

## Market Expanding or Market Stealing?

### Competition with Network Effects in Bike Sharing

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Competition of network markets has caught the attention of researchers and policy makers. Positive network effects may lead to winner-takes-all, but multi-homing and compatibility could play a role in alleviating the anti-competitive concern. How do firms compete when they face positive network effects and multi-homing users? How do price, sales, and investment of the incumbent change in response to entry? To what extent does the entry of a competitor expand or steal the user base of the incumbent? Are there other competitive considerations besides the potential of winner-takes-all?

Cao, Jin, Xi, and Zhou take these issues to dockless bike sharing. In a dockless system, bikes are parked freely on the sidewalk (within city-authorized areas). Users use smartphones to scan the QR code on the bike's smart lock and reset it after finishing the trip. The paper focuses on two leading Chinese firms in dockless bike sharing. The first system, ofo, was launched on September 7, 2015 in Beijing with yellow bikes. The second system, Mobike, started in Shanghai on April 22, 2016 with orange bikes. Industry reports find that ofo and Mobike accounted for 90 to 95 percent of the Chinese bike-sharing market from the very beginning, and most users multi-home.

Like ride sharing, bike sharing embodies both negative and positive network effects. Given a fixed number of bikes, more users competing for the same bike generates a negative network effect. However, a user who rides a bike from point A to point B makes the bike available for the next rider at point B. Such "consumption-as-supply" implies a positive network effect, as more users may increase bike availability at the needed time and location and therefore encourage more users to use bike sharing. In addition, more users on the road may motivate bike-sharing firms to put more bikes on the market, which further increases each user's willingness to use bike sharing.

Does entry help or hurt the incumbent? Using news reports and ofo's internal data (up to September 14, 2017), the authors identify 59 cities that were first served by ofo and then joined by Mobike. Applying difference-in-differences (DID) to the sample of *ofo Alone* and *ofo First* (while defining Mobike's city-specific entry as the "treatment"), the authors find that entry helps the incumbent.

More specifically, Mobike's entry is found to boost ofo's daily trip volume by 40.8 percent and enhance ofo's average revenue per trip by 0.041 RMB (listing price is 1 RMB). The latter suggests that the booming trip volume is not driven by intense price wars. To address potential endogenous entry, the authors use Mobike's venture capital funding rounds and city attributes to predict entry dates. Results are robust when they use the predicted entry date as the instrument variable (IV) for the actual entry date. Moreover, they demonstrate a market-expansion effect on new users, which dominates a market-stealing effect on old users.

More interestingly, data suggest that ofo put more bikes in the *ofo First* markets after Mobike's entry, above and beyond the periodical bike investment it made in *ofo Alone* markets. This could explain part of the market-expansion effect, but it does not explain why ofo's bike utilization rate—measured by the number of trips per ofo bike per day—has also increased significantly upon Mobike's entry. Furthermore, Mobike's entry allows ofo bikes to reach more grids and to be more dispersed in the city.

All these results point to a competition-reinforced network effect: Mobike's entry has likely expanded the overall network of bike sharing, attracted more consumers to join bike sharing, and helped to expand the ofo network in depth, width, flatness, and user reach. These findings, together with a theoretical model that highlights consumer search and network effects, suggest that a market with positive network effects is not necessarily winner-takes-all, especially when users multi-home across compatible networks.