks.

*Analysis of Government Intervention and Impact of Policy*

As the gig economy is an urban phenomenon in modern society, cities around the globe have become central contributors in debating the nature and organization of the sharing economy. However, city officials nationwide vary in their interpretation of potential opportunities and challenges and their governance responses. Building on a qualitative comparative analysis of 16 leading global cities, research titled Envisioning the 'Sharing City': Governance Strategies for the Sharing Economy reveals four framings of the new economy: 'societal endangerment,' 'societal enhancement,' 'market disruption,' and 'ecological transition.' Such framings go hand in hand with patterned governance responses, although there is considerable heterogeneity in the combination of public governance strategies (ILO, 2022).

Government policy has microeconomic effects whenever its implementation alters the inputs and incentives for individual decisions. As new legislation is drafted daily in cities worldwide, however, the potential ramifications of such policies remain unknown. The COVID-19 pandemic has prompted governments across several jurisdictions to implement regulations to safeguard restaurant owners in the food delivery industry and drivers in the ride-sourcing market. Concurrently, to mitigate health risks and improve earning potential during the pandemic, numerous ride-sourcing drivers have transitioned from

ride-sourcing platforms to other on-demand delivery services, such as food delivery, grocery delivery, and package delivery (Shaheen, 2020).

Government policies that required further research pertain to two sharing economy markets: (a) the food delivery market, where a platform offers on-demand food delivery services to customers, and (b) the ride-sourcing market, where a platform provides on-demand ride-hailing services to passengers. These two markets are interdependent, as the platforms share the same pool of for-hire drivers. Although city officials have proposed several regulations to safeguard these markets, a closer examination of their outcomes is warranted. The food-delivery and ride-source markets involve many individuals who decide based on self-interest. These decision-makers are interdependent and include food-delivery customers, couriers, restaurant owners, ride-hailing passengers, drivers, and ride-sourcing platforms. They interact with each other to reach an economic balance. Any regulatory policies that target specific groups will indirectly affect the decisions of all others, which may incur a change in the overall economic equilibrium and lead to counterintuitive outcomes or unintended consequences (Liu, Li., 2023).

In the ride-sourcing industry, there has been a concerted effort by regulators to establish two areas of employment law: minimum wage standards and reclassifying for-hire drivers as employees. In April 2023, the City of New York implemented a minimum per-trip payment on ride-sourcing trips to ensure a minimum wage of $17.96 per hour for ride-sourcing drivers. The NYC wage mandate for food delivery couriers is 19.7% higher than the city minimum wage of $15 per hour. Similarly, according to the Office of Labor Standards, Seattle proposed a minimum state wage of $5 per trip after expenses in 2023. In contrast, California's Proposition 22 imposed substantial wage mandates for delivery platforms state-wide in 2020. How will these wage and policy mandates impact drivers and improve the industry? This question and many more will depend on scholars in the future to answer.

## Conclusion

A well-crafted strategic plan can significantly impact drivers' earnings for DoorDash, Uber Eats, or any other delivery platform—the key to maximizing earnings lies in selecting optimal work areas and meal periods. However, convenient hourly wage measurements are inadequate for effectively reporting

gig earnings as they fail to account for utilization rate and meal time. This research study highlights the importance of considering the behavioral function of drivers in evaluating earnings measured through utilization rates. Federal agencies must adopt new methods reflecting drivers' earnings and productivity to better track and report the growing gig economy. The gig economy has become a critical source of income for millions of families nationwide, and as such, it is essential to ensure accurate reporting of earnings. While the industry will undoubtedly continue to evolve, the COVID pandemic has demonstrated the lasting economic significance of drivers.

According to the Bureau of Labor Statistics (BLS) website, there is currently no tabulation of wage estimates available for drivers who engage in electronic-mediated work, and there are currently no proposed plans to modify reporting practices. Data on workers outside major metropolitan areas, such as Seattle, Los Angeles, and New York City, is limited. Although food delivery jobs comprise a relatively small percentage of the total labor population for most states, the issue of population distribution across state earnings estimates for electronically-mediated workers still needs to be developed, primarily due to the relatively small sample sizes in most states. Notably, the BLS has yet to make plans to provide subnational estimates for electronically-mediated work.

Despite the economic significance of the occupation of gig-delivery drivers, there exists a need for consistent measurements of wage rates. The possibility of reclassifying independent contractors as employees or dependent contractors sounds like a plausible solution; however, businesses have expressed their concerns regarding the associated spike in operating costs. The forecasted expense is due primarily to the tax liabilities, minimum wage, labor, safety, and other legal requirements that apply to employees (U.S. DOL, 2022). Based on estimates provided by the New York City Department of Consumer and Worker Protection (NYC DCWP), Exhibit 8 presents data that reveals a $1 increase in driver base pay would lead to an almost 23% rise in labor costs for service platforms. Solving the issue of wage reporting and driver classification requires a more innovative solution between government agencies, labor rights groups, and industry. Failure to address this problem could severely affect drivers' livelihoods and the industry's overall stability.

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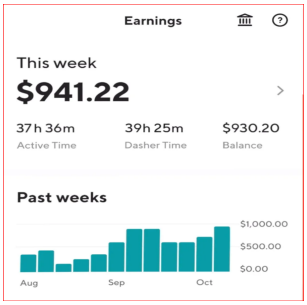
## Supplemental Information

*Exhibit 1a & 1b: Base pay model*


https://dasher.doordash.com/en-us/about/pay

*Exhibit 2: Reddit Comments Regarding Density and Order Volume*

| Comment | User | Upvotes | Sub-Comments | Response Rate | AVG | High | Low | Platform |
|---|---|---|---|---|---|---|---|---|
| *I make about $120 every 4-6 hours. My market is a smaller college town of about 60k, so there's only like 10 of us total at any given time* | ItalianOlympicYogurt | 2 | 6 | 8 | $25 | $30 | $20 | UE |
| *I make 75 - 120 each day only 4 - 5 hours during dinner time. Heard NYC is a rough market. Also traffic is a nightmare* | Just_Cap_9338 | 17 | 13 | 30 | $23 | $30 | $15 | UE |
| *$20/hr is about average for me, but I've hit $25-$35 on real good days. I don't think there's a lot of drivers in my zone so I get constant orders and I can cherry pick as much as I want since there's so many orders.* | tjackprevails | 238 | 110 | 348 | $23 | $25 | $20 | DD |
| *I have since moved but meridian Idaho used to be insane. It felt as if I was the only driver online. Regularly making $30-40 an hour* | Kadence444 | 34 | 0 | 34 | $35 | $40 | $30 | DD |
| *Only 50-70 for 10-12 hours?? I'm sorry but that is a bad market. I average 40-70 a day for only 2-4 hours a day.* | justanotherperson218 | 2 | 0 | 2 | $19 | $20 | $18 | UE |
| *Yeah this is me currently. Getting to $100 isn't too bad. (About a 6-8 hour day depending on what's going on. After that it's a dead zone or only those $3 drives.* | Unskrood | 2 | 3 | 5 | $15 | $17 | $13 | UE |

*Exhibit 3: Reddit Comments Regarding Acceptance Rate*

| Comment | User | Upvotes | Sub-Comments | Response Rate | AVG | High | Low | Platform |
|---|---|---|---|---|---|---|---|---|
| *I usually make 50-70 doing about 3 hours during dinner rush. I not accept $3-4 orders unless I'm heading that direction anyway? Sure. I have a 55% acceptance rate, so I do turn down jobs. I would say it's far from cherry picking though.* | scovok | 1 | 3 | 4 | $20 | $23 | $17 | UE |
| *I used to hit 20$/hr before they rolled out the acceptance rate priority program. After they enrolled me in that, my average dropped to $12-$16 an hour regardless of whether I conformed to that or not.* | CharlesJHV | 12 | 17 | 29 | $17 | $20 | $13 | DD |
| *See, I used to hit about 30. Nowadays I found a job that pays me that. God bless you folks still dragging the food stuff stones by your shackles, I wish you all be financially free* | Slip_Careful | 18 | 0 | 18 | $30 | $30 | $30 | UE |
| *Made $200 yesterday but damn that was a grind 🤣 you gotta really go for it, (with photos)* | Respecttheu | 8 | 23 | 31 | $16 | $18 | $14 | UE |

*Exhibit 4: Reddit Comments Regarding Multi-Apping*

| Comment | User | Upvotes | Sub-Comments | Response Rate | AVG | High | Low | Platform |
|---|---|---|---|---|---|---|---|---|
| *Multi app. I'm easily making 25+ hour here in denver.* | saryiahan | 0 | 0 | 0 | $25 | $25 | $25 | DD |
| *Well it's different every week but last week I made $650 in 23 hours multi apping with Doordash, GrubHub and Uber Eats.* | CornpopsGhost | 8 | 7 | 15 | $28 | $28 | $28 | DD |
| *I can make $150 in 10 hours just Uber or $200 in 8 hours multi apping, only taking orders from one app at a time and pause the other.* | immeasmyself | | | | | | | UE |
| *I do $220+-5 in 8 or 8.5 hrs multiapping* | DIGITALTAAJIR | 1 | 5 | 6 | $28 | $28 | $25 | UE |
| *I multi app and can average $30+ an hour, but have to be selective.* | hallalua | 2 | 0 | 2 | $30 | $30 | $30 | UE |
| *Yeah, same. After the 4th (where I made $200 each on UE and DD in 8 hours) I have never seen such low offers. My AR is fucked on UE after these last few days. $32 and $65, worst days I've ever had. Idk, I feel like the algorithm knows I did really well and is pumping my brakes.* | matike | 7 | 26 | 33 | $25 | | | UE |

*Exhibit 5: Reddit Comments Group by Wage Response Tier*

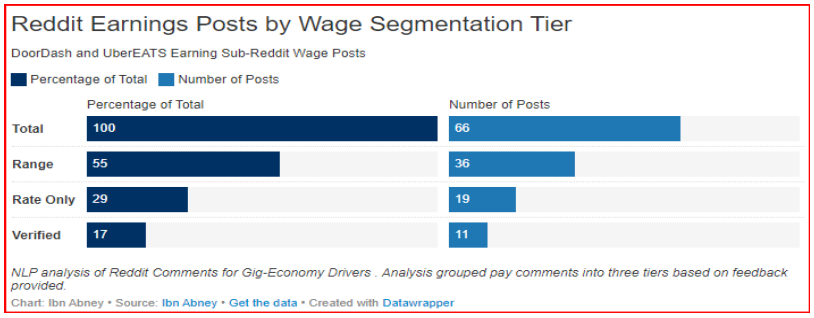
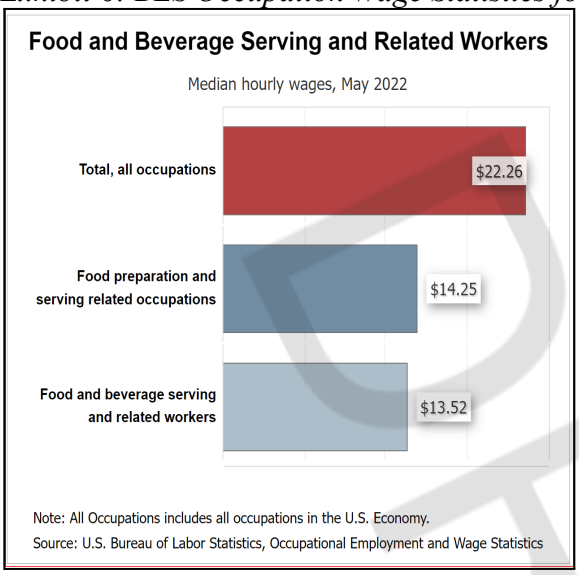


*Exhibit 6: BLS Occupation Wage Statistics for Drivers*




Median hourly wages for food and beverage serving and related workers in May 2022 were as follows:

| | |
|---|---|
| Food servers, nonrestaurant | $14.57 |
| Dining room and cafeteria attendants and bartender helpers | 14.00 |
| Fast food and counter workers | 13.43 |
| Hosts and hostesses, restaurant, lounge, and coffee shop | 13.33 |

In May 2022, the median hourly wages for food and beverage serving and related workers in the top industries in which they worked were as follows:

| | |
|---|---|
| Educational services; state, local, and private | $15.17 |
| Healthcare and social assistance | 14.94 |
| Retail trade | 14.52 |
| Special food services | 14.10 |
| Restaurants and other eating places | 13.31 |

- https://www.bls.gov/oes/current/oes533031.htm

*Exhibit 7: BLS Occupation Wage Statistics for Food and Beverage Serving Related Workers*

**National estimates for Driver/Sales Workers:**

Employment estimate and mean wage estimates for Driver/Sales Workers:

| Employment (1) | Employment RSE (3) | Mean hourly wage | Mean annual wage (2) | Wage RSE (3) |
|---|---|---|---|---|
| 489,510 | 2.0 % | $ 17.10 | $ 35,560 | 0.8 % |

Percentile wage estimates for Driver/Sales Workers:

| Percentile | 10% | 25% | 50% (Median) | 75% | 90% |
|---|---|---|---|---|---|
| Hourly Wage | $ 9.49 | $ 11.84 | $ 15.72 | $ 21.27 | $ 26.54 |
| Annual Wage (2) | $ 19,730 | $ 24,630 | $ 32,690 | $ 44,250 | $ 55,200 |

States with the highest employment level in Driver/Sales Workers:

| State | Employment (1) | Employment per thousand jobs | Location quotient (9) | Hourly mean wage | Annual mean wage (2) |
|---|---|---|---|---|---|
| California | 49,280 | 2.79 | 0.84 | $ 20.89 | $ 43,460 |
| Texas | 43,680 | 3.36 | 1.02 | $ 15.93 | $ 33,120 |
| Ohio | 30,920 | 5.75 | 1.74 | $ 14.70 | $ 30,580 |
| Florida | 30,760 | 3.34 | 1.01 | $ 15.99 | $ 33,270 |
| New Jersey | 21,710 | 5.28 | 1.60 | $ 18.87 | $ 39,260 |

Metropolitan areas with the highest employment level in Driver/Sales Workers:

| Metropolitan area | Employment (1) | Employment per thousand jobs | Location quotient (9) | Hourly mean wage | Annual mean wage (2) |
|---|---|---|---|---|---|
| New York-Newark-Jersey City, NY-NJ-PA | 30,780 | 3.35 | 1.01 | $ 19.31 | $ 40,160 |
| Los Angeles-Long Beach-Anaheim, CA | 16,420 | 2.69 | 0.81 | $ 19.79 | $ 41,160 |
| Chicago-Naperville-Elgin, IL-IN-WI | 13,960 | 3.16 | 0.95 | $ 17.62 | $ 36,650 |
| Houston-The Woodlands-Sugar Land, TX | 11,030 | 3.61 | 1.09 | $ 15.82 | $ 32,910 |
| Dallas-Fort Worth-Arlington, TX | 10,260 | 2.70 | 0.81 | $ 18.37 | $ 38,210 |
| Atlanta-Sandy Springs-Roswell, GA | 9,880 | 3.62 | 1.09 | $ 14.43 | $ 30,020 |
| Miami-Fort Lauderdale-West Palm Beach, FL | 9,730 | 3.71 | 1.12 | $ 16.05 | $ 33,390 |
| Philadelphia-Camden-Wilmington, PA-NJ-DE-MD | 8,980 | 3.24 | 0.98 | $ 17.94 | $ 37,320 |
| Phoenix-Mesa-Scottsdale, AZ | 7,930 | 3.57 | 1.08 | $ 17.27 | $ 35,930 |
| Washington-Arlington-Alexandria, DC-VA-MD-WV | 7,910 | 2.61 | 0.79 | $ 17.06 | $ 35,490 |

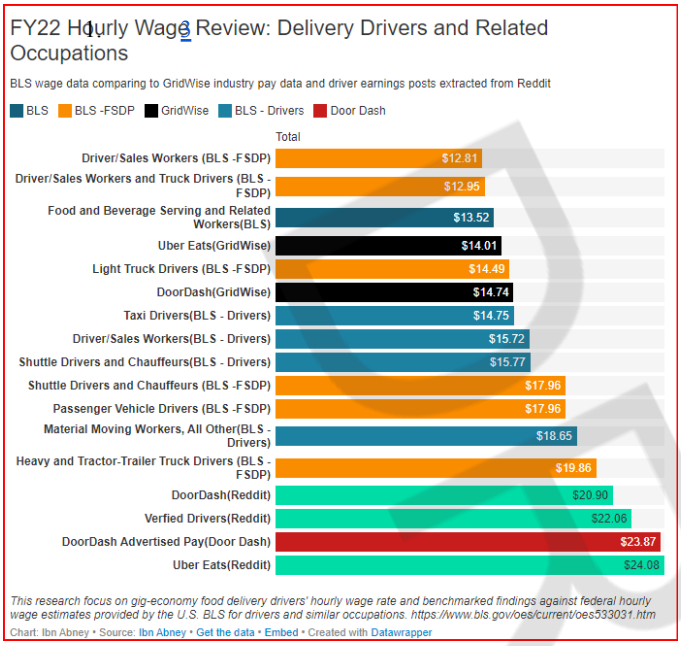
Industries with the highest levels of employment in Driver/Sales Workers:

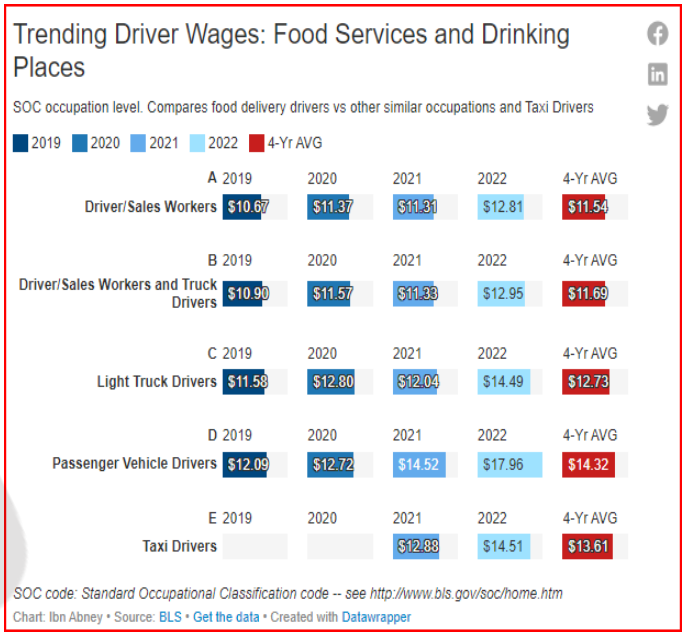
| Industry | Employment (1) | Percent of industry employment | Hourly mean wage | Annual mean wage (2) |
|---|---|---|---|---|
| Restaurants and Other Eating Places | 236,050 | 2.27 | $ 13.30 | $ 27,660 |
| Merchant Wholesalers, Nondurable Goods (4244 and 4248 only) | 74,320 | 7.59 | $ 22.10 | $ 45,960 |
| Drycleaning and Laundry Services | 20,340 | 8.27 | $ 23.35 | $ 48,570 |
| Truck Transportation | 14,370 | 0.92 | $ 28.60 | $ 59,490 |
| Automotive Parts, Accessories, and Tire Retailers | 9,690 | 1.72 | $ 13.46 | $ 27,990 |

Industries with the highest concentration of employment in Driver/Sales Workers:

| Industry | Employment (1) | Percent of industry employment | Hourly mean wage | Annual mean wage (2) |
|---|---|---|---|---|
| Drycleaning and Laundry Services | 20,340 | 8.27 | $ 23.35 | $ 48,570 |
| Merchant Wholesalers, Nondurable Goods (4244 and 4248 only) | 74,320 | 7.59 | $ 22.10 | $ 45,960 |
| Fuel Dealers | 4,960 | 7.00 | $ 23.29 | $ 48,430 |
| Local Messengers and Local Delivery | 7,630 | 4.22 | $ 17.50 | $ 36,410 |
| Florists | 2,470 | 3.77 | $ 13.47 | $ 28,020 |

*Exhibit 8: BLS Occupation Wage Statistics Compared to GridWise and Reddit Earnings*



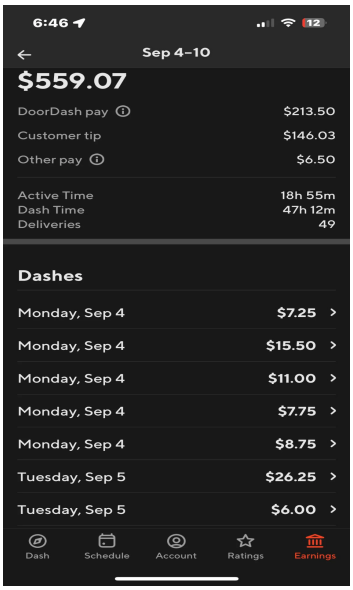



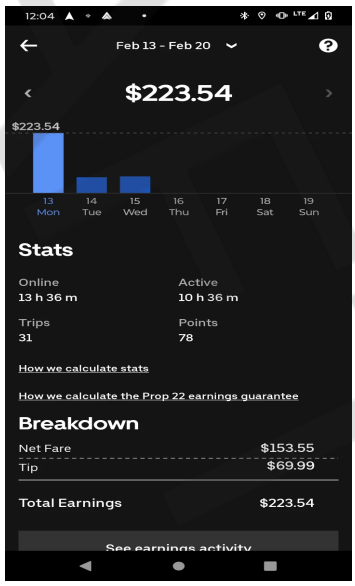

**8a**: https://www.datawrapper.de/_/SArIP/ **8b** : Median Wage over prior 4 yrs (BLS)

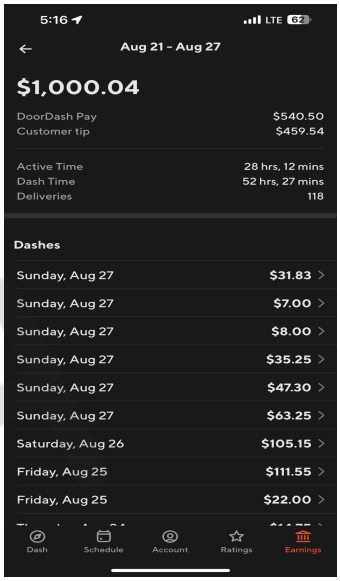
*Exhibit 9: Reddit Earnings Verified Example with Engaged and Active Time.*

**Source Links**

Example 1
Example 2
Example 3

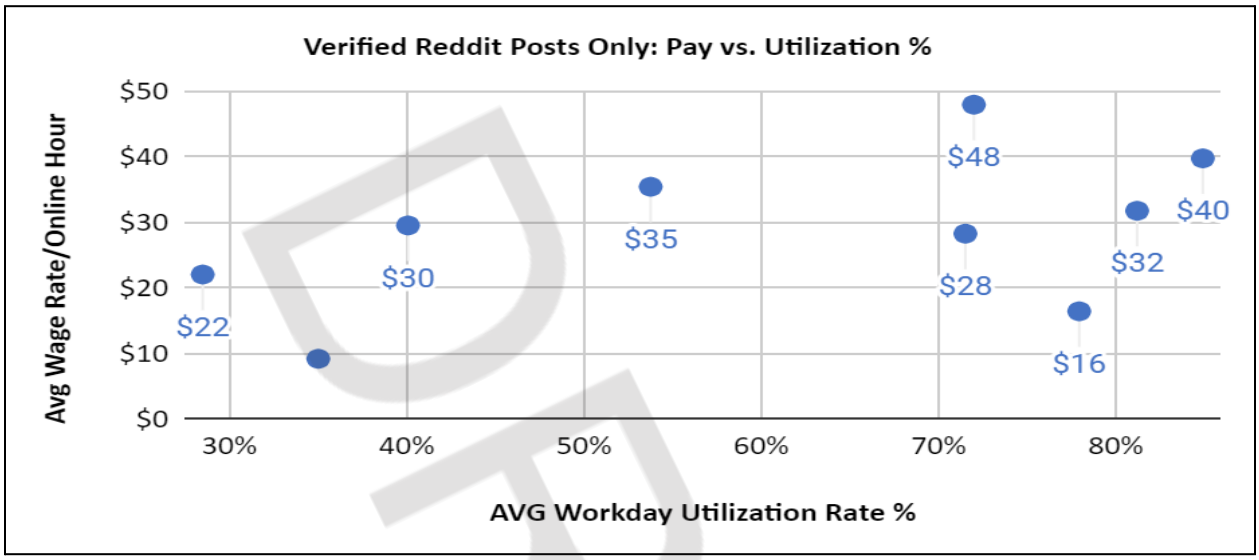



**Reddit Driver Subbreddits used for NLP text extraction:**
https://www.reddit.com/r/DashEarnings/comments/16gea6c/best_earnings/
https://www.reddit.com/r/doordash/comments/12oeitj/how_many_of_you_actually_make_the_national/
https://www.reddit.com/r/doordash_drivers/comments/ps86hj/how_much_are_you_drivers_making_a_week/
https://www.reddit.com/r/UberEATS/comments/xm7rvg/a_guide_to_maximize_your_earnings/
https://www.reddit.com/r/UberEATS/comments/13jr4e8/anyone_actually_making_150day_or_more/
https://www.reddit.com/r/UberEATS/comments/14tcja4/average_uber_eats_wage_is_709_an_hour_uber_lets/

*Exhibit 10: Reddit Earnings Verified Earnings Only*

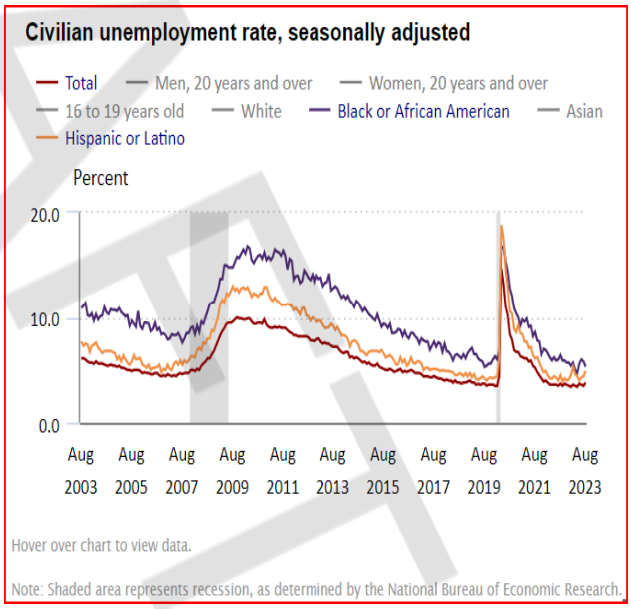



**Comparison of workplace legal protections for employees and for independent contractors in the United States**

| Labor standard | Employee | Independent contractor |
|---|---|---|
| Minimum wage | √ | X |
| Overtime pay | √ | X |
| Unemployment insurance | √ | X |
| Workers' compensation | √ | X |
| Paid sick days | √ | X |
| Paid family leave | √ | X |
| Health and safety protections | √ | X |
| Right to a union | √ | X |
| Discrimination and sexual harassment protections | √ | X |

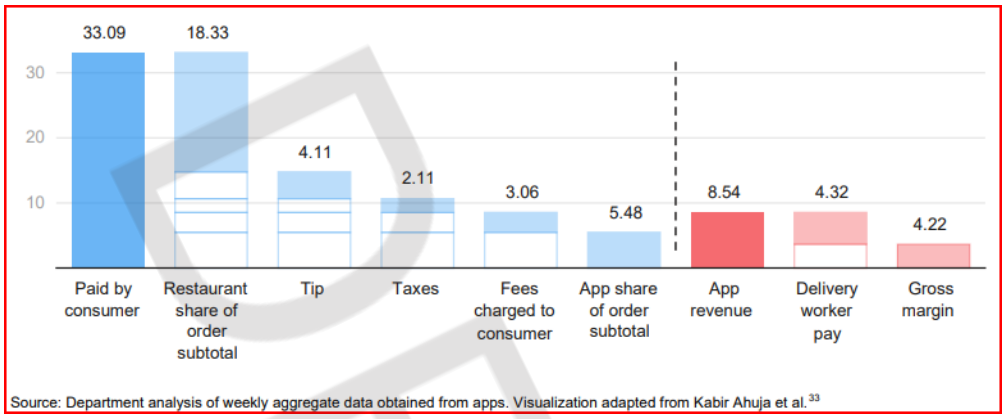
**Source:** Authors' analysis of current (as of May 2022) federal and state laws. Employees have these protections in places where they are statutorily prescribed. Independent contractors do not have these protections in any jurisdiction.

Economic Policy Institute



## Technical Notes

*Food Delivery Companies' Average Cost, Wage, and Margin by Order*




- Unit Economics of App Delivery in NYC, July 2021 – June 2022
- New York City Department of Consumer and Worker Protection. November 2022. A Minimum Pay Rate for App-Based Restaurant Delivery Workers in NYC (15).

**Glossary:**

1. Python Reddit Library- https://praw.readthedocs.io/en/stable/
2. UpVote- https://www.techopedia.com/definition/Upvote
3. Microeconomics Definition, Uses, and Concepts - https://www.investopedia.com/terms/m/microeconomics.asp
4. System of National Accounts (SNA) - https://www.bea.gov/help/glossary/system-national-accounts-sna
5. Labor Force Statistics from the Current Population Survey - https://www.bls.gov/cps/cps_over.htm
6. Occupational Outlook Handbook (OOH)- https://www.bls.gov/ooh/
7. Self-Employment Tax (Social Security and Medicare Taxes) - https://www.irs.gov/businesses/small-businesses-self-employed