

# Differential responses to market competition by private and public hospitals in China: a longitudinal analysis

Junjian Yi, Ye Yuan, Shaoyang Zhao

## Abstract

**Background** China launched a nationwide health-care reform in 2009. An important objective of the reform was to improve the health-care service quality by encouraging the entry and development of private hospitals and instilling market competition. The reform has led to a large increase in private hospitals, yet the effect on the hospital market and health-care service quality has not been systematically studied. This study evaluates the effect of the increase of private hospitals on the operations and health-care service quality of incumbent hospitals, and further explores differential responses to market competition between private and public hospitals.

**Methods** We obtained administrative hospital panel data from the annual report of medical and health institutions in Chengdu, Sichuan province, China. The data are collected by the National Health and Family Planning Commission and cover all hospitals in Chengdu from 2007 to 2016. We excluded hospitals that recorded zero or missing values for either total revenue or total patient visits. The sample included a total of 603 hospitals, of which 208 were public hospitals. We used fixed-effects estimation by controlling for fixed effects of hospital, year, and district-by-year. We investigated six categories of outcome variables (hospital revenue, patient visits, the number of medical staff, mean yearly hospital expenditure, the number of medical devices, and inpatient mortality rate) and their subcategories. The independent variable was the ratio of the number of new private hospitals in a 10 km radius in a given year to the number of existing hospitals in a 10 km radius in the base year (2007). This variable measures the increase in intensity of competition from private hospital entries to the local hospital market.

**Findings** When the ratio of the number of private hospital entries to existing hospitals increased by 100%, there was a decrease in total revenue of 21.4% ( $p < 0.0001$ ) and patient visits to 23.7% ( $p < 0.0001$ ) incumbent private hospitals. By contrast, for incumbent public hospitals, total revenue only decreased by 1.3% ( $p = 0.839$ ) and patient visits increased by 1.6% ( $p = 0.826$ ). Furthermore, private hospitals cut total expenditure by 18.9% ( $p < 0.0001$ ). Specifically, the number of medical staff decreased by 4.8% ( $p = 0.015$ ) and total wage expenditure decreased by 13.5% ( $p = 0.013$ ). By contrast, public hospitals raised the number of medical staff by 5.3% ( $p = 0.092$ ) and increased the number of medical devices by 14.9% ( $p = 0.048$ ). Finally, inpatient mortality rate decreased in public hospitals by 3.43 deaths per 1000 admissions ( $p = 0.001$ ). By contrast, inpatient mortality rate decreases by 0.119 deaths per 1000 admissions ( $p = 0.855$ ) in private hospitals.

**Interpretation** The results show that the 2009 health-care reform has intensified hospital competition. Private and public hospitals respond differently to more intense competition: private hospitals reduce expenditure, whereas public hospitals raise health-care service quality. Our findings suggest that future pro-competition reforms need to consider differential responses to market competition between private and public hospitals.

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## Contributors

JY, YY, and SZ jointly proposed the project, conducted the statistical analyses, and wrote the abstract. JY, YY, and SZ contributed equally to this project. All authors have seen and approved the final version of the Abstract for publication.

## Declaration of interests

We declare no competing interests.

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Department of Economics,  
National University  
of Singapore, Singapore  
(J Yi PhD); School of Economics,  
Peking University, Beijing,  
China (Y Yuan PhD);  
Department of Economics,  
Sichuan University, Chengdu,  
China (S Zhao PhD)

Correspondence to:  
Dr Ye Yuan, School of Economics,  
Peking University, Beijing  
100871, China  
yuanye.econ@gmail.com