Healthcare across Boundaries: Urban-Rural Differences in the Financial and Healthcare Consequences of Telehealth Adoption

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**Background**

- Telehealth adoption has expanded by an order of magnitude in the US
- Telehealth (Telemedicine): use of technologies to support remote, digitally-enabled clinical healthcare

![Graph showing total telehealth expenditure from 2012 to 2019](chart.png)

Source: GAO analysis of Medicare statutes and regulations | GAO-17-747T
Related Work

- Effects on healthcare (Hersh et al 2001, Jennett et al 2003)
- What is under explored: the competition among healthcare providers
  - Rural providers face greater competition from urban telehealth adopters
  - Telehealth may backfire as rural hospitals are closing rapidly (135 from 2010 to 2020)

We address the following research questions:

1. How does telehealth adoption affect competition, especially the financial performance, of healthcare providers across geographic regions?
2. What are the underlying channels that redistribute patient flows through telehealth services?
3. What are urban providers’ competitive edges in serving patients virtually?
Research Design and Data

Research Design

- Challenge: The adoption of Telehealth is endogenous
- **Telemedicine Licensure Compact** is a nationwide quasi-random, geographic shock that lowers providers’ cost of delivering interstate telehealth
- We estimate a staggered difference-in-differences (DID) regression

Data

- **Physician sample**: Open Payment database (2013-2018) for quarterly licensure information and CMS Medicare Provider Utilization and Payment Data
- **Hospital sample**: CMS Healthcare Cost Report Information System (HCRIS, 2012-2018) for hospitals’ annual patient services and revenues, etc.
- **Patient sample**: IBM Marketscan database (2012-2019) for de-identified patient healthcare reimbursement info such as procedure and revenue codes
Main Findings

- Financial effects: a shift of service from rural to urban providers
  - Physician level: Medicare payments of affected rural physicians drop by 5.6%, and those of affected urban physicians increase 1.9%
  - Hospital level: affected rural hospitals experience a 4.5% decline in total revenue, whereas their urban counterparts experience a gain of 2.6%

- Two channels (shown by the patient sample):
  - Substitution effect: affected rural patients increase telehealth expenditures to urban providers by 7.6% and reduce telehealth expenditures to rural suppliers by 15.1%
  - Gateway effect: an affected rural patient’s follow-up in-person visits to an urban provider after the first telehealth visit significantly increases by 8.6%

- Heterogeneous effects: affected urban providers receive more financial benefits if their hospitals have better telehealth equipment or if their hospitals have higher ratings (high-quality services)