

Academic Writing in Economics

How to sell your papers?

Paper as a Sales Pitch

Research impact = *quality* × *coverage*

- coverage needs "promotion"
- The paper manuscript is the sales pitch for your research
- Through your paper, you want to:
 - capture attention
 - incite citations and applications
 - invite collaboration and ideas for future research

Paper as a Sales Pitch

sales pitch = value proposition

- As a sales pitch, the paper's most important job is to clearly define the **value added** to the readers
- Research **value added** = contribution = novelty \times significance
- Any paper has to answer two main questions:
 - How is it new?
 - Why should the readers care?
- And it needs to answer them quickly (abstract and the first page)

Research contribution: Novelty

Novelty is most often motivated by research gaps

- New research question: why no one has asked this question?
- New methodology: old methods cannot handle certain cases
- New data: old data are small or limited in scope
- New context: old context only looks at developed countries

Research contribution: Significance

- How different the results are to the old results?
- Research implications
 - do the empirical results help confirm, reject, or extend existing models
 - do the theory help explain/reconcile existing unexplained real-life data or phenomena
- Policy/managerial implications
 - Based on the results, how should policy makers/managers/social workers react?

Research contribution: Positioning

- Something could be new and important to one field but outdated or inconsequential in another field
- Choose your audience
 - There can be multiple sets of audience; but best to pick one to be the "target" audience
 - This will also influence the journals/outlets you want your paper to be published
- Tailor the writing to the target audience - cite their papers, explain how this paper is related to their papers

Research contribution: Do's and Dont's

- Don't include results that are not value-added
- Keep the main message short and clear and position it at the beginning of the paper
- All the caveats or extensions or robustness checks can be added later at the end of the paper or the Appendices
- Make references and connection to existing literature

A typical economics paper structure

- **Abstract**
- **Introduction (Motivation)**
- Background/Literature Review
- Theoretical/Empirical Framework
- Results/Discussion
- Extensions/Robustness checks
- Summary and Concluding remarks

A typical economics paper structure

- Abstract is the most read section of any paper; Introduction is the second most read
- In both abstract and introduction, clearly state your contribution
- In introduction
 - define your research question
 - explain why it is new and important
 - explain how it is related to one or a few branches of literature
 - summary of key results and implications

Beyond paper writing

- Give presentations early and often
- Incorporate feedbacks continuously
- Rewrite constantly
- Come up with a punchline/hook for your paper: one or two sentences that are catchy/provoking about your paper results
- Give presentations often and continuously

Example: the tale of two papers

Thakral, Neil, and Linh T. Tô. "Daily labor supply and adaptive reference points." *American Economic Review* 111.8 (2021): 2417-2443.

vs.

Duong, Hai Long, Junhong Chu, and Dai Yao. "Taxi drivers' response to cancellations and no-shows: New evidence for reference-dependent preferences." *Management Science* 69.1 (2023): 179-199.

Context

- Do people work more when wage is higher?
 - Classical theory: yes, because the opportunity cost of not working is higher
 - Reference-dependent preferences: no, because workers may reach their income target sooner
- Conflicting evidences from literature
- Thakral & Tô: new model to reconcile conflicting evidences
- Duong et al.: more credible evidences in support of Reference-dependent preferences

Target audience

- For Duong et al., we have tried QJE, AER, Restud, AEJ-Policy, Restat, PNAS, and Management Science
- We were considering two different core audience: labor economics, and platform economics; ended up with labor economics-oriented paper

Abstract

Daily Labor Supply and Adaptive Reference Points[†]

By NEIL THAKRAL AND LINH T. TÔ*

research question

This paper provides field evidence on how reference points adjust, a degree of freedom in reference-dependence models. Examining this in the context of cabdrivers' daily labor-supply behavior, we ask how the within-day timing of earnings affects decisions. Drivers work less in response to higher accumulated income, with a strong effect for recent earnings that gradually diminishes for earlier earnings. We estimate a structural model in which drivers work toward a reference point that adjusts to deviations from expected earnings with a lag. This dynamic view of reference dependence reconciles conflicting "neoclassical" and "behavioral" interpretations of evidence on daily labor-supply decisions. (JEL J22, J31, L94)

contribution

Taxi Drivers' Response to Cancellations and No-Shows: New Evidence for Reference-Dependent Preferences

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Received: May 14, 2021

Revised: September 7, 2021

Accepted: October 5, 2021

Published Online in *Articles in Advance*:
■■■■ ■■, 2022

<https://doi.org/10.1287/mnsc.2022.4349>

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Abstract. ^{research question} We study how daily labor supply responds to unanticipated earnings shocks among Singapore's taxi drivers using a ^{contribution} novel identification strategy that uses idiosyncratic variation in booking cancellations and passenger no-shows (CNS) that drivers repeatedly receive. Our results ^{contribution} provide new and more compelling evidence in support of the income-targeting model of labor supply. Not only are the average responses on the extensive margin consistent with the income-targeting model, but the responses on the intensive margin and the heterogeneous responses at different income levels and across driver characteristics are as well. We find that drivers work longer and earn more per hour following CNS, and the effects are robust after controlling for rich fixed effects, market supply and demand conditions, and drivers' sunk cost of time. The CNS effects on ending a shift exhibit a U-shaped pattern, are strongest when cumulative income is close to the average shift income, and become insignificant when the income level is too low or too high. The effects are most pronounced in the first hour of CNS and fade away quickly afterward. Drivers achieve higher productivity by reducing break time, taking more jobs, driving faster, driving to places with more earning opportunities, and having more time with passengers on board. Drivers choose the response strategies that are complementary to their abilities and circumstances such as schedule flexibility and potential for productivity improvement: those with flexible working schedules tend to prolong their shifts, whereas those with flexible earnings rates tend to increase their subsequent productivity. ^{contribution} Our novel identification strategy strengthens the empirical literature on daily labor supply, and our findings of heterogeneity effects offer new insights on income-targeting behaviors.

History: Accepted by Matthew Shum, marketing.

Funding: This work was supported by a Singapore Ministry of Education Social Science Research Thematic Grant [Grant MOE2016-SSRTG-059].

Supplemental Material: Data and the online appendices are available at <https://doi.org/10.1287/mnsc.2022.4349>.

Introduction Section

Daily Labor Supply and Adaptive Reference Points[†]

By NEIL THAKRAL AND LINH T. TÔ*

This paper provides field evidence on how reference points adjust, a degree of freedom in reference-dependence models. Examining this in the context of cabdrivers' daily labor-supply behavior, we ask how the within-day timing of earnings affects decisions. Drivers work less in response to higher accumulated income, with a strong effect for recent earnings that gradually diminishes for earlier earnings. We estimate a structural model in which drivers work toward a reference point that adjusts to deviations from expected earnings with a lag. This dynamic view of reference dependence reconciles conflicting "neoclassical" and "behavioral" interpretations of evidence on daily labor-supply decisions. (JEL J22, J31, L94)

In the neoclassical economic model of labor supply, individuals choose hours of work to trade off the utility of additional income against the disutility of additional effort. Based on an analysis of daily decisions about work hours among New York City (NYC) taxi drivers, Camerer et al. (1997) proposes the alternative hypothesis that drivers quit working upon reaching a target level of earnings. An ongoing debate since then focuses on the question of whether workers exhibit such reference-dependent behavior with respect to daily earnings.

The broader question of what determines the reference point poses a challenge for evaluating the importance of reference dependence in any given setting. The highly influential work on prospect theory by Kahneman and Tversky (1979) describes the implications of the existence of a reference point but leaves the reference point itself largely unspecified. In an attempt to discipline the theory, Kőszegi and Rabin (2006) endogenizes the reference point through assuming that it coincides with recent expectations. Even under this perspective, there remains an implicit degree of freedom in the theory—the speed of adjustment of the reference point—which can substantially affect its empirical predictions.

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[†]Go to <https://doi.org/10.1257/aer.20170768> to visit the article page for additional materials and author disclosure statements.

Understanding whether labor-supply behavior exhibits reference dependence requires both detailed data and an operational model of what the reference point is. This paper uses comprehensive trip-level data on all NYC cab fares in 2013 to identify the timing of reference-point effects. We find that the key income-related determinant of the decision to stop working is recent earnings, not daily earnings, and the reference-point effects gradually diminish for earnings accumulated earlier in the day. To interpret the results, we offer a conceptual framework that emphasizes the role of reference-point adaptation and we structurally estimate the model. By characterizing the dynamics of reference points in the context of daily labor-supply decisions, this paper provides field evidence on a degree of freedom in one of the central models of behavioral economics (Della Vigna 2009). The framework also helps to organize, explain, and reconcile conflicting interpretations of previous evidence.

We present a model of reference-dependent preferences with an adaptive reference point. The formalization provides a way of capturing the following intuition which conveys our main findings: people overreact to surprises, as they work less in response to higher accumulated earnings, but surprises wear out over time, so that quitting depends to a greater extent on more recent earnings. Our formulation nests the neoclassical model as well as static income targeting. At one extreme lies a reference point that adjusts instantaneously, which produces behavior that coincides with the neoclassical prediction, and at the other extreme lies a fixed reference point. Neither extreme case permits stronger reactions to more recent experiences. In the intermediate case, the reference point exhibits some degree of persistence or stickiness, with decreasing weights on lagged values of the reference point. This slow-adjusting reference point incorporates earlier earnings to a greater extent than more recent earnings, thus accounting for the gradually diminishing effect of earnings on quitting.

To identify the timing of reference-point effects, we use data consisting of over 170 million trips from over 40,000 NYC cabdrivers to estimate how income accumulated at different times influences the decision to stop working. Isolating variation in earnings requires flexibly controlling for factors influencing the value of quitting, including cumulative daily work hours. The data enable us to obtain, as a function of how long a driver has been working, the marginal effect of earnings accumulated during different hours of a shift on the decision to quit. An empirical Monte Carlo exercise validates our estimation approach.

We find strong income effects for recent earnings—despite the fact that higher recent earnings predict better opportunities from continuing to work—and behavior that appears neoclassical in response to earnings accumulated earlier in the day. Overall, for a driver who finishes a trip after 8.5 hours of work, a 10 percent increase in accumulated daily earnings corresponds to a 3 percent increase in the probability that he stops working for the day. The effect size changes to 10 percent if the additional earnings come in the most recent hour and gradually declines for earnings accumulated earlier. Earnings from the first four hours have little or no effect on the decision of whether to end a shift at 8.5 hours.

To quantify the speed of adaptation of the reference point, we estimate a structural model of daily labor supply. The model enables us to examine alternative specifications of the reference point in more detail. Crawford and Meng (2011) provide evidence that drivers' expectations of daily earnings as determined by past outcomes

serve as the reference point. The adaptive reference point we propose reduces to their beginning-of-day expectation of daily earnings in the special case that the reference point does not adjust within the day. Maximum likelihood estimates of the model confirm that an intermediate degree of adaptation provides a better fit for the patterns in the data: the reference point adjusts to incorporate about 40 percent of a shock to earnings within one hour and about 90 percent within four hours. As an alternative specification of the reference point that also accommodates within-day updating, we consider forward-looking reference points based on a one-period lag of expectations (Kőszegi and Rabin 2006, 2009) under different definitions of the lag (e.g., previous trip instead of previous day). Adopting a discrete view of how the reference point adjusts would produce a stark contrast between the most recently accumulated earnings, which the reference point does not incorporate, and any earlier earnings, which the reference point does incorporate. The data instead show a gradual decline in the influence of less recent earnings on stopping decisions, and we find that earlier lags remain important for explaining the patterns we observe. In this sense, one can view our framework as extending the Kőszegi and Rabin model by allowing for a gradual adjustment of the reference point.

To put our findings in perspective, we review the previous work on reference dependence in labor supply. The earliest work focuses on estimating daily wage elasticities on the intensive margin for cabdrivers, uncovering a negative relationship between average wages and the number of hours worked each day (Camerer et al. 1997, Chou 2002). To explain the puzzling finding of a backward-bending labor-supply curve, Camerer et al. (1997) argues that a cabdriver's marginal utility of income must drop sharply around the level of average daily income due to loss aversion, resulting in a probability of quitting for the day that rises substantially when a driver gets near their target.¹ Due to econometric problems with estimating daily wage elasticities, Farber (2005) tests for reference dependence by using a hazard specification to examine directly whether stopping decisions respond to accumulated daily earnings.² Despite finding a positive association between accumulated daily earnings and the probability of ending a shift conditional on hours worked, qualitatively consistent with reference dependence, Farber cannot reject the neoclassical null hypothesis with these data.³

¹Chou (2002, p. 30) lacks data on hourly wages but points out that with such data, "income targeting may be tested more rigorously ... utilizing a hazard specification" in which "the probability that a driver quits for the day at any point in time may be parameterized as a function of the cumulated income and the expected marginal wage ... Short-horizon targeting predicts that quitting is related to cumulative same-day income ..."

²Camerer et al. (1997) instruments for a driver's average wage on a given day with summary statistics of the distribution of other drivers' wages on the same day to address potential concerns about division bias (i.e., that average hourly wages are obtained from dividing daily income by hours, so measurement error in hours can lead to a spurious negative relationship between wages and hours). However, as Farber (2005) points out, the instrumental-variables (IV) approach does not purge the elasticity estimates of day-specific factors that affect both wages and aggregate labor supply. In addition, as Camerer et al. acknowledges, estimating a daily wage elasticity requires that wages vary across days but remain relatively constant within days; Farber (2005) disputes the premise of relatively constant within-day wages. We also document how within-day variation in wages can lead to biased estimates (see online Appendix B).

³Farber (2008) estimates a structural version of the stopping model, which consists of a latent underlying distribution of daily income targets and accommodates a threshold effect of exceeding the income target, and concludes that the variation in driver-day targets leaves the model with little predictive value despite finding a threshold effect. Crawford and Meng (2011) uses the same data to estimate a structural stopping model that allows for reference dependence in both daily income and hours, where drivers' expectations of daily income and hours based on previous shifts determine the driver-day targets following the ideas from Kőszegi and Rabin (2006), and conclude that the data support this model.

significance

The availability of large-scale administrative data since then provides an opportunity to settle these unresolved issues. Farber (2015) uses a sample of 13 percent of all NYC cabdrivers between 2009 and 2013 to revisit the earlier studies and test a model of reference dependence with a fixed daily income target. Applying the previous approaches to the comprehensive new dataset leaves a puzzle, as some evidence of income-targeting behavior emerges. Farber (2015) finds that negative wage elasticities appear for one-third of day-shift drivers and one-seventh of night-shift drivers, and accumulated daily income has a small but statistically significant influence on the decision to quit working during day shifts.⁴ The modest evidence for the presence of reference dependence raises the possibility of misspecification of the reference point as a potential explanation, especially in light of theoretical work describing the reference point as “recent expectations” (Kőszegi and Rabin 2006, 2009).

significance

A dynamic view of reference dependence helps to resolve some of the conflicting perspectives in the literature on labor supply. Existing work on daily labor supply using observational and experimental data in a variety of settings yields mixed results.⁵ Previous research implicitly tends to offer a binary characterization of behavior, with a negative wage elasticity corresponding to daily income targeting and a positive wage elasticity corresponding to the neoclassical model, or a positive marginal effect of accumulated earnings on stopping corresponding to daily income targeting and a null effect corresponding to the neoclassical model. By emphasizing reference-point adaptation, our model describes the extent to which workers exhibit neoclassical behavior through the speed of adjustment. Our results point toward the relevance of a component of the utility function pertaining to recent expectations in addition to all the forces embedded in the neoclassical model. Neglecting the importance of recency in forming the reference point can lead to misspecification in tests of reference dependence. For example, small effects of accumulated daily income on cabdrivers’ quitting decisions (Farber 2005, 2015) and substantial variation across shifts in their estimated reference income levels (Farber 2008) would suggest a limited role for reference dependence under the assumption of a daily-level income target as the reference point.⁶

significance

Our investigation of labor supply also reveals lessons about models of reference dependence. While some lab experiments find evidence of forward-looking, expectations-based reference points following Kőszegi and Rabin (2006), other recent experiments yield mixed results.⁷ Existing empirical tests of reference

⁴Morgul and Ozbay (2014) uses the full set of over 30,000 drivers in four separate months of 2013 to revisit the earlier studies as well, finding a negative wage elasticity for the month of January as well as a positive relationship between daily earnings and stopping conditional on hours during all four months.

⁵Papers using observational data that find negative wage elasticities include Ashenfelter, Doran, and Schaller (2010); Doran (2014); and Schmidt (2018) on taxi drivers in NYC; Chang and Gross (2014) on pear packers in California; Agarwal et al. (2015) on taxi drivers in Singapore; and Nguyen and Leung (2013) on swordfish fishermen in Hawaii. Those finding positive wage elasticities include Jonason and Wällgren (2013) on taxi drivers in Stockholm and Stafford (2015) on lobster fishermen in Florida. Also see field experiments by Fehr and Goette (2007); Andersen et al. (2018); and Dupas, Robinson and Saavedra (2020).

⁶Similarly, designing a field experiment to test reference dependence by inducing unexpected cash windfalls in the morning (Andersen et al. 2018) makes use of the assumption of a daily-level income target, but a null effect on aggregate labor supply would not reject expectations-based reference dependence if the reference level adjusts during the day.

⁷See Abeler et al. (2011); Ericson and Fuster (2011); Banerji and Gupta (2014); Karle, Kirchsteiger, and Peitz (2015); and Sprenger (2015); but also see Heffetz and List (2014); Gneezy et al. (2017); and Cerulli-Harms, Goette, and Sprenger (2019).

dependence tend to assume a particular view of what constitutes the reference point, including how quickly the reference point adapts to experimental manipulations in the context of lab studies. Motivated by this observation, Heffetz (2021) argues that changing the reference point requires a “sense of internalization” of updated expectations, related to the idea that realization of gains or losses leads to reference-point updating (Imas 2016).⁸ Our paper contributes to this line of work by characterizing the precise timing of reference-point effects. We evaluate a reference point based on a one-period lag of expectations but find support for further history dependence in modeling the reference point. The results complement existing evidence on the importance of past outcomes in shaping the reference point in various domains such as housing demand (Simonsohn and Loewenstein 2006), risky choice (Post et al. 2008), and job search (Della Vigna et al. 2017), which we return to in the concluding section.

The paper proceeds as follows. The next section provides background information on the institutional context and describes the data. Section II analyzes the impact of accumulated daily earnings on labor supply and discusses possible explanations for the results. Section III presents a model of loss aversion with an adaptive reference point along with structural estimates. Section IV concludes.

I. Data

A. Background

Our study uses trip-level data provided by the NYC Taxi and Limousine Commission (TLC) for every fare served by NYC medallion taxicabs in 2013. The “trip sheets” consist of detailed information about each fare, including anonymized identification numbers for the driver and car, start and end times for each trip, pick-up and drop-off locations, tips paid by credit card, and the fare charged. These data are collected and transmitted electronically in accordance with the Taxicab Passenger Enhancements Project (TPEP). Haggag and Paci (2014) and Farber (2015) provide further details about the data, with the former using data from 2009 and the latter using data from 2009–2013.

Prior to TPEP, cabdrivers were required to fill out trip sheets by hand to record and store information on paper about each fare. By 2008, all medallion taxicabs in NYC had implemented a series of technology-based service improvements (e.g., credit/debit card payment systems, passenger information monitors, and text messaging between the TLC and drivers) due to a March 2004 mandate by the TLC Board of Commissioners, which also led to automated trip sheet data collection. Relative to the earlier handwritten trip sheets, the electronically transmitted data also include Global Positioning System (GPS) coordinates for pick-up and drop-off locations, available for over 98 percent of the trips.

For each trip at the standard city rate (i.e., within the city limit), the meter computes the fare by combining a base rate of \$2.50, any surcharges, and an incremental charge of \$0.50 for each unit of distance (0.2 miles at a speed of at least 12 miles

⁸Some recent lab evidence also explicitly considers the speed of reference-point adjustment (Gill and Prowse 2012; Song 2016; Baucells, Weber, and Welfens 2011).

Taxi Drivers' Response to Cancellations and No-Shows: New Evidence for Reference-Dependent Preferences

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Received: May 14, 2021
Revised: September 7, 2021
Accepted: October 5, 2021
Published Online in Articles in Advance: ■■■■■ ■■■, 2022
<https://doi.org/10.1287/mnsc.2022.4349>
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Abstract: We study how daily labor supply responds to unanticipated earnings shocks among Singapore's taxi drivers using a novel identification strategy that uses idiosyncratic variation in booking cancellations and passenger no-shows (CNS) that drivers repeatedly receive. Our results provide new and more compelling evidence in support of the income-targeting model of labor supply. Not only are the average responses on the extensive margin consistent with the income-targeting model, but the responses on the intensive margin and the heterogeneous responses at different income levels and across driver characteristics are as well. We find that drivers work longer and earn more per hour following CNS, and the effects are robust after controlling for rich fixed effects, market supply and demand conditions, and drivers' sunk cost of time. The CNS effects on ending a shift exhibit a U-shaped pattern, are strongest when cumulative income is close to the average shift income, and become insignificant when the income level is too low or too high. The effects are most pronounced in the first hour of CNS and fade away quickly afterward. Drivers achieve higher productivity by reducing break time, taking more jobs, driving faster, driving to places with more earning opportunities, and having more time with passengers on board. Drivers choose the response strategies that are complementary to their abilities and circumstances such as schedule flexibility and potential for productivity improvement: those with flexible working schedules tend to prolong their shifts, whereas those with flexible earnings rates tend to increase their subsequent productivity. Our novel identification strategy strengthens the empirical literature on daily labor supply, and our findings of heterogeneity effects offer new insights on income-targeting behaviors.

History: Accepted by Matthew Shum, marketing.
Funding: This work was supported by a Singapore Ministry of Education Social Science Research Thematic Grant [Grant MOE2016-SRRTG-059].
Supplemental Material: Data and the online appendices are available at <https://doi.org/10.1287/mnsc.2022.4349>.

Keywords: reference-dependent preferences • income targeting • negative shocks • labor supply • productivity • taxi drivers

1. Introduction motivate by referencing a debate

Despite being a building block for many economic models and playing an imperative role in the design of numerous public policies and industrial practices, the characterization of labor supply is still an ongoing debate in economics. The two competing theories are the neoclassical labor supply model, which predicts temporal substitution of leisure for labor when wage rises, and the reference-dependent preferences theory, which predicts that workers have a target level of income, which, together with loss aversion, motivates them to work harder when wages are lower. Empirical studies have shown mixed results, sometimes even in the same setting. A prominent example is the taxi industry, where seminal work by Camerer et al. (1997) and more recent papers, such as Crawford and Meng

(2011), Martin (2017), and Thakral and Tô (2021), found evidence for drivers' daily income target. However, other studies, such as Farber (2005, 2015), found stronger support for the neoclassical model.

To reconcile these mixed results, Kőszegi and Rabin (2006) proposed a model of reference-dependent preferences that formalizes the notion of income targeting while allowing for neoclassical behaviors to exist under certain circumstances. The model's key insight is that sophisticated workers can form their target rationally; for them, reference dependence only matters if the variation in wages is unanticipated, because they will adjust their targets in response to anticipated changes in a manner that is consistent with the neoclassical model. Therefore, the key to identifying income-targeting behavior is whether income shocks

are anticipated or unanticipated; only the latter will lead to behaviors that contradict the neoclassical model of labor supply because the former is already factored into workers' income targets.

research gap Empirical studies of daily labor supply have largely overlooked this distinction between anticipated changes and unanticipated shocks. A common test of reference-dependent labor supply is to show a relationship between intraday income—either in the form of cumulative earnings up to a point in time, or total earnings during a specific time interval of the day—and subsequent labor supply decisions. However, an insignificant result of this test does not entirely reject reference dependence; it may simply reflect a low level of unanticipated shocks experienced by workers within that specific time and context, or an anticipation formation process that is extremely adaptive to new shocks. For instance, Farber (2015) found a marginal effect of income on stopping decisions in day shifts, but positive wage elasticity on night shifts due to negligible variation in transitory unanticipated hourly wages among New York City taxi drivers. Thakral and Tô (2021) pointed out that if the reference point adjusts to recent earnings at a sufficiently fast speed, a reference-dependent worker may act in a manner similar to a neoclassical worker. Several papers used structural models to explicitly account for a worker's anticipation, but this approach requires strong assumptions about how the reference point is formed. Since the reference point is unobserved, these assumptions are difficult to test. As a result, using variation in realized daily earnings constitutes, at best, only a weak test for reference dependence, and at worst, can be misleading about the nature of the labor supply response.

novelty We proposed a novel approach, by exploiting unanticipated sources of external income shocks that workers repeatedly encounter over time, to test for reference-dependent labor supply. We focused on Singapore's taxi industry and the income shocks we used are booking cancellations and passenger no-shows (CNS hereafter)—that is, where a passenger makes a booking but fails to follow through with the trip, resulting in a loss of time, mileage, and potential earnings for the driver. Passengers' decisions to cancel a booking or not show up are made with little interaction with the driver, and hence, are unlikely to be predicted by drivers and factored into their daily income target prior to the booking. Since the subsequent wage rate is not affected by these idiosyncratic events, the neoclassical model would predict no relationship between CNS and the subsequent supply of labor. In contrast, under reference-dependent preferences, we would expect drivers to work harder because CNS cause their realized earnings to fall below the level they can typically achieve with the same amount of working hours but without CNS.

Compared with prior literature based on observational data, we were able to identify close-to-causal effects of CNS on driver's labor supply and productivity, thanks to the richness and volume of our data, especially due to the availability of trip trajectories. As such, we were able to offer compelling evidence for income targeting by (1) only using booking trips after which drivers search for at least three minutes for passengers; (2) including (i) a rich set of fixed effects for driver, date, hour of day, day of week, postal code (building), and their interactions, (ii) proxy variables for market demand and supply conditions, and (iii) distance and time to pick-up point; (3) identifying a credible set of nearby placebo drivers who experienced the same market conditions as the CNS drivers for comparison; (4) controlling for vacancy time and on-call time to rule out the possibility of drivers falling victim to a sunk cost fallacy; (5) conducting a falsification test on anticipated wage shocks; (6) running an instrumental variables regression; and (7) conducting various robustness checks to rule out confounding factors and alternative explanations.

Moreover, we not only tested the implications of the reference-dependent preferences for the average responses on the extensive margin of labor supply but also the implications for the intensive margin and the heterogeneous effects at different earnings levels and across driver characteristics. The results showed that the CNS effects on shift ending are strongest when cumulative income is close to the average shift income and grow weaker and statistically insignificant when cumulative income is too high or too low. This U-shaped pattern on shift ending or inversely U-shaped pattern on labor supply around the average daily income level cannot be explained by the classical model of labor supply. It is consistent with the theory of reference-dependent preferences where the marginal utility of income has a sharp change at the reference point. The CNS effects are most pronounced in the first hour after a CNS and fade away afterward, which suggests a dynamic, adaptive nature of the reference point. The strength of the effects also varies across different groups of drivers. Drivers tend to choose the response strategies—prolonging their shifts or increasing their productivity—that are complementary to their abilities and circumstances. Those with flexible working schedules tend to prolong their shifts, while those with flexible earnings rates tend to increase their subsequent productivity.

Our paper is related to the literature on daily labor supply of flexible-hour workers (Camerer et al. 1997, Farber 2015, Chen et al. 2019, Thakral and Tô 2021), to which we make three contributions. First, we provided a cleaner test and more compelling evidence for reference-dependent labor supply by exploiting an unanticipated source of random income shocks,

booking cancellations, and passenger no-shows, hence, we helped move a step closer to settle the debate between the neoclassical theory and the reference-dependent theory of labor supply. Our survey results showed that income targeting is prevalent among Singapore's taxi drivers, but the income targets vary substantially across drivers and within the same drivers from day to day, and the same drivers often have a range of targets for a single day. The unobservability and variability of income targets mean that it is challenging to identify their effects on labor supply with observational data. Previous studies have relied on the variation in either daily wages (Camerer et al. 1997) or total earnings up to a point in the day, which are both prone to misspecification, division bias, or endogeneity concerns (Oettinger 1999, Farber 2005). As a result, even though Farber (2015) claimed that unanticipated earnings only accounted for a small proportion of the total variation in New York City taxi drivers' daily income, subsequent studies employed more flexible specifications and reached contrary conclusions among the same taxi drivers (Martin 2017, Thakral and Tô 2021). Farber (2015) may have underestimated within-day income effects because he did not have proper exogenous variations in daily incomes that were induced by unanticipated shocks. We demonstrated the importance of distinguishing between anticipated and unanticipated income shocks by (a) using unanticipated shocks to identify the effects of CNS that are consistent with the reference-dependent preferences as well as (b) conducting a falsification test with anticipated wage shocks from changes in fuel prices that led to behavioral changes in a neoclassical manner.

Second, this paper also addressed a growing question in the reference dependence literature: How is the reference point determined? If the reference point is fixed, the wage elasticity of the labor supply will be close to -1 and there will be little variation in daily income—an outcome that is easily rejected in most contexts that involve flexible-hour workers. To explain the high variation in daily income among these workers, some form of the reference point's ability to adapt to market conditions must be present. We provided evidence for the adaptive nature of the reference point by showing how the strength of the effects evolves over time and added an important piece to an emerging strand of work on this topic (DellaVigna et al. 2017, Thakral and Tô 2021). CNS are random events that can occur anytime during the day, and their timings can be used to test the dynamic nature of the reference point. A recent CNS and a CNS that occurred early in the shift, given similar characteristics, cost drivers the same amount of potential earnings, and hence, under a static reference point, would have the same effect on subsequent labor decisions.

On the other hand, if drivers continually adjust the reference point when new shocks come in, we would expect the effects of recent and earlier CNS to be different. This constitutes a complementary, albeit more direct and transparent, alternative to Thakral and Tô (2021)'s test of adaptive reference dependence.

Third, we investigated not only the extensive margin of labor supply (the decision to stop working), but also the intensive margin (how much effort to put in per unit of time). We found that after CNS, drivers not only work harder and longer, but also work more diligently and organize their time more efficiently. They choose these strategies that are complementary to their abilities and circumstances. Furthermore, we provided drivers' detailed behavioral changes to achieve higher productivity after CNS.

Taken together, our study brings us a step closer to settling the debate between Camerer et al. (1997) and Farber (2005, 2008). Our empirical exercise showed that a key requirement to identifying an income-targeting effect on labor supply with observational data are to have exogenous and unanticipated variations in income and have adequate treatment of the adaptive nature of income targets by empirically addressing it in a flexible manner.

Our paper is the first to study workers' behavioral responses to CNS in the service sector. Existing literature on the impacts of CNS (Moore et al. 2001, Patrick and Puterman 2008, Feldman et al. 2014, Norris et al. 2014) has mostly focused on their operational aspects such as revenue shortfall or efficient booking systems. Our paper indicates that the effects of CNS can go beyond their impacts on the operational flow of the system: they may even change how human actors in the system behave. Failure to account for the workers' behavioral responses may result in biased estimates of the operational effects of CNS and understate the resilience of the system in absorbing negative shocks by itself.

We also contribute to the literature on coping with stress and negative shocks. Previous literature has found both negative responses in the context of factory workers coping with machine breakdowns (Cai et al. 2018), and positive responses in the context of professional basketball (Berger and Pope 2011) and laboratory experiments (Buser 2016). Our paper not only presented new empirical findings of positive responses to negative shocks in an important setting, workers in a platform economy (Rochet and Tirole 2003, 2006; Rysman 2009; Sriram et al. 2015; Zhang et al. 2021), but also provided strong evidence for a likely underlying mechanism driving these responses—income-targeting behavior. This suggests that income-targeting motives can ameliorate or even reverse the impact of negative events. In addition, we also uncovered multiple channels that drivers use to cope with adverse events; they not only

Conclusion

- Your paper is the best marketing materials to sell your research
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- Short and direct message are more effective than long and convoluted one
- Insights and implications are more interesting to read than methodology and mathematics
- Beyond writing paper, talking about the paper is equivalently important