

The Effect of Vertical Integration on Physicians' Referral Pattern for Surgical Procedures

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Vertical integration between hospitals and physician practice groups is an emerging trend in the US health care market. Vertical integration creates incentives for physicians to localize referrals to their owner hospitals. For surgical services, the Medicare fee schedule has higher reimbursement rates for surgeries performed in hospital-based settings compared to alternative, free-standing settings. This paper analyzes the impact of the hospital-physician integration on physicians' referral patterns for three categories of downstream outpatient surgical procedures—joint arthroscopies, cataract replacement surgeries, and colonoscopies.

Using 100% Medicare fee-for-service claims data and MD-PPAS from 2013 to 2016, we attributed patients to primary care providers, linked individual providers to practice groups, identified the integration status of practice groups, and measured referral patterns at provider-level for each procedure. For the outcomes, we evaluated the impact of vertical integration on the probability of referring to a hospital-based facility, the total medical expenses for Medicare and beneficiaries, and patients' travel distance.

First, we used difference-in-difference regressions with provider and time fixed effects to estimate the impact of integration. We find that vertical integration leads to 4.5 to 8.3 percentage points increase in the probability of receiving surgery in a hospital-based facility, a \$6.6 to \$54.2 increase in Medicare spending, and a 1 to 2-mile increase in patient travel distance. At an aggregate basis, our estimates imply that vertical integration over this time period led to a 900,000 procedure increase in the number of surgeries performed at hospital-based facilities instead of independent facilities. This change in the choice of site-of-care is accompanied by a \$73 million increase in Medicare and a 6.8 million miles increase in patient travel distance. Those results are substantive reduced-form evidences for the impact of vertical integration on physicians' referral patterns as well as resulting burden on Medicare and beneficiaries.

Next, we employed a discrete choice model for the choice of downstream provider. This model enables us to incorporate patients' preference into PCPs' referral decision. We assume patients' utility is a function of service price p_{kt} , patients' own characteristics (such as age, gender, race), provider characteristics (such as group size), and the travel distance. On the other hand, we assume PCPs are altruistic—they take into account their patients' utility in addition to the incentives from integration. Therefore, PCPs' utility is a function of service price, aforementioned patient and provider characteristics X_i and Z_{kt} , and the integration status between PCPs and downstream providers. We also include provider fixed effects and PCP fixed effects in the utility function to capture time invariant effects from unobserved characteristics of providers and assigned PCPs, respectively. Therefore, the utility of referring patient i to provider k in market t is

$$u_{ikt} = \alpha p_{kt} + X_i \beta^X + Z_{kt} \beta^Z + V I_{j(i)kt} \beta^V + d_{ik} \beta^d + \delta_k + \delta_{j(i)} + \varepsilon_{ikt}$$

X_i is a vector of patient i 's characteristics, Z_{kt} is a vector of provider characteristics, VI_{jkt} is an indicator of whether PCP j and provider k are integrated in market t .

We then use multinomial logit regressions to estimate the impact of vertical integration on provider choice. Based on the estimates and predicted choices, we are able to measure the effect of vertical integration on the probability of choosing a hospital-based facility and the expected spending and travel distance for each procedure.

Results from this paper suggest that vertical integration increases concentration of hospitals, total spending, as well as the travel cost to Medicare beneficiaries. We are extending these results to look at the full impact on patient welfare and market dynamics.