

## Incentive Design in Ride Sharing Platforms

**Purpose:** Ride sharing platforms have quickly become a widespread phenomenon, but it is unknown if the ultimate benefits of these platforms might be hindered by mismatches between supply and demand at peak times (temporal mismatch) or in some locations (spatial mismatch). This prompts the idea of a design of incentive systems to align the behaviors of riders and drivers, to make the economic and operational outcomes more consistent with agents' preferences.

**Approach:** Currently, ride-sharing platforms cannot differentiate prices and services among different riders. Assuming Rider A and Rider B request a ride at the same time from the same origin to the same destination. Rider A is in a hurry, and thus willing to pay a premium for getting a ride right away, but in the current scenario, Rider B may get a ride before Rider A.

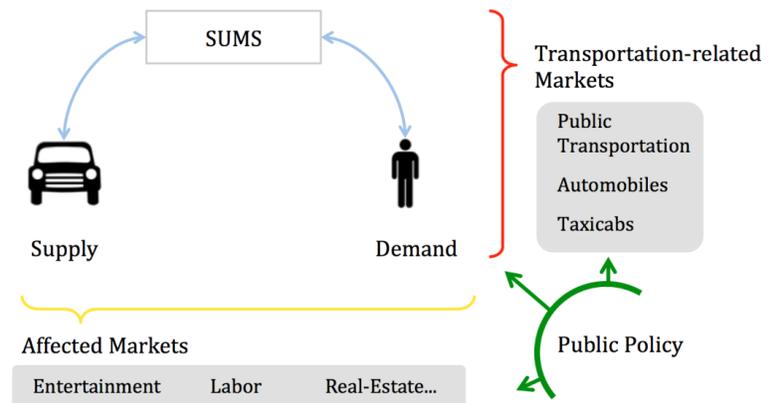
The proposed mechanism enables Riders A and B to let the platform know about their preferences, which enables the platform to account for them when allocating rides. This mechanism augments existing surge pricing practices when riders are heterogeneous. Instead, the proposed mechanism elicits customer preferences to provide personalized pricing and service levels.

**Key Findings:** Ride-sharing platforms can use the timing of rides strategically for demand-supply imbalances and discriminating service levels across time-sensitive and price-sensitive riders.

Under weak rider heterogeneity, the mechanism maximizes social welfare but the platform leaves some surplus to the riders as information rent.

The mechanism also increases the platform's profits, as compared to a static menu of prices and service levels—thus showing the benefits of dynamically adjusting the service offerings and prices.

**Conclusion:** This project can inform the design of pricing and service levels for ride-sharing platforms to make them more consistent with riders' and drivers' preferences while increasing profits, thus increasing the overall performance of on-demand urban transportation systems.



### Research Team:

- Alexandre Jacquilat (Principal Investigator)  
<http://orcid.org/0000-0002-2352-7839>

### Project Record:

- <https://ppms.cit.cmu.edu/projects/detail/187>

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