

Paying rideshare drivers for pickups

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Summary

In this presentation, we . . .

- ① **describe base compensation for Lyft drivers.**
- ② highlight consequences of misalignment between driver compensation and driver preferences.
- ③ estimate driver preferences using a simulated-choice conjoint analysis evaluated through a conditional logit model.
- ④ describe Lyft's efforts to pay drivers for pickups and discuss preliminary outcomes.

Driver time and pay

We categorize our drivers' online time into three periods:

- Period 1 (P1): Driver is online but not assigned to a route.
- Period 2 (P2): Driver is assigned to route and on the way to pickup.
- Period 3 (P3): Driver has passenger in the vehicle.

Drivers are generally only paid for P3 time and distance.

- Uber has been paying time and distance for long pickups over a threshold that varies by city since 2017.
- Lyft is experimenting with neutral rate card rebalances to pay for P2 and P3 at the same rates.

Base pay for Lyft drivers

Drivers are paid based on the actual duration and mileage of their routes multiplied by rate cards.

Region	Base fare	Per mile	Per minute
Los Angeles	–	0.795	0.1275
San Francisco	1.65	0.6825	0.2925
Atlanta	0.78	0.6075	0.1125
Cheyenne, WY	1.800	1.3575	0.21
Roswell, NM	1.425	1.3125	0.1875

Sample driver rate cards (in \$) for standard/shared, personal vehicle, short-tenured driver

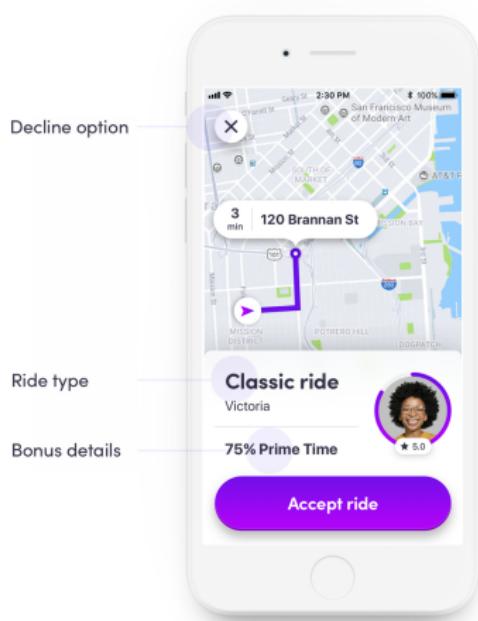
Rate cards vary by region, ride type, whether the vehicle is owned by the driver or rented, and driver tenure.

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Driver behavior definitions



Lapse: A driver declines a ride either by hitting the cross or letting it time out.

- Passengers experience lapses as a delay in their matching to drivers.

Pre-arrival cancel: A driver cancels a ride that she has already accepted before picking up the passenger.

- Passengers experience reassignment, often with increased ETA.

Both lapses and cancels are negative passengers experiences and reduce conversion.

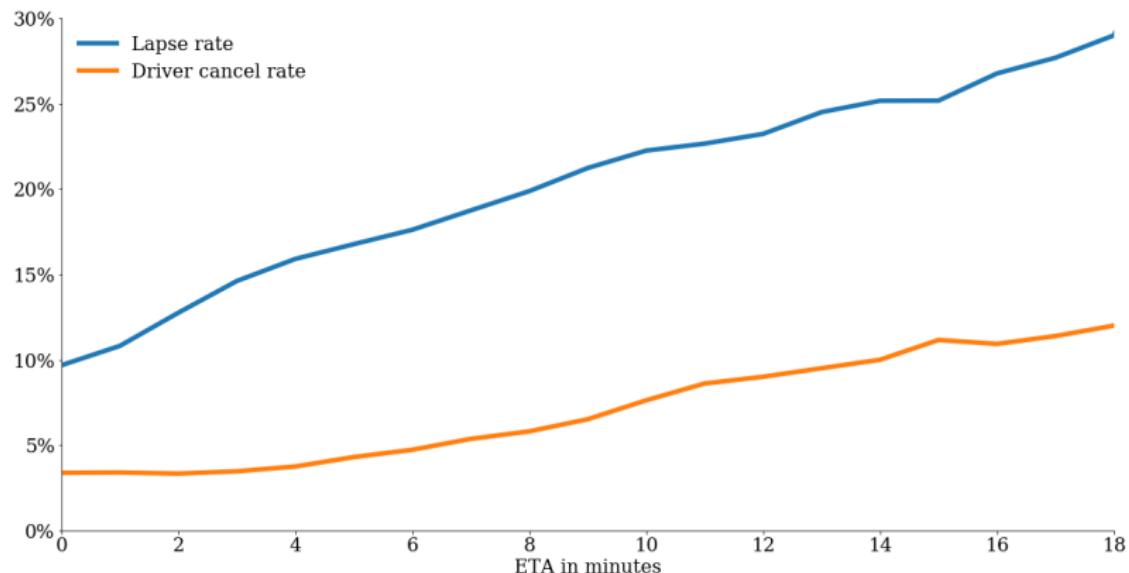
Why do drivers lapse and cancel?

Drivers lapse and cancel because...

- ① **Unpaid P2:** The pickup is too far and the driver doesn't want to waste time and gas. They think they can wait and get a closer ride.
 - In a Lyft survey, 85% of drivers identified not being paid for pickup time and distance as a challenge, making it the most commonly identified challenge in driving with Lyft.
- ② **Driver anticipates passenger will cancel due to high ETA.**
- ③ **Driver may infer unfavorable characteristics** of ride from the pickup location.
- ④ **Dual-app driver** may have ride on other app.
- ⑤ Driver has decided to **end shift** but hasn't yet gone offline.

The distribution of lapse and cancel rates across drivers is wide. Many accept almost all rides while others lapse on a majority.

Relationship between ETA and lapse and cancel rates



Lapse and cancel rates by ETA for select regions

Other signals of misaligned pay

There are other clear signals of misaligned base pay:

- ① Philadelphia Inquirer: *At Philly airport, Uber and Lyft drivers wait and wait, gambling on a big pay day.*
 - “On a recent day, some drivers’ screens showed 90 to 100 vehicles before them in the airport queue. The wait for a passenger can take up to two hours.”
- ② The Points Guy: *Why Your Uber Driver Is Purposely Taking A Longer Route*
 - “...Uber pays drivers a whole lot more on the distance driven versus the time of the ride ...”

Principles for base pay

We want base pay to achieve the following:

- ① **Ride-level driver surplus neutrality:** Drivers should be close to indifferent across the rides that we may offer them.
 - At least in aggregate, ignoring idiosyncratic preferences.
- ② **Earnings consistency and predictability:** Drivers that make similar choices should have similar net earnings outcomes.
- ③ **Incentive compatibility:** Drivers should be incentivized to make choices that maximize total surplus.

All three of these require us to understand drivers' preferences and costs.

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Estimating driver preferences

Drivers accept and decline/lapse countless rides, yet **we don't have strong revealed preference data.**

- Drivers don't know trip details at the accept screen.
 - Could use post-arrival cancels but they're rare and complicated interactions.
- Driver payment is non-random, perfectly determined by ride characteristics.

Given this, we ran a conjoint analysis.

- Complex market research ecosystem involving Lyft, u30, Fuel Cycle, and Conjoint.ly

Driver pay conjoint analysis

Conjoint study with 1000 drivers, each making ten binary choices between hypothetical rides. Features:

- ① P2 time in minutes
- ② P2 distance in miles
- ③ P3 time in minutes
- ④ P3 distance in miles
- ⑤ Number of pickups (i.e. shared rides)
- ⑥ Payment in dollars

Generated levels for each alternative based on a set of historical rides, generating randomized conditional prices.

Randomized conditional prices

Problem: Need to randomize the payment to avoid collinearity. Using entirely random prices would yield a lot of uninteresting choice situations.

- A driver prefers a short ride with a high payment to a long ride with low payment!

Solution: For ride k , draw five random variables $(r_{1,k}, r_{2,k}, r_{3,k}, r_{4,k}, r_{5,k})$ uniformly from $[0, 1]$. Set payment as randomly weighted average of feature levels:

$$\tilde{p}_k(\alpha) = \left(\frac{r_{1,k} \cdot p_{2\min k} + r_{2,k} \cdot p_{2\text{mil } k} + r_{3,k} \cdot p_{3\min k} + r_{4,k} \cdot p_{3\text{mil } k} + r_{5,k} \cdot \text{Pickups}_k}{\alpha \cdot \sum_j r_{j,k}} \right)$$

Choose α to target right price levels: $\sum_k \tilde{p}_k(\alpha^*) = \sum_k p_k$, where p_k is ride k 's actual driver payment.

Conjoint experience on computer

Which of the following routes would you prefer?

1st Pickup

Trip

Payment

3 minutes / 0.6 miles

25 minutes / 6.9 miles / 2 pickups

\$19

12 minutes / 0.2 miles

24 minutes / 3.9 miles / 1 pickup

\$22

A binary choice between routes in the computer survey flow

Details:

- Drivers were *not* given the choice to select neither ride.
- Half of respondents were shown miles before minutes.
 - Those who saw miles first put slightly more emphasis on mileage, but differences were small.

Conjoint experience on mobile

The image displays three sequential screenshots of a mobile application interface, likely from an Android device, showing a conjoint study about route preferences. The top status bar shows signal strength, battery level, and time (3:25) across all three frames.

Screenshot 1: The title "A study of your preferences over routes" is displayed. Below it, the text "An example route:" is followed by a box containing route details:

- 1st Pickup: 1.5 miles / 5 minutes
- Trip: 3.1 miles / 6 minutes / 1 pickup
- Payment: \$7

Text below the box states: "You will be asked to make choices between routes for different payments. For each route, you will be asked to look at the first pickup time and distance, the trip time and distance, and the total number of pickups on the route. We ask that you choose the route and associated payment that you prefer."

Screenshot 2: The same title and introductory text are shown. Below the text, there is a detailed description of the task: "look at the first pickup time and distance, the trip time and distance, and the total number of pickups on the route. We ask that you choose the route and associated payment that you prefer." This is followed by a paragraph: "In choosing between routes, assume there is no primetime or other bonuses in the market and you expect to be idle for about 5 minutes between routes." At the bottom is a "Continue" button.

Screenshot 3: The title "A study of your preferences over routes" is displayed. Below it, the text "Which of the following routes would you prefer?" is shown. Below this, two route options are listed:

- 1st Pickup: 2 minutes / 0.8 miles
- Trip: 5 minutes / 1.7 miles / 3 pickups
- Payment: \$4

Below these options is another route option:

- 1st Pickup: 3 minutes / 0.3 miles
- Trip: 6 minutes / 2.0 miles / 4 pickups
- Payment: \$5

Survey flow on mobile device

Conjoint analysis results

We inferred a utility function from 10,090 choices using a conditional logit model (McFadden, 1974).

By dividing the (negative) coefficients of non-payment features by the (positive) payment coefficient, we recover a partworth utility, or cost per unit, for each non-payment feature.

Feature	Implied cost	CI-bootstrap
P2 minute	29c	[24c, 35c]
P2 mile	21c	[5c, 38c]
P3 minute	31c	[28c, 33c]
P3 mile	22c	[16c, 27c]
Pickup	\$1.43	[\$1.12, \$1.74]

Conjoint analysis conclusions

We had three significant conclusions from the analysis:

- ① Drivers value P2 time and distance comparably to P3 time and distance.
 - In most markets, only P3 is compensated.
- ② Drivers value a minute of their time more than a mile on their vehicle.
 - Mile-to-minute compensation ratio is currently above 5:1 in many markets. Results would suggest 0.7:1 ratio.
- ③ There's a significant cost associated with the pickup itself.
 - In most markets, we don't pay a pickup charge for the 2nd+ pickup in a shared route.

A note on the cost of a mile

IRS reimbursement rate for a business mile driver is 58c.

The cost per mile for a rideshare driver is substantially lower.

- A 2017 *The Rideshare Guy* post estimates cost per mile in San Diego at about 19.5c per mile, not including insurance, for a 2013 Toyota Prius.
- Zoepf et al. (2018) estimate costs per mile at about 30c per mile.
 - This study had some well-publicized issues in earnings data, but the cost accounting is reasonable.

Inferred mileage cost of about 22c from the conjoint analysis is not unreasonable.

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New rate cards

Rate card changes in Las Vegas:

	Base/pickup*	P2 mile	P2 min	P3 mile	P3 min
Previous	\$1.125	–	–	60c	15.75c
New	45c	42c	18.75c	42c	18.75c

Rate card for standard/shared, personal vehicle, short-tenured driver

Highlights:

- ① We compensate P2 and P3 at the same rates.
- ② We shift mile-minute compensation ratio from 3.81 to 2.24.
- ③ We replace base fare with a per-pickup fare.
- ④ Changes calibrated to have neutral overall impact on driver earnings.

Product experience

9:41 AM \$ 100% ━

May 4, 1:18 PM



\$18.47
Lyft

Time	Distance	
18m 24s	8.8mi	

Ride route

- Request accepted
- Pickup Passenger A Requested at 6:11 PM
- Dropoff Passenger A

6:07 PM 6:15 PM 6:36 PM

Ride earnings

You're paid for total time and distance once you accept a ride. See your rates: [San Francisco](#)

Without passenger	\$5.04
Time (7m 12s x \$0.45/min)	\$3.15
Distance (3.6mi x \$0.524/mi)	\$1.89
With passenger	\$8.43
Pickup fare (1 x \$0.75/pickup)	\$0.75
Time (1m 12s x \$0.45/min)	\$4.96
Distance (5.2mi x \$0.524/mi)	\$2.72
Other	\$5.00
Tips	\$5.00
Total earnings	\$18.47

[Rate Passengers](#) >

[View Earnings Breakdown](#) >

[Help](#) >

Presentation of ride earnings in app

Experimentation strategy

Experimenting with driver base pay is difficult.

- Neither user- nor time-splits (random paired-paired hours) would go over well.

Almost no choice but to conduct a region-split experiment.

- Challenging due to region-specific seasonality and exogenous conflating changes made by Lyft and Uber.
- We're using a Lyft implementation of **synthetic difference in differences** (Arkhangelsky et al., 2019).
 - Bobak Moallemi developed Lyft's implementation.
 - Lyft Science has also used Google's CausalImpact in the past.

Launched to 5 markets in June and 9 markets in August.

Communications strategy

Marketing, creative, and others did significant work to enable:

- Email to drivers a week before and on launch date.
- Console card in the app a week before and on launch date.
- Blog post with further explanation.
- Extensive work with local teams and customer experience to prepare.

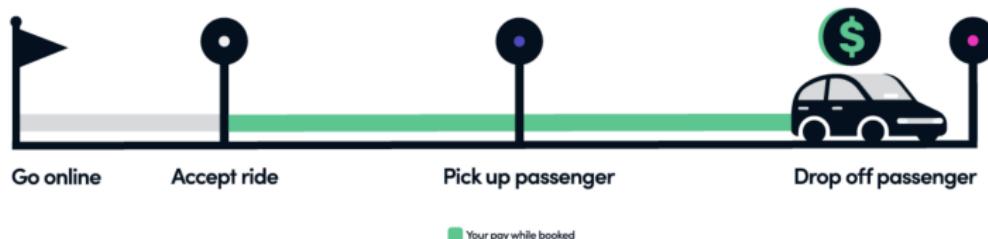


Illustration used in blog explanation

Email communications a week before



Start earning as soon as you tap Accept!

Start earning as soon as you tap Accept! You'll now calculate flat rate instead of time-based rates. Learn more. There's a minimum fare of \$10.00 and a base fare of \$1.00. You'll also get compensation fees for the time you spend driving.

[LEARN MORE](#)

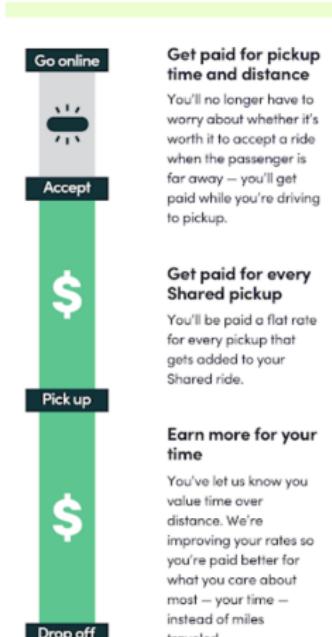
Get paid for pickup time and distance
Flat rate for pickup time
Flat rate for time spent driving
Earnings for your passengers
Earnings from your passengers
Distance traveled
Per mile
Per minute
Per [mile/kilometer]

How much you earn depends on the location you're in. Check your rate card for details.
With drivers who know ahead of time what changes we're making, you can earn more.

Start earning as soon as you tap Accept

Your time is valuable. But right now, you only earn when there's a passenger in your car. On June 26, we're improving the way your pay is calculated so you can earn more for the time you spend driving.

[LEARN MORE](#)



Time — your time — instead of miles traveled.

Here's how your rate card in [Region] will look:

Standard ride	
Pickup rate The amount you get for every pickup	\$[0.48]
Per minute The amount you earn per minute once you accept a ride	\$[0.68]
Per [mile/kilometer] The amount you earn per mile once you accept a ride	\$[0.304]

Your rates as a driver in [Subregion] will be updated on June 26, too. Check your rate card to see the new rates.

We'll always let you know ahead of time when we plan to make changes to your pay. Learn more about this one [»](#)

©Hold for legal disclaimer copy T&C

Email communication of the change on mobile device

Initial reception was fairly negative

Difficult media coverage:

- The Rideshare Guy: *Lyft's Making More Pay Changes – Here's How Much My Rates Were Cut*
- Minneapolis Star Tribune: '*Not worth the money,' some Twin Cities drivers say after Lyft changes pay*

Pressure on local teams, community associates, and customer experience.

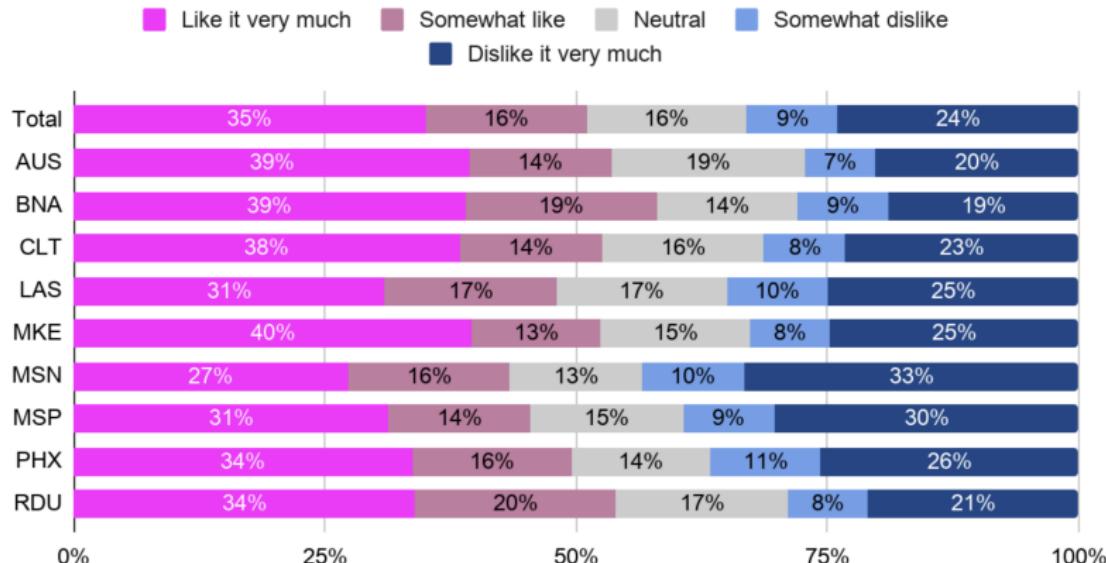
Manageable but significant **loss in driver hours**, mostly P1 hours.

- This did yield increased utilization and earnings for remaining drivers.

These effects are typical with neutral driver pay changes.

- Drivers that view changes most negatively are the most vocal.

Survey results a month in are mixed but encouraging



How much do you like this change in how you earn with Lyft?

Experiment results

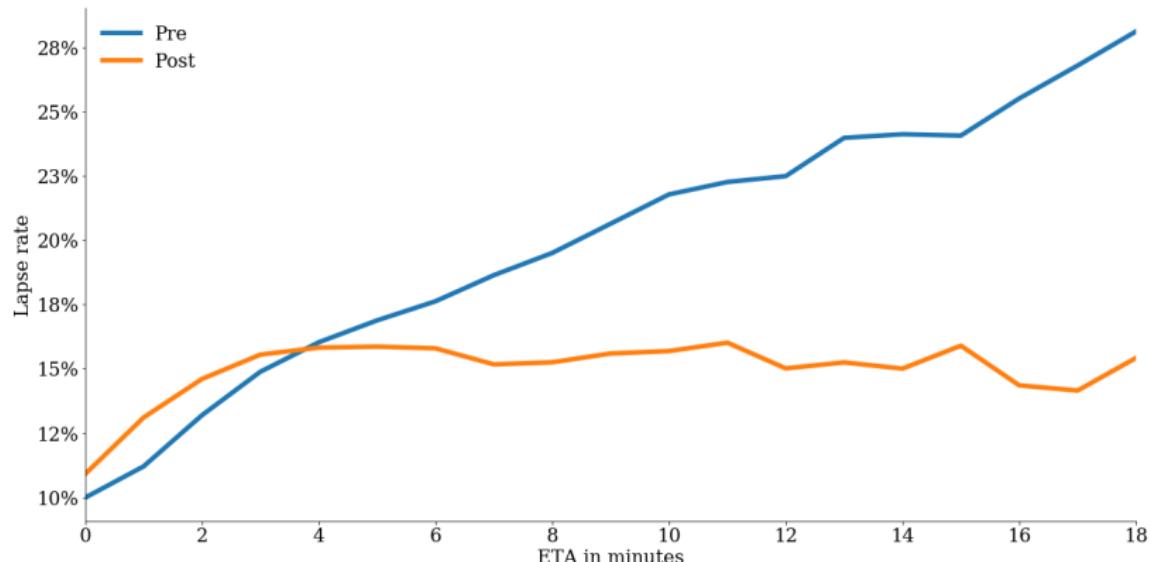
For competitive reasons, we can't show the causal inference results.

- Just starting to assemble results for our larger August launches.

But we can show some analysis that suggests how we're improving alignment in base pay (and how we're not):

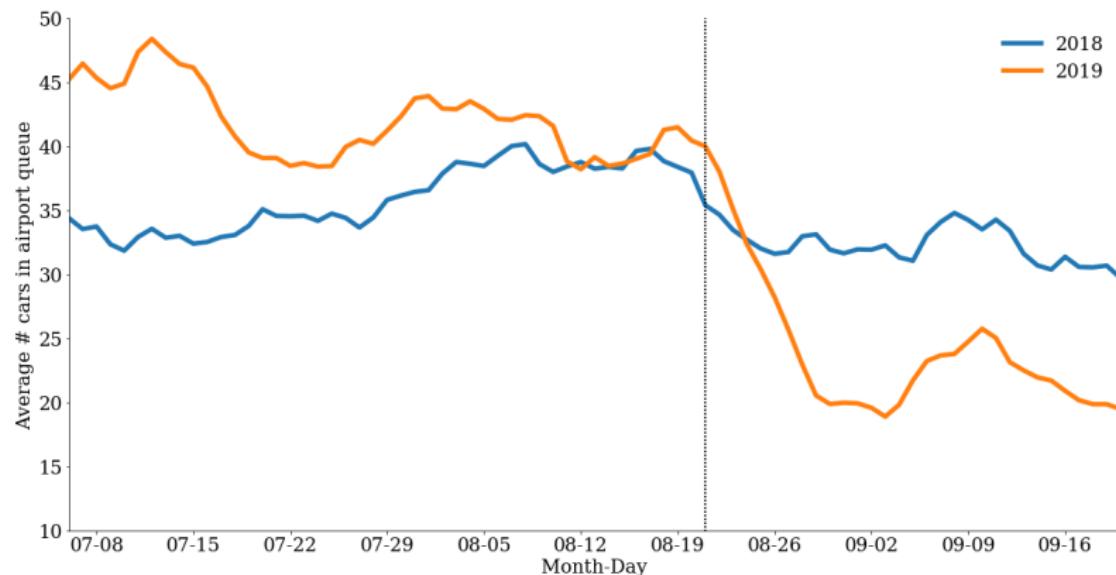
- ① Pre/post analysis on ETA-lapse rate relationship.
- ② Time series view of average airport queue length.
- ③ Time series view of reduction in earnings variance.
- ④ Example of long-ride undercompensation

Effect on ETA-Lapse rate relationship



Relationship between ETA and lapse rates pre- and post- treatment

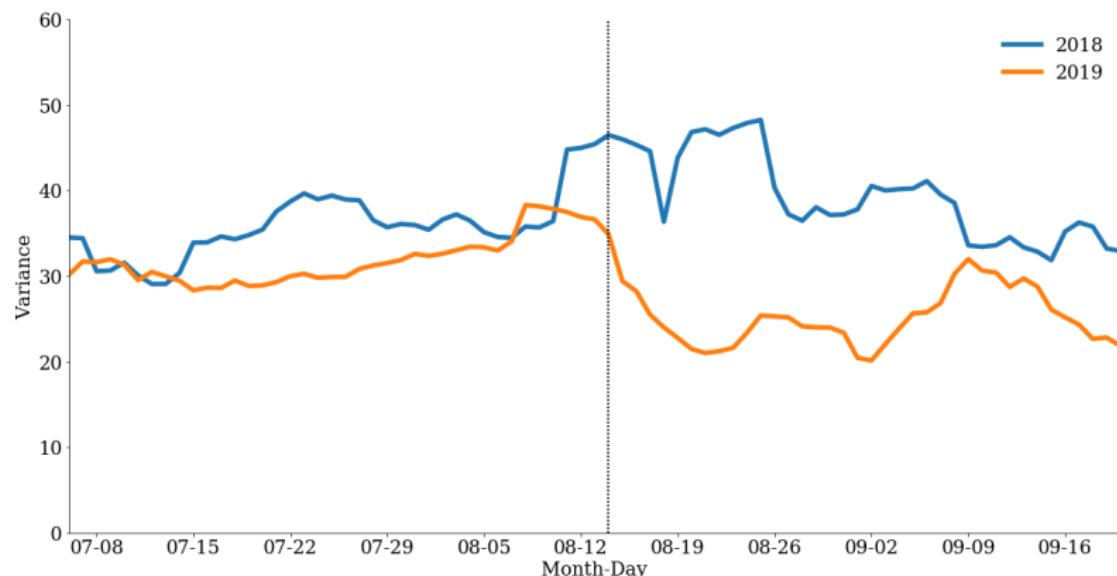
Effect on airport queue length



Rolling 7-day average airport queue length in MSP

Effect on base earnings variance

Reducing variance in earnings yields fairer, more predictable pay.



Rolling 7-day average variance across drivers in base earnings per P23 hour (i.e. hour in trip) in RDU

Example of long-ride undercompensation

Pam, a member of our local driver advisory council in Madison, WI, took riders from Madison to Milwaukee airport:

- 91 minutes to go 88.54 miles.
 - And similar time and distance to get back, with no rider.
- Base compensation on old cards: \$92.28
- Base compensation on new cards: \$58.87

We don't pay drivers for return time and distance.

- Because long trips tend to be relatively high-speed, the mileage-heavy old rate cards made them somewhat more reasonable even without the return pay.
 - New cards make the lack of long-ride return pay more problematic.

Conclusions

- ① **Driver base pay in ridesharing is not well aligned with driver costs/preferences.**
 - Incentivizes strategic ride acceptance, suboptimal routing, and excess airport queues.
- ② **Base pay is hard to change due to perception and experimentation considerations.**
 - Any rebalancing of pay that is neutral overall is likely to harm some drivers, and those drivers will be vocal.
 - User- and time-split experimentation not practical.
- ③ **We can improve marketplaces with structural pay changes.**
 - See lapse rate, airport queues, and earnings variance impact.
 - Beware the theory of the second best: improving time-mileage compensation ratios made the lack of return pay more problematic.

Appendix: Survey verbatim 1

How do you like the change?

Like

Why?

It's the chance to earn more and accept more rides, even though they are significantly far away.

Anything else you would like to tell us about this change?

I am pleased that this change happened. It makes driving for Lyft more exciting with many more opportunities to make money.

Appendix: Survey verbatim 2

How do you like the change?

Dislike

Why?

We make about 25-30% less for the same rides and you make more. Not fair.

Anything else you would like to tell us about this change?

We are trying to make a living and you are reducing our pay. We are YOU, everyone should quit.

Appendix: Survey verbatim 3

How do you like the change?

Neutral

Why?

I just drive. I don't worry about much.

Anything else you would like to tell us about this change?

All is well

Appendix: Survey verbatim 4

How do you like the change?

Dislike somewhat

Why?

I feel I'm making less on long range trips

Anything else you would like to tell us about this change?

I will adapt to the new pay structure

Appendix: Survey verbatim 5

How do you like the change?

Like

Why?

Lyft always doing good to help drivers and riders

Anything else you would like to tell us about this change?

Keep it up =)