TOO GOOD TO BE TRUE? A COMMENT ON HALL AND KRUEGER'S ANALYSIS OF THE LABOR MARKET FOR UBER'S DRIVER-PARTNERS

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In their comment on the article on Uber driver-partners by Jonathan Hall and Alan Krueger, the authors analyze the article's methodological problems, including sample bias, leading questions, selective reporting of findings, and an overestimation of driver earnings, which do not account for the full range of job-related expenses and is based on outdated data. The authors also argue that Hall and Krueger make unsubstantiated claims that extend beyond the scope of their research and ignore a rapidly growing literature that is critical of the Uber model as well as the broader for-hire vehicle industry in which Uber operates. As policymakers grapple with how to respond to transport network companies, the authors argue that a fuller understanding of the costs and benefits of services such as Uber is critical for making informed policies.

A survey of Uber drivers showed that the vast majority are happy working for the company. They greatly value the flexibility in terms of when and how much to work. . . . They also seem happy with the pay.

—Testimony given by Joe Kennedy, Senior Fellow, Information Technology and Innovation Foundation, to the House Small Business Committee Hearing, United States House of Representatives, May 24, 2016

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This article is written in response to Jonathan V. Hall and Alan B. Krueger's 2018 article titled "An Analysis of the Labor Market for Uber's Driver-Partners in the United States," *ILR Review* 71(3): 705–732. For information regarding the data used for this article, please address correspondence to the authors at berg@ilo.org or 8hesj@queensu.ca.

Keywords: labor market analysis, for-hire vehicle industry, gig economy, Uber, taxi industry

ILR Review, XX(X), Month 201X, pp. 1–30
DOI: 10.1177/0019793918798593. © The Author(s) 2018
Journal website: journals.sagepub.com/home/ilr

Research on the economic and social impact of the on-demand economy are key reference points for governments as they grapple with how best to regulate changing labor markets. In testimony before the House Small Business Committee and in other official proceedings, the article by Hall and Krueger has been cited for documenting drivers' contentment with the flexibility of the Uber model and its pay. Yet the findings presented in their article are fraught with methodological problems and unsubstantiated claims. Given the impact that research can have on the lives of working people, we must accurately convey the social and economic costs and benefits of restructuring labor markets—a responsibility grossly overlooked by Hall and Krueger.

Our comment presents four criticisms of the Hall and Krueger study. First, there are methodological concerns, including a poorly constructed survey and a flawed analysis of job-related costs. Second, the authors present an incomplete portrayal of the situation of Uber drivers. Third, the authors make unsubstantiated claims that parrot Uber's corporate narrative about the virtues of the company's business model. These claims are not grounded in the authors' research and are at odds with a growing body of literature, not cited by the authors, that presents a more critical analysis of the working conditions of Uber drivers. And fourth, the authors provide an incomplete labor market analysis that fails to account for the impact of transport network companies (TNCs), such as Uber and Lyft, on taxi and other for-hire vehicle (FHV) drivers, despite the paper's recurring comparisons of Uber vs. Taxi.

In addressing the four aforementioned critiques, we present a structured response. We address the first two criticisms with a critique of the survey, the authors' use of the survey, and their earnings calculations. We discuss Hall and Krueger's unsubstantiated claims that reinforce Uber's corporate narrative in two sections on driver flexibility and driver ratings, where we introduce research that examines how Uber's business practices are used as disciplinary and management tools. Finally, we address some of the missing elements in the authors' "labor market analysis" of Uber drivers by explaining the evolution of the taxi labor market in the United States over the past several decades, which is key to understanding the current situation of FHV drivers. We also briefly explain Uber's competitive practices and the consequences of these practices for FHV drivers, cities, and the public alike.

Uber's Survey of Its Drivers

Hall and Krueger's description of Uber drivers draws from two surveys conducted by the Benenson Strategy Group (BSG) under contract for Uber. The first survey was conducted in December 2014 and included 601 Uber drivers in 20 US cities. The second survey was conducted in November 2015

and included 833 respondents in 24 US cities.[1] Hall and Krueger have shared the survey questionnaire as well as the aggregated responses.[2]

Both surveys collect information on standard demographic characteristics, education, previous work experience, household income, and experiences driving for Uber. Some overlap occurs between the two surveys, though the 2015 survey is considerably longer (with 135 questions and subquestions as opposed to 95 in 2014). The surveys provide some useful information for analyzing the financial condition and dependence of workers on the platform, as well as their motivation and experience driving for Uber.

Our criticism of the survey concerns methodological shortcomings, including possible non-response bias that skewed the survey sample, and missing questions. We are also concerned about bias in the survey with respect to the framing of some of the questions as well as the authors' incomplete presentation of the survey results. As we point out, the authors emphasize some data over others, or do not provide sufficient context to analyze the survey results.

Non-response Bias

As acknowledged by Hall and Krueger, the survey response rate, at "around" 10%, is low. Although the authors state that "the (weighted) respondents do not appear to be dissimilar from the full set of driver-partners in terms of their average work hours or hourly earnings" (p. 709), they do not provide an accounting of this weighting. The article states that the sample was stratified, and that the weighting adjusts for this, but this is not the only weighting issue involved. It is possible there were differential response rates across groups of respondents, in which case a post hoc weight would be needed.

The risk of non-response bias is particularly high given this was a company-sponsored survey. Sanchez (2007) explained how employee surveys can be helpful management tools, if they are perceived by workers as having the right intentions, such as workplace improvement. Had Uber notified drivers that they had contracted a survey company to hear about drivers' concerns, the response rate might have been higher than 10%. The low response rate likely suggests alternative worker perceptions of the survey, such as those suggested by Thompson and Surface (2007) who explained how many workers will not respond "when they feel the [company] survey will not result in meaningful action and change" (p. 243).

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[1]According to BSG (2014, 2015) the two surveys were conducted among Uber driver-partners in top US markets who provided at least four rides in the month prior to fielding. The survey was conducted over the Internet and respondents were given a financial incentive and guaranteed anonymity. The BSG 2014 survey reported that "weights were derived to make the sample representative of all drivers in terms of the services they offered." For 2015, "quotas and weights were used to ensure the samples were representative of the actual Uber driver-partner population at the time of fielding."

[2]Hall extended an invitation to inspect the data at Uber headquarters for the purpose of replicating the article's results; unfortunately, this option was not feasible for us.

A greater concern would be if non-response bias resulted from failure to respond, or failure to respond honestly, out of fear of reprisal from the company. Indeed, shortly after the 2014 survey results were released, *Newsweek* published an article questioning the validity of the survey results, in part, based on interviews with Uber drivers who said they would not have responded to the survey had they been selected, with one driver indicating fear of retribution from the company (Mosendz 2015). If drivers did not respond (or did not respond honestly) for fear that their accounts would be deactivated[3]—perhaps a more salient concern among those with greater financial dependence on the platform—a non-response bias is likely in the sample.

Given the low response rate, an investigation of non-response bias should have been included in Hall and Krueger's article. Analyzing and accounting for non-response bias can be done through follow-up surveys to non-respondents as well as by examining the characteristics of the respondents, as certain socioeconomic characteristics may contribute to a lower response rate. Comparing the sample to the "full set of driver-partners in terms of their average work hours or hourly earnings" (p. 709) is not sufficient for addressing this concern; it merely asserts that the variables chosen by the authors for sample comparison are the only possible cause of response propensity (Groves 2006). The failure to address non-response bias calls into question Hall and Krueger's claim that the study is based on a "*representative*, national sample" of Uber drivers (p. 705, our emphasis).

Missing Questions

Another concern about the survey is missing questions or questions that solicit incomplete information. One critical question missing from both the 2014 and 2015 surveys is the average number of hours the person drives for Uber in a typical week. As a result, analysis of other survey questions, such as how much the person spends per month on fuel costs related to driving (2015: Q53R2), is rendered impossible. Moreover, this information is necessary for analyzing the survey responses, given key differences between part-time and full-time drivers. Full-time drivers comprise a smaller percentage of the total number of registered drivers, but they drive a much higher proportion of hours and are fundamental to Uber's ability to offer a reliable service.[4] Using the parlance of Uber, they are the company's "top partners." Assuming that the intent of the survey was to solicit feedback from its drivers, it is thus surprising this question was not included. Moreover, Hall and Krueger use the administrative data on hours worked in their earnings regression, but they do not use it to delve into possible differences between

[3]During the same time frame, there had been some press articles about Uber canceling the account of a driver who was critical of the company. See https://www.forbes.com/sites/ellenhuet/2014/10/16/uber-driver-deactivated-over-tweet/#758d74356a4c.

[4]We return to this issue in the section on flexibility.

the part-time and full-time workforce. Rather, they limit the analysis to a presentation of aggregated data.

Framing of Questions

A basic tenet in questionnaire design is to avoid combining two opinions into a single question. Doing so forces respondents to answer two questions at once when their opinions about the two may diverge. As Sudman and Bradburn (1982) explained:

> Even the rankest beginner would wince at a question like "In the coming election do you support Senator Pace and peace, or do you support Governor Guerra and war?" Less blatant examples may slip by the inexperienced question formulator. For example, consider: "Are you in favor of building more nuclear power plants so that we can have enough electricity to meet the country's needs, or are you opposed to more nuclear power plants even though this would mean less electricity?" Conjoined here are questions . . . with the implied relationship that nuclear power plants are the only way to increase the supply of electricity. Such a tactic could easily be used to load a question in favor of one particular kind of response. (p. 133)

Double-barreled questions can also be formulated as one-and-a-half-barrel questions when additional considerations are included in the answer. This tactic occurred in the BSG questionnaire in 2014 with the following forced choice question (Q38): "If both were available to you, at this point in your life, would you rather have: a steady 9-to-5 job with some benefits and a set salary or a job where you choose your own schedule and be your own boss?" Few workers would state that they do not want schedule flexibility and autonomy. Had a question been included to solicit their views on "a job with a regular and guaranteed income that is sufficient to support one's family," similar high marks would likely have been recorded.

The 2015 survey improved on the formulation of Q38 by making the opposition clearer, but it also misleadingly characterized the opposing contractual terms, likely skewing the response. It asks (Q52):

> Which of the following would you most prefer regarding your driving with Uber: being classified as an employee of Uber so you could be eligible for a minimum wage, health care and other benefits, but you would not have the flexibility to set your own schedule; or being classified as an independent contractor for Uber so you would have the flexibility to set your own schedule, but you are not eligible for a minimum wage, health care or other benefits.

Hall and Krueger report the results of this question on page 714, stating that 79% of respondents indicated their preference for an independent contractor relationship, but they provide no details of the question. This presentation is problematic as readers may incorrectly assume that the question was appropriately framed. Furthermore, if Uber really wanted to capture what the drivers valued, they should have teased out the label

(employee or independent contractor), as many people have preconceptions of what these two things mean. Then separately, they should have asked drivers how much they valued each of the possible features: schedule flexibility, income guarantees, and other job-related benefits.

More troubling, the question mischaracterizes what is included by law in an employment relationship and thus forces workers to choose between two alternatives based on misinformation. A worker who is classified as an employee according to US employment law is not obligated to work from 9 to 5 or to have an inflexible schedule. Many American workers have little control of their schedule, but this is because of employer practices, not employment law as detailed in the Fair Labor Standards Act (FLSA). Put differently, employee status is not incompatible with schedule flexibility. Indeed, working-time laws in the United States only designate payment of overtime after 40 hours a week for non-exempt occupations. The FLSA does not guarantee minimum weekly hours, nor does it impose requirements on notification of schedules. Of importance to drivers, working time would include time spent driving to pick up a passenger, thus for the total time that the driver is at the disposal of their employer, the employee would be guaranteed the minimum wage. In addition, under the FLSA, drivers would be eligible for reimbursement of their driving expenses, which is likely to be of significant value to Uber drivers but was not mentioned in the survey question.

The phrasing of Q38 (2014) and Q52 (2015) is particularly disconcerting given the high-profile legal proceedings involving Uber drivers who claim they have been misclassified as independent contractors. The framing of these questions does not meet the academic rigor expected in peer-reviewed research and seems better suited to the purpose of public relations. And indeed, the company has disseminated widely the finding that drivers prefer their current contractual status as independent contractors, likely with a view to influencing policymakers as they grapple with regulation of TNCs.

Insufficient Analysis of Findings: Job Satisfaction

One of the headline findings of the Hall and Krueger study as well as the Uber press release based on the BSG survey is that 81% of the 2015 drivers responded that they were very satisfied or somewhat satisfied with driving with Uber. Hall and Krueger merely report this finding at the end of the section on the BSG survey results (p. 715); they do not provide information on how this figure compares with other workplace studies of job satisfaction, nor do they offer any analytical explanation of the concept of job satisfaction and the shortfalls in its measurement.

One of the reasons this question produced a favorable response is the rating scale. The survey allows workers to choose from only one of four options: very satisfied, somewhat satisfied, not very satisfied, not at all

satisfied. A middle option—"neither satisfied nor dissatisfied"—is not offered as a choice. This omission can bias responses upward, as drivers who feel neutral are forced to choose between "somewhat satisfied" or "not very satisfied" (Friedman and Amoo 1999). By contrast, the Conference Board, a business membership and research organization that has published an annual job satisfaction survey in the United States since 1987, uses a 5-point scale ranging from most satisfied to least satisfied and offering a neutral middle category. Using this scale, only 48.3% of American workers reported in 2014 they were satisfied with their jobs (Cheng, Kan, Levanon, and Ray 2015).

Hall and Krueger could have compared their findings with the 2015 American Working Conditions Survey carried out by researchers at the RAND Corporation, which uses the same 4-point scale of the Uber survey. It found job satisfaction rates (percentage satisfied or very satisfied) for its nationally representative sample of American workers that ranged from 80% to 92%, depending on the age, sex, and education of the respondent (Maestas et al. 2017). Non-college graduate men scored the lowest (81% for the men between the ages of 35 and 49 and over 50, and 83% for men under the age of 35), no different from the level reported for Uber drivers. These comparative data are necessary for interpreting the results of the Uber survey.

The use of a single-measure job satisfaction indicator is problematic given the extensive literature that shows it is not reliable. Rose (2003) discussed this issue in his study of job satisfaction among UK occupations based on data from the British household panel survey. He found that "poorly paid childcare workers with low negotiable skill have higher overall job satisfaction levels than sales managers enjoying fat bonuses; cleaners with low negotiable skill qualifications are likely to have far higher levels of job satisfaction than the school teachers whose classrooms they tidy up" (p. 526). The author explained this anomaly by the tendency for respondents to answer single-measure job satisfaction questions based on the intrinsic characteristics of the job (the work that the person actually performs, autonomy, stress at work) rather than extrinsic characteristics such as pay, contractual status, or prospects for promotion (Rose 2003). For this reason, the academic literature is clear that single-item measures of job satisfaction are misleading and should be replaced, or at least complemented, with multiple-item measures of job satisfaction (Oshagbemi 1999; Brown, Charlwood, and Spencer 2012). For example, Oshagbemi (1999) contrasted the findings from two questionnaires administered to university teachers that used single- versus multiple-item questions of job satisfaction and reported an overestimation of 31 percentage points using the single-item measure.

Using single-measure job satisfaction would be understandable if this were the only information available, as is commonly the case in publicly available data, but both the 2014 and the 2015 BSG surveys asked drivers to

rate their satisfaction on specific aspects of driving for Uber (nine aspects were surveyed in 2014 (Q51): schedule flexibility, personal safety while driving, passengers' treatment of drivers, Uber smartphone app, communication between Uber and partner drivers, how surge pricing works, the amount of business you receive from Uber, income, and the rating system). In 2015, the survey included 15 questions covering the topics of 2014 as well as asking about communication with the company and driver control over where they drive (Q29). The multiple-item questions provide a more nuanced picture of drivers' job satisfaction that should have been used in an academic assessment. For example, even though overall job satisfaction remained high in 2015, the percentage of drivers that reported they were satisfied or very satisfied with their income from driving with Uber fell from 65% in 2014 to 56% in 2015.

Earnings of Uber Drivers Compared to Taxi Drivers

Hall and Krueger state that drivers are attracted to Uber because of the "level of compensation" (p. 705) and that "taking expenses into account, the average Uber driver-partner is likely to earn at least as much per hour, and probably more, than the average taxi driver and chauffeur" (p. 727). We dispute the calculations provided by the authors of Uber driver earnings vis-à-vis taxi drivers. One problem concerns the reference group that Uber drivers are compared with: "employees." The other problem concerns their calculations, which understate Uber drivers' expenses. Their flawed calculations overestimate Uber drivers' earnings and position Uber as the higher-earning option for drivers, perpetuating the company's long-standing practice of using inflated wage statistics to lure drivers (Hook 2017).

Taxi Reference Category

A major methodological problem with the authors' earnings comparison is that the earnings data they use for taxi drivers and chauffeurs does not adequately capture a typical taxi drivers' earnings. The authors use occupational employment statistics (OES) data as if they were representative of the "average taxi driver and chauffeur" (p. 727), when in fact most taxi drivers are self-employed and thus not included in the OES data, which covers only employees. Furthermore, the occupational earnings data include other types of drivers who should not be included in the comparison, such as hearse drivers.[5]

According to 2017 Bureau of Labor Statistics (BLS) data, 188,860 drivers were employees in the "taxi drivers and chauffeurs" occupational category in May 2016. Labor force statistics from the 2016 Current Population Survey

[5]According to the BLS, occupational category 53-3041, Taxi Drivers and Chauffeurs, includes workers who "Drive automobiles, vans, or limousines to transport passengers. May occasionally carry cargo. Includes hearse drivers." See https://www.bls.gov/oes/current/oes533041.htm.

reveal 500,000 workers were employed in this same occupational category, which includes both self-employed and employees who report this occupation as their main job. While not directly comparable with the OES data, it does suggest that nearly two-thirds of drivers in this occupational category are self-employed. Studies of the taxi industry confirm this observation, noting that "employees [are] most common among limo drivers" (Schaller 2015).

Our review of BSG-surveyed taxi markets further confirms the prevalence of self-employment in the industry. In comparing the number of BLS taxi drivers and chauffeurs in a given metropolitan area to the number of reported taxicab medallions (the city-issued license to operate a cab), which we use as a conservative proxy for the number of drivers, we find that the number of medallions often exceeds the number of BLS taxi and chauffeur employees. For example, Philadelphia has 1,800 medallions but only 1,700 employees; Dallas has 2,000 medallions and 1,850 employees; Washington, DC, has 6,191 registered taxicabs and only 540 BLS taxi and chauffeur employees. Acquiring information on livery drivers is more challenging, as even in major cities such as Boston, the industry subsector remains largely unregulated. Livery cars, however, add to the total number of FHV on the road, and thus, workers in the sector. When accounting for livery drivers, many of whom are also independent contractors, the percentage of taxi driver employees represents an even smaller portion of the total occupational category. For example, in New York City, the BLS data tally 12,580 employed taxi drivers and chauffeurs. This compares to 13,587 yellow cab medallions and more than 143,647 licensed drivers (DeBlasio and Joshi 2016). In this market, employees account for fewer than one in ten drivers.

Calculating Uber Drivers' Expenses

Hall and Krueger provide two estimates to calculate Uber drivers' net earnings. The first is a gross earnings-per-hour figure for drivers, by city, that is net Uber fees but does not account for driving-related expenses. Then the authors generate a cost estimate of hourly expenses for part- and full-time Uber drivers, with a breakdown by vehicle size to determine take-home earnings. Uber's proprietary data set leaves us poorly positioned to either critique or affirm Hall and Krueger's computations regarding net hourly earnings; however, in unpacking driving expenses, we find that the proposed figures underestimate the true cost of driving.

Our contention that Hall and Krueger have underestimated driver costs is based on five findings. First, the authors make no mention of the self-employment taxes paid by independent contractors. Second, they fail to account for additional licensing costs in highly regulated markets. Third, variation in cities' transportation infrastructure suggests that the national mileage estimate used in their analysis is not appropriate. Fourth, the use of national American Automobile Association (AAA) data as a proxy for

vehicle ownership costs underestimates costs in the BSG cities; variation based on driver demographics is also insufficiently addressed. And fifth, Uber has implemented multiple fare decreases since 2014 that most certainly affect the associated costs and earnings of Uber drivers; existing research suggests these changes have resulted in higher hourly expenses.

Tax Rates and Social Programs

Failure to account for additional tax obligations of Uber drivers leads to inflated hourly earnings. As independent contractors, Uber drivers are solely responsible for FICA contributions (payroll taxes), effectively doubling their payroll tax rate to 15.3% (compared with 7.65% paid by employees) on income below $127,000. Independent contractors may also be subject to state tax contribution rates. As Krueger has noted elsewhere, "A positive hourly wage premium for independent contractors could partially reflect a compensating differential for lower benefits and the need to pay self-employment taxes" (Katz and Krueger 2016)—an important consideration when directly comparing earnings of taxi and limousine employees with Uber drivers.

In addition to no employer-provided benefits, independent contractors are not covered by labor laws that govern wages and hours, family and medical leave, workers' compensation,[6] and unemployment. As self-identified low-income workers (according to the BSG survey, 54% of respondents described themselves as poor, working class, or lower-middle class) in an industry with exceptionally high rates of violence and injury,[7] lack of workers' compensation and disability coverage can be risky.

Hall and Krueger suggest that the independent contractor status of drivers allows them to "partially offset their costs by deducting work-related expenses from their income for tax purposes" (p. 726); however, existing research suggests that many gig workers are unfamiliar with how to navigate tax codes. A recent survey, conducted by the Kogod Tax Policy Center at American University to assess on-demand workers' understanding of their tax-filing obligations, found that almost half of survey respondents were unaware of available deductions, credits, or liabilities they could claim for tax purposes (Bruckner 2016). Similarly, Oei and Ring (2017), in their qualitative analysis of Internet discussion forums of TNC drivers, found that drivers were confused about which driving-related expenses could be considered tax deductible. They concluded that drivers chose to participate in rideshare platforms without full knowledge of driving-related expenses. As they explained, "the rideshare industry is one in which many of the operating costs, and the burdens of estimating

[6]Workers' compensation is provided in select cities for independent taxi drivers, but not universally.

[7]Taxi drivers have significant occupational safety and health risks, with 14.9 fatalities in taxi drivers and chauffeurs compared to 3.3 per 100,000 workers in other occupations, as a result of homicide and motor vehicle accidents (Burgel, Gillen, and White 2012).

such costs, are borne by drivers. . . . some of these costs (including tax costs) may not be particularly salient to drivers at the time of their labor supply decisions" (Oei and Ring 2017: 67).

Municipal Licensing Costs

FHV industries are commonly regulated at city or municipal levels; the process of developing a cost model on a statewide or national basis, as done by Hall and Krueger, flattens the market and glosses over important differences between cities. Locally determined regulatory provisions governing taxi permits and licensing eligibility affect the cost of driving and should have been considered in their analysis.

In various cities, Uber has fiercely opposed regulation; however, in other markets, including BSG-surveyed cities, Uber has acquiesced to regulatory mandates. Such regulation results in additional driver expenses. Although Uber left San Antonio, Texas, for approximately six months in 2015,[8] and Austin, Texas, in 2016 after the cities voted to require TNC drivers to be fingerprinted, Uber has complied with regulations in valuable markets. In New York, for example, initial licensing fees paid for by Uber drivers now total as much as $726.50,[9] plus any costs associated with visiting a physician, all of which are borne by the driver. Additionally, drivers must pay a new vehicle registration of $550 for a two-year license plus a $75 inspection fee if the vehicle has more than 500 miles on it. Within the BSG-surveyed cities, New York City is an outlier because of these additional costs; nonetheless, due diligence requires that additional licensing and registration fees be accounted for.

Urban Geographies

Urban infrastructure affects mobility within cities, a fact that is insufficiently addressed in Hall and Krueger's estimate of driver expenses. The built environment of each city surveyed as part of the BSG survey is unique and differentially affects the rate of travel and thus the earnings of Uber drivers. Hall and Krueger estimate, on average, across 20 BSG cities that drivers would cover 35,000 business miles in 2,000 hours, an average speed of 17.5 miles per hour.

Congestion and traffic, however, make a huge impact on the abilities of drivers to perform under the terms suggested by Hall and Krueger. This detail leads us to ask whether the assumption of 17.5 miles per hour

[8]The inclusion of San Antonio in the 2015 BSG survey raises additional questions about the representativeness of the sample given that Uber did not operate in San Antonio for a six-month period during 2015. In fact, Uber signed an agreement with the city of San Antonio to re-admit services on October 13, just 18 days before the BSG was conducted in the city. See Salazar 2015; Griswold 2015.

[9]Cost estimate includes license fee $252, drug test $26, defensive driving course $60, wheelchair accessible vehicle $75, 24-hour taxi school $150, license exam $75, and fingerprints and photos $88.50. For more details, see http://www.nyc.gov/html/tlc/html/industry/drivers.shtml.

produces a reasonable expense estimate for drivers. Research on taxi speeds in New York City, for example, reveals an average taxi speed of less than 13 miles per hour in 2015 (Wellington 2015), which suggests that within the BSG sample significant variation occurs between cities. While 17.5 miles per hour may be a predictable rate of travel in Phoenix, where infrastructure was built to accommodate the automobile, it may not be a reasonable estimate for old-city Philadelphia, whose narrow streets were designed for the horse and carriage. To better account for these variations, Hall and Krueger should have estimated driver mileage and hours by city.

The AAA Comparison

Hall and Krueger use national AAA estimates on the cost of car ownership to estimate the hourly cost of driving for Uber. The authors offer two cost calculation scenarios: driving full-time and driving part-time. The part-time scenario excludes insurance registration and fees, assuming that these costs would be incurred regardless, whereas the full-time scenario incorporates a national estimated cost of insurance and registration fees, assuming that drivers have purchased the car explicitly for the purpose of driving for Uber. Once insurance and registration fees are accounted for (or, in the case of part-time drivers, disregarded), the authors add a per-mile driving fee and then convert the amount to an hourly estimate.

Vehicle ownership costs have substantial geographic variability. Insurance rates differ drastically between urban and rural areas, by driver age, and by miles driven. While 2014 AAA estimates for insurance range between $981 and $1,081[10] depending on vehicle type (AAA 2014), cities surveyed by BSG have a wide range of variability relative to average insurance rates. For example, a 2014 comparison of automobile insurance rates reveals that the Phoenix metropolitan area is generally 10% below the national average, Philadelphia and San Francisco are 10% higher, and Miami and New York are 34% and 36% higher, respectively. Detroit, surveyed by BSG in 2015, boasts the highest insurance rates in the nation, at 165% above the national average (DiUlio 2014; Huffman 2014).

Other key differences are in play regarding AAA estimates. The AAA estimate is based on a 47-year-old male driver who commutes three to ten miles a day on his way to work, not someone who works as a professional driver and logs 35,000 business miles per year. Although most drivers are male, BSG findings report that 19.1% of Uber drivers are between the ages of 18 and 29; another 30.1% are between 30 and 39. Uber drivers skew young, which is an important consideration given the negative correlation between age and insurance costs in the United States. Actual insurance cost

[10]AAA insurance estimates are $981 for a small sedan, $1,007 for a medium sedan, and $1,081 for a large sedan. We have not considered the additional cost of commercial insurance, but given higher costs associated with the regular use of a personal vehicle for business purposes, we believe this should have been considered by the authors.

differentials can be quite extreme. For example, industry research on the 10 most expensive cities for 2014 extended automobile insurance (all of which are covered in the BSG survey), priced for a 26-year-old driver, reported premiums of $2,225 in Atlanta, $2,859 in Chicago, and $3,169 in Miami. Calculated for a Toyota Camry, these figures are much higher than the 2014 AAA estimate of $1,007 used by Hall and Krueger. The additional costs for young drivers are particularly important considerations given Uber's targeted marketing to college students (Uber, n.d.). Individual driver expenses may also vary based on driving style, vehicle type, fuel requirements, driving record, and other factors[11] that are more difficult to account for on a generalized basis.

Although driving expenses may vary individually, estimating driver costs could have been done in a more nuanced way. Small changes to the BSG survey would have provided more fruitful information about driver-related expenses. The 2015 survey, which includes a question about driver expenses (car payments, fuel costs, insurance, repairs, regular maintenance, registration, car wash or interior cleaning, and parking costs) might have asked respondents to specify what percentage of these costs are work-related; instead, by not asking this information, Hall and Krueger position their findings as a "best estimate" despite its many flaws.

The survey could have also asked respondents to provide exact figures for known expenses, such as car payments, or Hall and Krueger could have used internal driver expense estimates, such as those leaked to the press in 2016. The leaked data, analyzed by BuzzFeed and subsequently confirmed by Uber, found that once expenses were accounted for, hourly driver earnings in Denver, Houston, and Detroit (all surveyed in 2015 by BSG) were $13.17, $10.75, and $8.77, respectively—rates much lower than the authors' estimate of $19.35 per hour (O'Donovan and Singer-Vine 2016). Alternatively, Uber could have also used data from its partner, SherpaShare, an app that provides a means for Uber drivers to monitor their expenses.[12] Given the company's relationship with this app, it raises the question as to why the authors did not use this data to calculate Uber drivers' expenses as this would arguably have produced a more accurate estimate.

Fare Decreases and Outdated Data

Hall and Krueger's analysis is outdated. They state that "as long as drivers' costs are less than $6.79 per hour, the net earnings of Uber drivers-partners would exceed those of taxi drivers and chauffeurs, on average" (p. 725). Because the data are from 2014, this conclusion should be written in past

[11]Additional variations would also include car financing rates. While rates are dependent on individual circumstances, rates of Uber's wholly owned subsidiary, Xchange, were widely reported to target low-income drivers, charging as much as 22.75% interest (Harnett 2015; Griswold 2017; Richter 2017).

[12]See https://www.sherpashare.com/.

tense, as Uber dropped its rates in 2015 and 2016 in major cities across the United States.[13] Although the 2014 trip data correspond with the BSG survey year, the authors could have used more up-to-date data to calculate their earnings estimates. Other research by the first author (Hall, Horton, and Knoepfle 2017; Cook et al. 2018) confirms this author's access to up-to-date data. Given the importance of the debate around TNCs, we point to the political repercussions of presenting outdated driver earnings as if they were contemporarily relevant.[14]

Uber justified its 2015–16 rate cuts by telling drivers that price cuts stimulate demand and increase the volume of work. In the 2015 BSG survey, Uber drivers reported they were working more; only a minority of respondents associated increases in work volume with higher earnings. When the BSG survey asked (Q50): "Compared to your first few months driving for Uber, which of the following comes closest to how you feel about driving with Uber now?" Twenty-eight percent of respondents reported they were driving more but making less money overall; 21% indicated they were driving more just to make the same amount of money. Only 21% of respondents indicated they were driving more and making more money. (Thirty percent of drivers indicated they had not increased their amount of driving.)

Drivers' reports of increased hours worked without financial benefit is supported by other Uber-sponsored research including by Hall himself. One recent study determined that driver's short-term earnings shifted in the same direction as the fare change. In the long run, the study found "little change in the hourly earnings rate despite large changes in the base fare index [in 2015 and 2016 and that] only driver utilization (the time drivers spend working with a paying passenger in their car) seems to show a persistent change in levels" (Hall et al. 2017). Similar to Hall and Krueger, Hall et al. (2017) failed to account for driving-related costs, a problematic omission given the likely case that higher utilization results in higher mileage, and thus, increased expenditures and lower net earnings. Furthermore, if Hall and Krueger's unsubstantiated claim that drivers "can conduct personal tasks while the Uber app is turned on" (p. 721) is true, then increased driver utilization results in a loss of these earning opportunities following a fare decrease (similar claims made in Chen, Chevalier, Rossi, and Oehlsen 2017; Hall et al. 2017).

Flexibility

Throughout their article, Hall and Krueger reiterate that people are attracted to driving for Uber because of the flexibility it provides. One of

[13]According to Horan (2017), Uber drivers retained 77% of each passenger dollar in 2016, down from 82% in 2014–15.

[14]In January 2017, Uber agreed to pay a $20 million fine to the Federal Trade Commission for misleading drivers with inflated promises about potential earnings (Hook 2017).

Table 1. Distribution of Uber Drivers by Hours per Week and by Approximate Share of Hours Driven

Hours per week	*% UberX drivers, 2014*	*Approximate share of hours driven (%)*
1–15	51	19.9
16–34	30	36.6
35–49	12	24.6
50+	7	18.8

Source: Derived from Table 4, Hall and Krueger (2018).
Notes: We estimated the share of hours driven by multiplying the midpoint of the hours band by the percentage of Uber drivers and then dividing the share by total hours. For 50+, we calculated the hours at 55. We use 2014 data as their discussion in the article and their Figure 8 are based on 2014 data.

the pieces of evidence they give to support this argument is the high degree of variability in working hours. As they explain, "driver-partners vary the number of hours in which they use the Uber platform by a considerable amount from week to week" (p. 723).[15] Hall and Krueger's presentation of this evidence paints a distorted picture of working-hour variability. We critique the authors' claim that Uber provides flexible work opportunities and instead argue that workers' schedules are highly dictated by the availability of work and their financial dependence on income from Uber. Furthermore, Uber's practices to ensure a ready supply of drivers limit driver choice and control, undermining the flexibility that is extolled by the authors and the company alike.

Working-Hour Variability

Uber drivers have distinct profiles: those who drive short-hour "gigs" to complement other income sources and those who drive long hours, week after week, and rely on Uber as an important source of income. Although short-hour drivers constitute half of Uber's workforce, as a percentage of hours driven the smaller share of drivers who work more than 35 hours per week (19% according to Table 4 of Hall and Krueger's article) are critical for ensuring that Uber can provide a reliable service. Indeed, the 7% of drivers who work more than 50 hours per week account for approximately 19% of total Uber hours driven (Table 1). The proportion of this small but dedicated cohort is only one percentage point lower than the proportion of hours driven by short-hour gig workers who make up 51% of the total driving fleet.[16]

[15]Unlike the survey, which was restricted to active drivers, this analysis is based on data that include any driver who spent at least one hour on the Uber app in the initial week.

[16]Zatz (2016) also made this point, arguing that Uber's attention to its secondary workers is part of its strategy to prevent reclassification of its drivers as employees.

The information on share of hours driven is important for analyzing the data presented in Figure 8 of Hall and Krueger on variability of working hours. As variation is measured by the percentage change in total working hours between two given weeks, greater variation is likely among the short-hour segment of Uber drivers, which would skew the information presented in the figure. A driver who works 5 hours one week and 8 hours the next week would have a 60% variation, but one who drives 45 hours one week and 48 hours the next would have only a 7% variation. By merging full- and part-time drivers, Hall and Krueger present working-hour variation easily attributed to demand fluctuations caused by sports games, festivals, or adverse weather conditions as overly significant, which contributes to inflated estimates of flexibility.

Data from another Uber-affiliated study (Chen et al. 2017) shed additional light on the predictability of total driver hours worked. The authors present a transition matrix of hours worked in five-hour intervals ranging from zero hours to 50+ hours for a series of contiguous weeks. Their matrix confirms the distribution of working hours reported in Hall and Krueger, but it also reveals that while some variability occurs between weeks, short-hour drivers and long-hour drivers remain in their respective categories. Of those drivers who worked 50+ hours per week in week *t*, 47% of them worked 50+ hours in week $t+1$ (23% worked 46–50 hours; 14% worked 41–45 hours, and 9% worked 37–40 hours). Consistent, predictable patterns are also observed among drivers working more than 40 hours in week *t*, as well as among short-hour drivers, who typically remain in the short-hour bands. Thus, while total working hour predictability is greatest among the highest volume drivers, their research also reveals a clear pattern of drivers' tendency to work within a predictable band from one week to the next (Chen et al. 2017).

Driving for Hire: A Demand-Driven Service

Like other for-hire drivers, Uber drivers must work when there is a demand for their services. Chen et al. (2017) found high rates of work of Uber drivers during evenings and weekends, and that "an hour of labor supplied in the late evening/early morning hour, especially on the weekends is more remunerative than an hour of labor supplied during the day" (p. 15). The study also found that payouts are highest in periods when the reservation wage is high, indicating that late nights and early mornings are less desirable times for drivers to work (Chen et al. 2017). Research by Schor et al. (2017), based on interviews with Uber drivers, revealed that despite drivers' preference to work during the day, little work is available. They wrote, "The workday of a driver has a substantial vacuum of activity in the middle of the day, and the lost income will have to be recouped by driving when the app tells them there's demand. In many cases that means that they feel compelled to work outside of conventional office hours, e.g., weekends and late

evenings. Rather than freeing up time for family and social leisure activities, drivers have little work when everyone else is at work, and more when everyone else is free" (p. 33).

Financial Dependence on Income from Uber

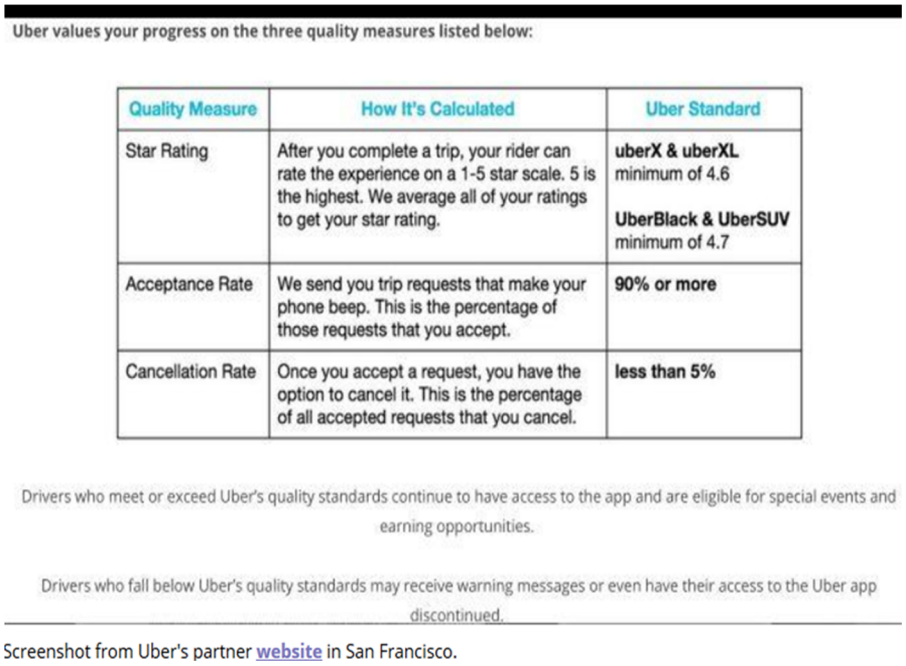
Drivers who are less financially dependent on Uber may be better able to balance work and non-work commitments; those who are most dependent on their income from Uber (ostensibly full-time drivers and those who have financed cars in order to drive for Uber) must drive when earning opportunities are high despite the occupational risks associated with night work. Financial woes of dependent drivers have increased because of Uber's fare decreases (or in some cases, increases of Uber's commission), lowering per-trip earnings and increasing pressure to drive more. As mentioned, the 2015 BSG survey found that of the drivers who report driving more, 70% were driving more for the same or less income (Q50). The BSG survey also revealed that 78% of respondents spend the money they earn from driving for Uber on essential items, such as rent, utilities, and debt. Likely included in this category are the 65% of Uber drivers who finance, lease, or rent their vehicles (2014: Q20). Many drivers acquire vehicles explicitly to drive for Uber, with one-quarter of Uber drivers stating they would have a less expensive vehicle or would not have a vehicle at all if they were not driving for Uber (2014: Q21). When Uber represents a significant or irreplaceable source of household income, driver scheduling decisions will be steered by those times when work is available, often at asocial hours.

Uber's Practices to Ensure a Ready Supply of Drivers

To meet demand for its services, Uber has designed its application to ensure a steady supply of drivers. In general, drivers are able to log on and off to the application, but once logged on they must adhere to Uber's regulations on the acceptance and cancellation of rides—constraints that effectively impede drivers from using more than one TNC application at a time. Although Uber's regulations vary by locality, drivers are constrained by how often they can decline or cancel rides (Figure 1; Rosenblat 2015). This process is all the more problematic given that drivers must accept rides prior to knowing the final destination of the passenger, making it hard to judge how much time it will take or how profitable the trip will be (Lee, Kusbit, Metsky, and Dabbish 2015; Rosenblat and Stark 2016).

Another tool that Uber employs to ensure a supply of drivers is *guaranteed earnings* incentives to work during specific times. Typically, these guarantees require drivers to work within specified hours, provide a pre-specified number of rides, and have a guaranteed acceptance rate—all aspects of company control that undermine driver flexibility (Figure 2; Rosenblat 2016).

Figure 1. Acceptance and Cancellation Criteria for Uber Drivers, San Francisco, 2015



Uber values your progress on the three quality measures listed below:

Quality Measure	How It's Calculated	Uber Standard
Star Rating	After you complete a trip, your rider can rate the experience on a 1-5 star scale. 5 is the highest. We average all of your ratings to get your star rating.	**uberX & uberXL** minimum of 4.6 **UberBlack & UberSUV** minimum of 4.7
Acceptance Rate	We send you trip requests that make your phone beep. This is the percentage of those requests that you accept.	**90% or more**
Cancellation Rate	Once you accept a request, you have the option to cancel it. This is the percentage of all accepted requests that you cancel.	**less than 5%**

Drivers who meet or exceed Uber's quality standards continue to have access to the app and are eligible for special events and earning opportunities.

Drivers who fall below Uber's quality standards may receive warning messages or even have their access to the Uber app discontinued.

Screenshot from Uber's partner website in San Francisco.

Source: Rosenblat (2015).

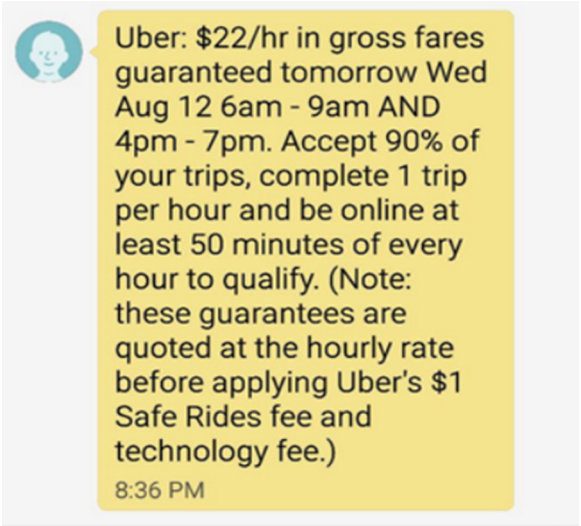
The tension between driver preference and economic need is what makes surge pricing, nudging,[17] and other incentives effective methods to lure drivers to their cars, and to keep them from logging off once they are driving (Scheiber 2017). According to Rosenblat and Stark (2016), "When Uber sets low rates for routine work, incentive-based pay steers drivers into working under much stricter and less flexible conditions in the hopes of higher earnings, such as hourly wage guarantees which vary according to the terms of each guarantee" (p. 3763). The authors explain that hourly guarantees are a way of scheduling shift work in order to ensure that drivers are available to meet consumer need at times of high demand. These practices may boost participation from part-time drivers; however, they serve as disciplinary and management tools for the full-time workforce who provide a disproportionate number of rides. Moreover, they undermine the flexibility that the authors and the company extoll.

Ratings

In their conclusion, Hall and Krueger introduce the issue of ratings, stating that "driver-partners are rewarded for having a good reputation, which

[17] *Nudging* is the dispatching of a subsequent ride before the completion of the current ride to encourage drivers to continue to work.

Figure 2. Example of Guaranteed Earnings Scheme



Source: Rosenblat (2016).

could lead Uber's driver-partners to earn more than taxi drivers" (p. 730).[18] Yet the authors' claim is unfounded; they do not provide evidence of how ratings improve workers' earnings. Moreover, their statement suggests that ratings are beneficial to Uber drivers despite qualitative studies (as discussed in more detail below) and the BSG survey, which reveal high levels of driver dissatisfaction with the ratings system. By asserting that ratings are beneficial to Uber drivers, Hall and Krueger ignore how worker rating systems are used as a tool of managerial discipline.

Most online platforms include rating systems, though the purposes of the ratings vary widely depending on the architecture of the platform. As Choudary (2017) explained, when online platforms allow workers to set their own prices, reputation systems can help workers get more business and higher earnings. For example, on Airbnb, reputation systems reward highly rated hosts with higher rankings on search results and greater market exposure, thus allowing them to increase their pricing. But on platforms such as Uber, where prices are fixed by the platform and services are standardized, reputation systems are instead used to remove poor performers from the ecosystem (Choudary 2017).

[18]The BSG survey did not ask drivers what their rating was, just like it did not ask about hours worked and earnings. However, the authors avail themselves of the administrative information on earnings per hour, but not of the administrative information on ratings. Had they, ratings could have easily been modeled in the earnings regression as an explanatory variable to assess the validity of their claim. In addition, a separate study by Hall and colleagues (Cook et al. 2018) that analyzed the gender pay gap among drivers did not include ratings in the regression analysis despite access to this information.

Uber's rating system performs a managerial assessment with passengers empowered to act as a middle manager (Rosenblat and Stark 2016). Alert functions notify drivers who are underperforming, and the rating system provides context for communicating desired behaviors to its drivers. For example, messages such as "You received a 'Talks too much' complaint" will direct drivers to a website that gives them advice on how to interact with riders (Rosenblat, Levy, Barocas, and Hwang 2017: 3). Additionally, Uber offers training videos giving advice to drivers who "aspire to 5-star ratings." Such advice encourages drivers to provide bottled water or phone chargers to passengers, to ask about music preferences or temperature, and to read social cues on whether the passenger wants to engage in conversation or not (Rosenblat et al. 2017), with drivers "perform[ing] emotional labor in exchange for ratings instead of tips" (Rosenblat and Stark 2016: 3775).

An important source of discontent among drivers is the difficulty they encounter in disputing low ratings they feel are undeserved. One problem with the rating system is that passengers may express their frustrations with the application, the fare (especially during surge pricing), or the route chosen by the application by rating the driver poorly—even though drivers have no control over these features of Uber (Raval and Dourish 2016; Rosenblat and Stark 2016). As is well known, drivers can be deactivated if their average ratings fall below a certain threshold, usually 4.6 or 4.7 on a 5-point scale. For drivers who have invested in a vehicle to be able to drive for the company, deactivation is a particularly daunting prospect.

Not surprisingly, Uber's rating system is a source of discontent among drivers. This finding has been documented in qualitative studies of Uber drivers (Raval and Dourish 2016; Rosenblat and Stark 2016; Rosenblat et al. 2017) and was also evident in the BSG survey, with 63% of drivers agreeing in 2014 with the statement "the rating system is unfair" (BSG 2014: Q52R8).[19]

In November 2017—three years after the first BSG survey was conducted—Uber updated its rating system by requiring passengers who rate drivers lower than 5 stars to select reasons why (e.g., GPS problems, traffic).[20] If the reason is for something that is out of the drivers' control, it will not be reflected in the driver's rating.

A Labor Market Analysis That Is Too Narrow

Hall and Krueger present their study as a labor market analysis of Uber drivers. We contend this perspective is too narrow; to fully understand the labor market for Uber drivers it is necessary to understand the interlinkages

[19]Q52R8 had 601 responses. The 2015 survey asked a different question on the ratings system, this time with a positive phrasing. "Now you will read some things people could say about Uber in particular. How well does this describe Uber?" Q23R24: "Has a fair rating system." Only one-third (269) of interviewees responded to this question. Of these, 52% responded that it describes Uber well and 31% stated it does not (15% were neutral and 2% responded don't know).

[20]See https://www.uber.com/newsroom/180-days-ratings/.

between TNCs and the overall market of FHVs. Indeed, the 2014 BSG survey revealed that of Uber drivers with additional employment, one in five is a black car or limo driver, one in six is a taxi driver, and one in ten worked for another TNC (2014 BSG: Q27). In addition, when asked what drivers would do if Uber were no longer available, 43% indicated that they would seek work as a taxi driver or for another TNC (Q32). Disruption in the FHV market affects the industry broadly as TNCs, taxis, and limos are competing services; segmenting the labor market as Hall and Krueger have done makes it impossible to fully understand the economic situation of FHV drivers, including those who drive for Uber.

In response, we offer a brief discussion of some aspects of the FHV market that should have been considered as part of Hall and Krueger's article, but were not. We examine how the reclassification of taxi drivers from employees to self-employed beginning in the 1970s created labor market conditions that facilitated Uber's market entry in the 2010s. This history is key to understanding the current situation of FHV drivers in the United States, including their working conditions and earnings. We then turn to the impact that Uber has had on FHV drivers in general, on medallion owners, and on the cities the FHV industry serves by examining the competitive strategies the company has employed to gain market share.

Leasing and the Transformation of America's Taxicab Labor Market

As noted earlier in this commentary, most taxicab drivers work as independent contractors. Despite Hall and Kruger's contention that drivers prefer being self-employed, a historical perspective reveals that this employment classification was not sought by drivers. Up until the late 1970s, taxicab garages hired drivers as employees, shared meter earnings, covered work-related expenses such as vehicle maintenance and gasoline, and frequently contributed to pension schemes and benefit plans negotiated by the drivers' unions.

In the mid-to-late 1970s, taxicab garages around the country began introducing the practice of leasing. While there were geographic variations in how the imposition of leasing occurred, the process was overwhelmingly involuntary and described as a move to disempower workers and destroy collective bargaining. For example, in 1976 in Minneapolis, Minnesota, taxicab drivers protested early measures to institute leasing, warning that lease drivers would "receive no pension, no insurance, nor vacation benefits, cannot receive unemployment compensation or workman's compensation, and still make less money on the street than commission drivers" and that the practice would destroy the strength of the drivers' unions.[21]

In 1975, drivers in Arlington, Virginia, reported similar objections to leasing in a newsletter article describing that of all the drawbacks of leasing, the

[21]Larry Wieland, Guild of Taxi Drivers and Associated Workers, 1975.

"worst blow" was the dissolution of the employee–employer relationship. "First, the lease has the driver agreeing 'that there does not exist between them (AYC[22] and drivers) the relationship of employer–employee . . . either express or implied, but that the relationship of the parties hereto is strictly that of lessor–lessee.' The company has obviously hired a smart labor lawyer because the National Labor Relations Act specifically excludes independent contractors from coverage by the protections of the NLRA" (emphasis in original).[23] Similar trajectories and timelines occur in New York City and San Francisco markets, both of which shifted to a leasing model by the late 1970s. Once drivers were no longer considered employees but instead self-employed independent contractors, taxi unions around the country systematically lost their right to collective bargaining (Dubal 2017).

Like the FHV industry as a whole, Uber's business model hinges on classifying drivers as independent contractors. Hall and Krueger state that "historically, independent contractors have reported in surveys that they prefer their working arrangements to traditional employment relationships" (p. 707), yet the historic reality of the reclassification of taxi drivers as independent contractors does not support this assertion.

Effect of TNCs on FHV Drivers

Though taxicab drivers suffered with the introduction of leasing, by being forced to take on many of the expenses associated with operating taxicabs (gasoline and tolls, for example) and to bear all financial risks, the entrance of TNCs into the FHV market has made FHV drivers' situation worse.

With some exceptions, most local taxi markets have been regulated through the issuing of medallions or taxi licenses. These licenses served two related purposes: to deter congestion by limiting the number of FHVs on the road and to restrict supply so that a decent income could be earned from driving a cab or limo. The entrance of TNCs such as Uber has created more competition among taxi and other FHV drivers, and despite increases in overall ridership, the oversupply of drivers points to a decrease in FHV driver earnings. In San Francisco, for example, the average number of trips for the city's 1,812 registered taxicabs decreased 65% between 2012 and 2014 (Garber 2014); although earnings data are difficult to obtain for a myriad of reasons discussed earlier, for individuals who drive on a full-time basis, a two-thirds decrease in the number of trips undoubtedly decreases earnings. During roughly the same period, 11,000 Uber drivers were added to San Francisco's streets (Rodriguez 2015), and a more recent study estimated the total number of TNC drivers at 45,000 with most rides occurring at and contributing to peak congestion (SFCTA 2017). These indications support the findings of the 2015 BSG survey, mentioned earlier, whereby 49% of Uber drivers report they are driving more for less or the same

[22]Arlington Yellow Cab.

[23]"Arlington Yellow 'Yellow Dog' Drivers," 1976.

amount of money. In addition, in response to an open-ended question asked of Uber drivers on why they expected their income from Uber to decrease, 142 drivers (34% of 417 respondents, Q47) stated it was because there were "too many drivers on the road."

Notwithstanding increases in congestion and the negative effect that too many drivers has on the earnings of taxi and full-time TNC drivers, Uber has resisted implementing a cap on the number of vehicles (Borkholder, Montgomery, Chen, and Smith 2018). Uber's impact on congestion and competition undermines the ability of FHV transport jobs to provide decent income to drivers—factors that led to taxi regulations and limits on the number of vehicles on the streets of cities such as New York in the first place. Though these observations are disregarded by the authors, they were not lost on New York City driver Doug Schifter, who ended his life in early 2018 on the steps of City Hall after publicly posting the following: "There was always meant to be numbers of cars below the demand. That was the guarantee of a steady income. Now the politicians have flooded the streets with unlimited cars and some 3000 new ones every month still coming. There is not enough work for everybody that pays a living. They are destroying many thousands of families financially."[24]

The company's disinterest in instituting a vehicle cap likely reflects its business model whereby profits are derived from the number of rides and associated fares. As Bhairavi Desai, executive director of the New York Taxi Workers Alliance, explained, unfettered access is not good for drivers: "The more [Uber] cars there are covering the streets, especially during prime times, the better the chance Uber has to deduct a commission off of the fare for themselves. So each individual driver will be earning less money, but Uber's profit goes up" (Chen 2015). Uber has not uniformly disrupted monopolies; Uber is trying to create a new one.

TNC Impact on Medallion Owners

Lease drivers predominate in most urban taxi markets, but a small number of workers own their taxicabs and the permits to operate them. The losses experienced by these workers since the arrival of TNCs (Hu 2017) should be considered in analyses of the benefits of Uber.[25] In April 2014, New York City unrestricted medallions were selling for as much as $1.024 million; by November 2017, unrestricted medallion prices had fallen to the $130,000 to $500,000 range. Moreover, unrestricted medallion foreclosures nearly tripled in 2017, as compared with 2015. Chicago has experienced similar

[24]From Doug Schifter's Facebook page; see also Bellafante (2018), https://www.nytimes.com/2018/02/06/nyregion/livery-driver-taxi-uber.html. Between January and July of 2018, six New York City drivers committed suicide; financial distress has been cited repeatedly as a contributing factor.

[25]According to Horan (2017), only New York, Boston, and Chicago have ever seen medallions with any significant value.

trends, with the median price of medallions falling from a high of $340,000 in early 2014 to $42,000 in late 2017.

Uber's narrative suggests that the negative effects of disrupting the medallion system are experienced exclusively by privileged monopolists who control large shares of the market. But across the country, medallion ownership regulations differ, with many jurisdictions promoting driver ownership and creating barriers to the financialization of the taxi industry fueled by private medallion sales. For example, in Trenton, New Jersey, taxicab permits are non-transferable (Mathew 2008), and for decades San Francisco explicitly sought to ensure that active drivers held taxi medallions. San Francisco described Proposition K (1978–2007) as follows: "Medallions are not transferable, and the medallion holder is required to drive a minimum number of hours every year in order to retain the right to keep the permit (. . .). If the medallion holder does not drive sufficient hours, the permit can be taken away by the City and given to the next person on the waiting list for a medallion" (SFMTA 2017). In these cases, regulatory oversight can ensure driver control as well as income for the city when new medallions are issued or transferred.

Market Externalities and Predatory Pricing

Medallion owners, including driver-owners, are not the only losers when taxi market regulation is dismantled. In some cities, stakeholders include the public writ large. When FHVs are treated like a private industry operating for public good, regulators can institute additional fees and charges that can be used for broader public interest. In New York, for example, a tax of 50 cents per taxi ride is remitted to the city in support of public transit, which corresponded to a 2014 MTA payment of $87.5 million; in 2015, as a result of competition with TNCs, yellow cab trips decreased by more than 52,000 per day and resulted in an annual loss of MTA fares of nearly $9.5 million.[26] Similarly, a 30-cent charge per taxi ride is included in all fares to help offset the cost of making New York's taxi fleet more accessible to people with disabilities. Although some cities have instituted similar fees for TNCs, Uber has at times lobbied against these measures (Pasick 2015; Anderson 2017). Unfettered TNC growth can also lead some riders to migrate from public transportation to TNCs, undermining the use and sustainability of public transportation (Rayle et al. 2016).

Hall and Krueger document the exponential growth of Uber, noting that the number of drivers doubled every six months from the middle of 2012 to the end of 2015, which they argue reflects Americans' desire for flexible working arrangements. But another factor explains its tremendous growth: predatory pricing. The Uber model has rested on setting fares at below cost to attract customers and to undercut competition from other FHVs.

[26]Calculated from total taxi trips, as reported in the 2016 NYC Taxicab Fact Book (DeBlasio and Joshi 2016).

Transportation industry expert Huber Horan (2017) estimated that in 2015 Uber passengers were paying only 41% of the actual cost of their trips. Investor money has subsidized these losses, while bonuses and other incentives have been used to attract drivers (Sommerville 2017). As Horan (2017) explained,

> The growth of Uber is entirely explained by massive predatory subsidies that have totally undermined the normal workings of both capital and labor markets. . . . the price signals that allow drivers and customers to make welfare maximizing decisions have been deliberately distorted, and the laws and regulations that protect the public's interest in competition and efficient urban transport have been seriously undermined. Absolutely nothing in the "narrative" Uber has used to explain its growth is supported by objective, verifiable evidence of its actual competitive economics. (pp. 34–35)

Uber's strategy has also rested on extensive lobbying efforts at the state level that have led to state laws that strip municipalities of the ability to regulate TNCs, while retaining regulations on the taxi industry.[27] According to Borkholder et al. (2018), 41 states have passed laws removing some or all of local governments' ability to set industry standards for TNC services. This move has not only undermined the ability of local regulators to develop transportation frameworks suited to the particular needs of local markets but has also hurt drivers. As Johnston (2017) explained, local taxi regulatory bodies have served as an avenue for traditional taxi drivers to negotiate some of the terms and conditions of their work despite their independent contractor status. The viability of this approach, however, is predicated on the existence of industry oversight.

Summary: Context Is Crucial

There is ample room to improve working conditions and remuneration in the FHV sector, including taxis. Hall and Krueger's conclusions—that Uber drivers are happy and earn well—are devoid of historical context, disregard TNC impact on the larger FHV sector, and ignore market externalities. Labor market analyses used for policy purposes should fully explain the labor market, and a proper analysis requires institutional context. This element is notably absent from their research. We do not offer a full history of FHV services in the United States, nor would we expect that from Hall and Krueger, but evaluating what on-demand labor markets mean for the future of work, as the authors portend to do, requires that Uber be situated squarely within the ecosystem of FHV transportation services. It requires understanding the history that bore the current conditions, as well as analysis of the (anti)competitive practices Uber has used to gain market share

[27]In 2017, the firm spent $1.8 million in lobbying for a statewide TNC bill in New York (Blain 2017) and $392,000 in Florida where a statewide bill legalizing TNC services passed (Ceballos 2017). In 2016, the firm spent $1.36 million lobbying at the federal level (Zanona 2017).

and the consequences of these practices. Segmenting the labor market, as the authors have done, disregards the impact that one subsector has upon another—a significant oversight given that many Uber drivers work for multiple FHV services simultaneously. An analysis that is too narrow also deflects discussion of market externalities and social dumping. It entrenches the taxis vs. Uber debate and stifles inquiry into the larger questions that researchers and policymakers should be asking: What sort of regulation of FHVs, including TNCs, is best for local urban transport markets? How can we improve working conditions of FHV drivers, including TNCs? Is there anything new about on-demand work?

Conclusion

Hall and Krueger's article has been cited in committee hearings of the U.S. Congress,[28] at a Federal Trade Commission workshop on the sharing economy,[29] on the California State Treasurer's website (as part of "peer-reviewed" work),[30] and likely in other policy venues. The regulatory questions are not settled, and articles published in scientific journals can skew policymakers' opinions.

Yet the article by Hall and Krueger, and the survey it is based on, are fraught with methodological problems—sample bias, leading questions, incomplete reporting of findings, flawed earnings calculations, unsubstantiated claims, and outdated data. These limitations do not restrain the authors from asserting their findings confidently, nor has it restrained the company from using these findings in support of its position in political and regulatory debates. The authors advance corporate claims of flexibility, extoll the benefits of driver ratings, and champion the "be your own boss" narrative without offering evidence to support their claims or to refute the growing body of literature that is critical of the on-demand labor practices of Uber and other similar companies.

What is most troubling about this article is that the authors have access to the information that would have allowed them to present not only a more timely analysis but a more rigorous one. Unfortunately, they do not. In a prescient article published in *Science* on computational social science, Lazer and colleagues (2009) warned "there might emerge a privileged set of academic researchers presiding over private data from which they produce papers that cannot be critiqued or replicated. Neither scenario will serve the long-term public interest of accumulating, verifying, and disseminating knowledge" (p. 721). It seems this concern has come to pass.

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[28]United States Congress, March 29, 2016; United States Congress, May 24, 2016.

[29]See https://www.ftc.gov/news-events/events-calendar/2015/06/sharing-economy-issues-facing-platforms-participants-regulators.

[30]See http://www.treasurer.ca.gov/newsletter/2017/201701/column.asp.

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