The Economics of Medical Procedure Innovation

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MOTIVATION
Rich literature on pharmaceutical innovation
- Development times, attrition rates, costs, patent, the FDA approval process and the timelines involved.
Sparse literature on medical procedure innovation
Why are medical procedures important?
- In 2018, the US spends $3.6 trillion (18% of GDP) on health care—32% on hospital care, 20% on physician and clinical services, and 10% on prescription drugs.

Key Differences between drug innovation and procedure innovation
- Timing of Reimbursement: Role of the American Medical Association in granting reimbursable billing codes.
- Appropriability: Mechanism 1: Timing of Reimbursement, the ad hoc system that oversees medical procedure innovation.

Aim 1: Document the extent and pace of medical procedure innovation and contrast them with those of pharmaceutical innovation.
Aim 2: What are the impediments of procedure innovation incentives?
- Mechanism 1: Timing of Reimbursement
- The administrative hurdle of securing reimbursable billing codes substantially delays the diffusion of innovation.
- Medicare Utilization increases 9-fold after the procedure code was promoted from provisional (non-reimbursable) to permanent status (Category I).

EMPIRICAL ESTIMATION
Model 1: DID
\[ Y_{it} = \beta_0 + \beta_1 PostCPT \times \text{Characteristics}_{it} + \Gamma \text{Trend}_{it} \times \ln\text{Time Trend}_{it} + \text{CPT}_{i,t} + \Omega \text{Year}_{it} \]
Model 2: Event Study
\[ Y_{it} = \beta_0 + \Phi \sum_{i=t} \text{Event}_{i,t} + \text{Characteristics}_{it} + \Gamma \text{Trend}_{it} \times \ln\text{Time Trend}_{it} + \text{CPT}_{i,t} + \Omega \text{Year}_{it} \]
For procedure i in year t, \( \text{PostCPT} = 1 \) is initiation (utilization) after PostCPT, \( \text{PostCPT} = 0 \) is before.

MECHANISM
Mechanism: Certification Effect vs. Financial Effect
- Certification mechanism: approval can certify the quality of the procedure.
- Financial incentive mechanism: promotion of CPT codes from temporary status (Category III) to permanent status (Category I) allows for payer reimbursement.

RESULTS

CONCLUSIONS AND IMPLICATIONS
The administrative hurdle of securing reimbursable billing codes delays the diffusion of innovative medical procedures.
Medical societies leads the billing code application when the procedure does not involve exclusive patented devices.
Future policies should find a better balance among safety, access, and innovation incentives of medical procedure innovations.