Extended Abstract of “Do Ratings Cut Both Ways? Impact of Bilateral Ratings on Platforms”

**Motivation.** One of the most important innovations enabled by digital technologies in recent years is the growth of the “Sharing Economy”. Platforms like Uber and Airbnb use software applications on smartphones to connect people who have under-utilized properties (cars, lodge, or time) with people who need them in real time. The idea of connecting customers with service providers via smartphone application combined with the secure and convenient mobile payment system generates tremendous economic value potentially.

Although improvements of technologies have largely reduced the physical obstacles between the customers and service providers, to reach a deal, both parties have to overcome the psychological obstacles—establishing trust. Rating systems have proven to be an effective way to solve this trust problem. These systems help digitize “word of mouth” by aggregating massive information of other people’s view about products and services for the decision-makers as reference.

In the “traditional” on-line platforms like eBay and Amazon that connect sellers who sell tangible products with buyers, only buyers rate sellers, i.e., a *unilateral rating system* is adopted, which is primarily due to the uncertainty in *product quality* faced by customers. For platforms like Uber and Airbnb, as service providers and customers will interact with each other *in person*, the service provider can incur loss due to the misbehavior of the customers during service. In these platforms, a *bilateral rating system* is implemented (i.e., both parties can rate the other party after each transaction). The distinction between unilateral and bilateral rating systems is the ability of service providers to select customers. Whether
to empower the service providers with such ability fundamentally changes the behavior of service providers and hence may affect the transaction volume and revenue of the platform. In this paper, we are aiming at understanding the impact of different rating systems on the pricing policy and revenue of platforms as well as the welfare of customers and service providers.

**The Model.** We consider a platform similar to Uber who (1) sets a price guiding the transaction between two sides of the market; (2) charging a commission fee from the drivers for each transaction. As we focus on the impact of rating systems, we assume away the “surging price” feature of the platform for mathematical tractability and hence the platform’s objective is to set the price and commission fee optimally to maximize its revenue. The customers’ valuation about the service quality is heterogeneous. The externality generated by customers on drivers is also heterogeneous. Every unit of time, a deterministic flow of customers submit requests to the platform asking for service. The platform gathers all the requests and assigns them to the drivers on the platform nearby. The drivers’ transaction cost (e.g., tear and wear cost, opportunity cost, etc.) is heterogeneous. Drivers in the market decide whether to join the platform based on the price and commission fee and if join, drivers decide what is the optimal effort to exert so as to serve the customers. The distinction between unilateral and bilateral rating system is the ability of the driver to reject the customer’s request based on the customer’s rating (which reflects the customer’s type) upon receiving the request from the platform. The customers always observe the rating of the drivers (which reflects the drivers’ effort) and can reject the drivers based on their rating. In practice, few customers are aware of the fact that drivers also rate customers\(^1\), therefore

\(^1\) Lyft does not display the customers’ rating on their smartphone app and customers have to send email
customers have less incentive to change their externalities on the drivers. For drivers, as both parties know the drivers’ rating and customers make decisions based on the drivers’ rating, the drivers have stronger incentive to decide their optimal effort so as to maintain a certain level of rating.

**Results.** For the comparison between Unilateral and Bilateral Rating Systems, it is tempting to conclude that empowering drivers with the ability to observe customers’ ratings and select customers would be beneficial to drivers. The common conception is that Bilateral Ratings should improve revenues, since even in the worst scenario, drivers can always accept all customers assigned by the platform like the situation in Unilateral Rating System. However, our analysis reveals that Bilateral Rating System could hurt drivers because the platform could utilize the Bilateral Rating System to squeeze the drivers’ revenue share when customers value the ride-sharing service less. For the platform, Bilateral Rating System reduces the transaction volume, since it requires both driver and customer in the matched pair to be mutually acceptable. At the same time, the platform could utilize Bilateral Rating System to press drivers and improve its revenue under some circumstances (when customers value the ride-sharing service less). Therefore, Bilateral Rating System can be a double-edged sword for both drivers and the platform. Both drivers and the platform have some, but not full control, over each others’ decisions. Specifically, drivers have direct control in determining whether a transaction would go through (in Bilateral Rating System) and the platform has direct control over drivers’ revenue share. Our main finding is that the relative influence of the control is mediated by customers’ valuation of the ride-sharing service.

or make a call to know their ratings. Uber only recently starts to display the customers rating on the app in its latest version but there is no reminder or automatic update procedure for old Uber user to update their app.