Shared Ride Hailing and Tip Payments: Evidence From Chicago

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Background

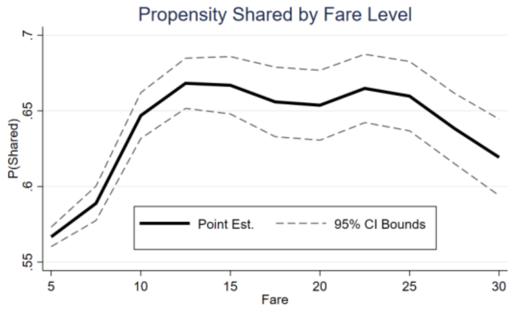
- To provide a cheaper service option in major market areas, transport network companies (TNCs) such as Uber and Lyft offer "pooling" – the ability to authorize one's ride to overlap with that of another customer.
- Not all pooling authorized rides end up shared. I exploit the quasi-random distribution of shared rides (conditional on time and place effects and fare level) to estimate how sharing pooling-authorized rides affects the tip payed to driver.
- Many customers do not tip, and evidence suggests that tip payments are driven by demand-side factors (mood, customer behavior) more than supply-side factors (driver quality, service quality).
- There are two main possible explanations why pooled-ride-hailing riders might pay less in tips when rides are shared than when rides end up solo?
  1. Distaste with having to share a vehicle with another customer or believe that their co-passenger will tip instead – a free rider effect.
  2. Distaste with increased travel times due to pick-up/drop-off detours for their co-passenger.

Data

- I use publicly available data of every TNC ride taken in Chicago during 2019. I restrict my sample to pooling-authorized rides that had no additional charges. Summary statistics are provided in Table I.
- I observe detailed information on trip time and location, along with tip (rounded to the nearest $1.00 and fare rounded to the nearest $2.50.

TABLE I: Summary Statistics

Variable	Solo Rides $N = 1,165,696$ Mean	St. Dev	Min	Max	Shared Rides $N = 1,910,767$ Mean	St. Dev	Min	Max
Fare ($)	9.498	4.456	5	30	10.664	4.929	5	30
P(Tip)	0.115	0.320	0	1	0.125	0.330	0	1
Tip ($)	0.263	0.860	0	45	0.277	0.853	0	44
Tip/Fare	0.030	0.098	0	2.2	0.028	0.088	0	2.2



Empirical Strategy

- I run OLS regressions, conditioning on the interaction of origin community area, destination community area, an indicator for weekend, and an indicator representing four-hour-timespan. I also condition on date-four-hour fixed effects and the fare level.
- I use inverse probability weighting on the propensity score P(Shared) to construct a doubly robust weighted estimator.
  - The figure in the bottom left corner shows sharing propensities by fare, indicating that rides with fares toward the center of the distribution are most likely to end up shared, conditional on time-and-place fixed effects,
- I estimate effects on both the extensive and intensive margins of tipping, specifically using three dependent variables.
  1. P(Tip) – a binary indicator for whether a rider tips
  2. Sinh^-1(Tip) – the inverse hyberbolic sine of tip rounded to the nearest $1.00.
  3. Sinh^-1(Tip/Fare) - the inverse hyberbolic sine of the tip as a proportion of fare.
- First, I estimate models of the below generalized equation, where Y represents one of the three outcome variables.

$$Y_i = \alpha_i + \beta_1 Shared_i + \gamma_1 \mathbf{Fare}_i + \mathbf{ODPair{*}Weekend{*}Time}_i + \mathbf{Day{*}Time}_i + \epsilon_i$$

- To test for a "detour penalty" effect on tips, I interact trip minutes with the main treatment variable shared, estimating the below equation.

$$Y_i = \alpha_i + \beta_1 Shared_i + \beta_2 TripMins_i + \beta_3 Shared * TripMins_i + \gamma_1 \mathbf{Fare}_i + \mathbf{ODPair{*}Weekend{*}Time}_i + \mathbf{Day{*}Time}_i + \epsilon_i$$

Results and Discussion

- Table II evidence that sharing reduces tipping at both the extensive and intensive margins
  - 7.99% reduction in the probability a rider tips
  - 6.46% reduction in tip payment value
  - 10.4% reduction in the tip/fare quotient
- Much of this gap can be explained by extended travel time, with estimated coefficient estimates on sharing an order of magnitude lower when the interaction of sharing and trip minutes is included in regressions.
  - Ride time is associated with higher marginal tipping for solo rides, but lower marginal tipping for shared rides at both extensive and intensive margins.
  - However, coefficients on sharing are still significant and negative.
- These results suggest that both hypothesized effects are playing out.
  - Riders in shared rides exhibit distaste for detours in shared rides that elongate trip time, reducing tipping.
  - Riders still tip less and lower amounts when rides are shared, even if detour time-extensions are short or virtually nonexistent, indicating either a "free rider effect" or an intrinsic preference for riding alone.
  - These effects occur despite riders opting into the possibility of sharing a ride with a co-passenger.

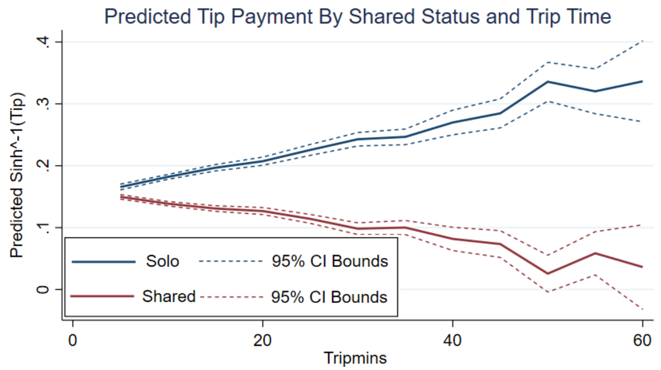


TABLE II: Tip Penalties from Actually Sharing Pooling-Authorized Rides — Intensive and Extensive Margins

Variables	A: $P(Tip)$ (1)	(2)	B: $Sinh^{-1}(Tip)$ (3)	(4)	C: $Sinh^{-1}(Tip/Fare)$ (5)	(6)
Shared	-0.0146***	-0.0156***	-0.0252***	-0.0273***	-0.0050***	-0.0048***
	(0.0008)	(0.0008)	(0.0012)	(0.0012)	(0.0002)	(0.0002)
Dependent Variable Mean	0.1213		0.2719		0.0285	
Elasticity	-7.47%	-7.99%	-5.96%	-6.46%	-10.1%	-10.4%
Date-Time FEs	No	Yes	No	Yes	No	Yes
Observations	3,076,463	3,076,463	3,076,463	3,076,463	3,076,463	3,076,463
R^2	0.060	0.061	0.068	0.070	0.042	0.043

Notes: All models control for origin*destination*weekend*four-hour-time fixed effects and fare level indicators. Panel A estimates extensive margin effects and Panels B and C estimate intensive margin effects on tip value and tip proportion of fare respectively. Standard errors clustered in origin-destination community area pair are provided in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE III: The Role of Extended Travel Time in Sharing-Induced Tip Penalties

Variables	A: $TripMins$ (1)	B: $P(Tip)$ (2)	(3)	C: $Sinh^{-1}(Tip)$ (4)	(5)	D: $Sinh^{-1}(Tip/Fare)$ (6)	(7)
Shared	5.084***	-0.0156***	-0.0055***	-0.0273***	-0.0050**	-0.0048***	-0.0023***
	(0.0898)	(0.0008)	(0.0015)	(0.0012)	(0.0023)	(0.0002)	(0.0005)
TripMins	—	—	0.0013***	—	0.0032***	—	0.0006***
			(0.0001)		(0.0002)		(0.00003)
*Shared * TripMins*	—	—	-0.0009***	—	-0.0020***	—	-0.0003***
			(0.00007)		(0.0001)		(0.0002)
Observations	3,076,463	3,076,463	3,076,463	3,076,463	3,076,463	3,076,463	3,076,463
R^2	0.777	0.061	0.063	0.070	0.072	0.043	0.045

Notes: All models control for origin*destination*weekend*four-hour-time, day*four-hour-time fixed effects and fare level indicators. Panel A dependent variable is *TripMins*. Panel A shows how sharing extends trip time. Panel B estimates extensive margin effects and Panels C and D estimate intensive margin effects on tip value and tip proportion of fare respectively. Standard errors clustered in origin-destination community area pair are provided in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

References

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