Outside equity and healthcare firm behavior

Haizhen Lin, Elizabeth L. Munnich, Michael R. Richards, Christopher M. Whaley, and Xiaoxi Zhao*

Businesses regularly seek capital from public and private markets, and healthcare firms are no exception. However, our understanding of healthcare firms' responses to new investors is incomplete, especially across the wide variety of industries. We undertake a novel investigation into outpatient surgery markets and ambulatory surgery centers (ASCs). ASCs are highly specialized firms that have long attracted external investments. Our empirical strategies capture ASC behavior changes following three distinct financial events involving private equity deals and an initial public offering (IPO). Capital infusions affect the financial engineering of ASCs but typically not treatment styles—though heterogeneity exists across investment sources.

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* Lin: Indiana University; Munnich: University of Louisville; Richards: Baylor University; Whaley and Zhao: RAND Corporation. *Corresponding author*: Richards, michael_richards@baylor.edu, Phone: (254) 710-4861.

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1. Introduction

Raising capital for firm expansion, productivity enhancements (e.g., technology adoption), and/or improved financial position is a regular occurrence for businesses in a variety of industries across the US economy and has been for most of its corporate history. However, a notable shift has taken place over the past 25 years, with private markets overtaking public markets as the predominant sources of external funding (Mauboussin and Callahan 2020). For example, in 2017, US companies received $3 trillion in financing from private markets compared to only half that (i.e., $1.5 trillion) from traditional public markets (Mauboussin and Callahan 2020). Private market investment vehicles' global fundraising has also resumed its upward trend following the retreating pandemic risks from COVID-19—with $700 billion in newly available capital (i.e., "dry powder") for North American funds in 2021 alone (McKinsey & Company 2022).[1]

Although private market funders include various investment industries (e.g., venture capital, real estate trusts, etc.), private equity (i.e., "PE") firms, specifically, are often some of the most highly capitalized and influential entities in this space. Views on private equity's presence and performance in different sectors of the economy have long been mixed, however. Some argue that these firms improve company efficiencies, productivity, and valuations (Jensen 1986, 1988; Argawal and Tambe 2016; Davis *et al*. 2019) as well as spur beneficial job creation (Davis *et al*. 2014); yet, others contend that key groups are harmed—particularly exposed workers (Shleifer and Summers 1988; Olsson and Tag 2017; Antoni *et al*. 2019). Associated controversies, coupled with the continued growth of private equity activity, has prompted concerns from industry stakeholders, regulators, as well as policymakers—especially as private equity begins playing larger roles in sensitive industries, such as those belonging to the healthcare sector.

Private equity dealmaking in US healthcare, specifically, has approached nearly $800 billion over the most recent decade, with many anticipating a continued climb (Scheffler, Alexander, and Godwin 2021). A confluence of factors is likely adding to private equity's affinity for healthcare investments (e.g., demographic trends, chronic disease burden, widespread insurance coverage, technology developments, etc.), but even historically, industry estimates suggest that the private equity returns on healthcare investments have outperformed those made in other sectors of the economy (Bain & Company 2022). Moreover, contemporary physicians are

[1] Across the globe, private investors are estimated to have nearly $10 trillion in assets under management (McKinsey & Company 2022).

having to navigate an increasingly complex and expensive practice environment in terms of the health information technology, insurer contracting sophistication, regulatory compliance, and other business costs that must be covered in order to maintain (much less grow) a financially stable enterprise. These circumstances are making outside investors/owners, including private equity, more attractive options for many physician practices as well as other smaller, more thinly capitalized healthcare firms (Strongwater 2022).

Private equity's recent acceleration within US healthcare has not gone unnoticed, however, and has led to a host of questions and concerns among interested parties (e.g., see Scheffler, Alexander, and Godwin 2021; Newitt 2022a, 2022b). Many of the concerns can be distilled down to a fundamental unknown: do private equity investors change how healthcare firms provide care or do they simply provide financing and business support functions to these firms? The latter scenario would not obviously invite regulatory interference and could even benefit providers and patients through expanded and/or more efficient care delivery. However, the former could raise concerns over consumer welfare if, for example, private equity business strategies undermine patients' best interests and therefore lead to more expensive care and/or lower quality care going forward. Such undesirable behavior changes could also have dramatic consequences in a $4 trillion sector of the US economy where a lot of private as well as public spending takes place—not to mention where quality erosion could translate to greater risks of permanent harm, and even death, for consumers. Yet, a priori arguments favoring either scenario are indeterminate, which makes empirical evidence crucial to better inform ongoing debates around private equity's involvement in US healthcare.

The existing literature devoted to private equity in healthcare is relatively new and largely confined to hospitals, nursing homes, and physician practices (e.g., Braun, Bond, Qian *et al*. 2021; Braun, Jung, Casalino *et al.* 2021; Braun, Yun, Casalino *et al.* 2020; Gandhi *et al*. 2020; Gao *et al*. 2021; Gupta *et al*. 2021; Offodile *et al*. 2021; Singh *et al*. 2022). While these investments are important and can be individually large, they still represent an incomplete view of the aggregate private equity activity across the sector. The impact of other common private equity healthcare investments remains virtually unknown. We therefore extend the literature by focusing on an influential and growing dimension of care (outpatient surgery) and key contributing industry (ambulatory surgery centers: ASCs) where private equity has been aggressive (Newitt 2022c), but as far as we are aware, only limited research has been pursued.

At this time, a rapidly growing share of all medical services has been migrating to outpatient delivery for many years (Munnich and Parente 2018; Baker, Bundorf, and Kessler 2019)—forcing even the hospital industry to adapt to this new normal, as its inpatient and outpatient revenue streams are now roughly equal in size (AHA 2020). ASCs, however, rival hospitals and often compete away profitable cases belonging to traditional Medicare and privately insured patients (MedPAC 2021). The ASC industry currently captures 60% or more of all outpatient procedural care (Frack, Grabenstatter, and Williamson 2017) and is composed of over 5,000 individual firms spread out across the US (Munnich and Richards 2022). Industry insiders estimate that it has a total market value approaching $30 billion,[2] and unlike hospitals, ASCs are also overwhelmingly privately held, for-profit firms where financial interests are known to directly influence related medical decision-making, with implications for consumer welfare (e.g., Munnich *et al*. 2021; Richards, Seward, and Whaley 2021; Geruso and Richards 2022).

Given these market attributes and to shed new light in this research area, we combine several unique data sources to conduct a novel investigation into ASC behavior before and after the introduction of outside investors. Specifically, we leverage all-payer data from Florida spanning more than 15 years, detailed ASC ownership information from a CMS Freedom of Information Act (FOIA) request, and corporate structure information from several sources to identify private equity owners among ASC investors. We then examine three related, but distinct, financial events tied to private equity involvement in the ASC industry.

First, we explore the impact of new private equity ownership stakes in standalone ASC firms. Importantly, we capture ASC behavior changes over the full life cycle of private equity investment (i.e., investment as well as divestment decisions), which spans 6-12 years in our analytic data—consistent with private equity investment time horizons in other industries. Second, we leverage the 2010 wholesale private equity acquisition of a large ASC chain, Surgery Partners. This additional set of analyses allows us to compare and contrast the effects of private equity investments on an ASC chain (i.e., a collection of horizontally integrated ASCs) relative to the individual (non-chain) ASCs that comprise our initial empirics. Additionally, the wide window belonging to our analytic data allows us to subsequently investigate any behavior changes once the private equity-owned chain becomes a publicly traded company via its initial public offering

[2] An industry press article remarking on these forecasts can be found here: https://www.beckersasc.com/asc-news/asc-market-to-hit-33b-by-2028-7-other-analysis-takeaways.html.

(IPO) in 2015—a more traditional path for private equity portfolio companies and a departure with the divestment behavior pertaining to individual ASCs noted above—i.e., selling ownership stakes to other private parties, such as ASC chains, hospitals, or provider management companies. Since both the initial private equity investment and the taking on of public shareholders differ from the smaller scale investments by private equity firms in our first analyses, we benefit from data and empirical approaches that facilitate such comparisons of the clinical and financial influences across these different sources of ASC investments. Examining these potentially disparate effects is also critical to better understanding the role of outside equity holders on healthcare firm performance. The risks of perverse financial incentives leading to suboptimal physician agency and/or increasing service prices are not necessarily unique to private equity investments and may exist following other types of capital investments as well.

To estimate the effects of private equity investment and divestment into standalone ASCs, we pursue a difference-in-differences strategy that relies on stacked event study estimation to address the differential timing of private equity ownership across firms in the data (Goodman-Bacon 2021). We then compare the behavior of affected firms against out-of-market firms that are never exposed to private equity involvement over our analytic period. Our identification strategy for our second set of analyses targeting the Surgery Partners private equity acquisition and eventual IPO makes use of a traditional difference-in-differences event study framework since the timing of market events is uniform across members of the ASC chain.

We ultimately find that ASCs do not become more productive after experiencing a private equity ownership stake. On average, these firms maintain the level of throughput demonstrated prior to private equity involvement—though, it is worth noting that ASCs targeted by private equity appear more productive at baseline. They do, however, begin charging much more per case. The increases are gradual but initiate soon after the private equity investment is made, and by 4 to 5 years out, average charges per case are approximately 50% above their baseline levels. The pattern of charging more per service is also common across payers (i.e., Medicare Advantage, private, traditional Medicare, and all others), which is consistent with ASCs setting chargemaster (i.e., list prices) at the firm level. Interestingly, while the firms are charging more for the care provided, they are not performing more intensive clinical care. The number of procedures performed per case declines by roughly 13% over time, with the effect driven by cases in the Medicare market where unbundling procedures can also increase revenue generation from the

public payer. Moreover, the level of case complexity is stable before and after the private equity investment is made. Put differently, we fail to detect any evidence that ASCs shift toward more complicated—and hence expensive—procedures once private equity is involved. At the same time, the ASC's payer mix experiences a shrinking of privately insured business and an expansion of traditional Medicare patients after a private equity firm takes an equity stake. One interpretation is that charging more for the same care leads price-sensitive private insurers and enrollees to seek out other provider options via their network and/or benefit (e.g., cost-sharing obligations) designs. When examining within-market competing ASCs in a supplementary analysis, we do not find that these firms demonstrate similar increases in list prices or shifts in payer mix as those receiving private equity investments (i.e., no evidence of market-wide trend changes).

Our sharpest ASC behavior changes following private equity investment belong to ownership decisions by individual physicians. Private equity appears to crowd-in, rather than crowd-out, physician equity holdings in the targeted ASCs. The effect is not immediate but instead takes place 1.5 to 2 years after private equity has taken an ownership stake in the ASC. At that point, the ASC is 40% more likely to have at least one physician owner (extensive margin) and has 300% more total physician owners (intensive margin) relative to baseline. The number of unique providers performing cases in the ASC and the rate of new providers at the ASC are both unchanged—indicating that providers with a pre-existing relationship with the ASC are now being converted into equity investors once private equity has been introduced. This effect also aligns with a private equity strategy observed in other industries, where remaining managers are required to invest in the company following a private equity takeover (Kaplan 1989; Muscarella and Vetsuyperns 1990; Leslie and Oyer 2008). Besides potentially increasing the amount of equity invested into the ASC (and hence financial capital accessible), this strategy can also credibly tie valuable human capital to the firm in the lead up to selling their investment stakes. An ASC's intangible assets in the form of reputation and existing referral networks attached to the physicians already working within the ASC are arguably more valuable to prospective buyers than the tangible assets (e.g., the building and equipment) available. Relatedly, the physician and private equity owners appear to coordinate their divestment decisions. There is a simultaneous reversal of the physician equity stakes at the point the private equity firm liquidates its ownership position. The physicians continue working at the ASC, however, and the residual ASC owners (i.e., those remaining post-private equity divestment) almost uniformly involve corporate healthcare entities.

The private equity acquisition of the ASC chain typically does not produce similar results. Treatment styles and case mix are stable as well as average list prices per case. Though, one clear commonality with the prior results is the loss of privately insured patients soon after the private equity takeover. ASCs within the chain maintain the same total volume of cases but attract 17-26% less privately insured business a year or more following the acquisition. However, in the lead up to the IPO, these same ASCs appear to increase their case throughput and charge more per case (especially among payers relying on negotiated prices), which is consistent with trying to boost revenues, and hence the company's overall valuation, immediately prior to the public offering. Our findings also suggest that many physician owners in these ASCs liquidate their equity stakes roughly a year before the IPO.

Taken together, our findings show that private equity involvement in the ASC industry seems to focus on financial engineering, rather than altering physician agency and related clinical activity. The results for standalone ASCs are consistent with private equity investors encouraging higher list prices as well as new ownership stakes among physicians already operating at the ASC––with the intent of all parties receiving a favorable downstream payout. However, the results from our second set of empirical exercises demonstrate that firms' responses to the arrival of new investors can depend, in part, on the pre-existing organizational structure (e.g., a horizontally integrated chain), source of capital, and the desired financial endpoints (e.g., a public listing). Thus, the implications of greater private equity involvement in US healthcare companies may not be uniform or necessarily unique relative to other financial pressures, even within the same industry.

2. Brief background on outpatient surgery markets

Outpatient procedures and same-day surgeries are overwhelmingly provided by two types of firms: ASCs and hospital outpatient departments. The organization of these two types of firms is markedly different, however. ASCs are typically small (2-4 operating rooms) and almost exclusively found in more densely populated areas (MedPAC 2021). The traditional (fee-for-service) Medicare program spends roughly $5 billion on ASC-delivered care per year (MedPAC 2021), and some industry watchers project the entire ASC market to be worth more than $30 billion

by the end of the current decade.[3] ASCs are thought to be attractive to consumers due to their greater convenience and generally lower costs (to payers and patients), which partly reflect their "focused factory" high degree of specialization and economies of scale (Casalino, Devers, and Brewster 2003; Paquette *et al*. 2008; Grisel *et al*. 2009; Munnich and Parente 2014; Weber 2014; Munnich and Parente 2018; Aouad, Brown, and Whaley 2019; Carey and Mitchell 2019; Sood and Whaley 2019). Hospitals' outpatient departments fare worse in markets contested by ASCs (Bian and Morrisey 2007; Courtemanche and Plotzke 2010; Carey, Burgess, and Young 2011; Koeing and Gu 2013; Hollenbeck *et al*. 2015) and seem pressured to lower their service prices when facing greater ASC competition (Carey 2017; Whaley and Brown 2018; Baker, Bundorf, and Kessler 2019).

To date, we are aware of only a single study examining private equity involvement in the ASC industry, specifically. Dov Bruch *et al*. (2022) find no evidence of higher case volumes or treatment costs nor worsening care quality after private equity ownership. These are important insights; however, the authors' focus departs from our contribution in several crucial ways. First, their analytic data are a random sampling from a single, public insurer (i.e., Medicare), which precludes any analyses of pricing behavior or shifts in payer mix that can be observed from a universe of ASC clinical activity. For example, we find ASCs increasing their exposure to the Medicare market (i.e., performing more cases) as their privately insured business contracts. Second, the estimations are limited to short-run effects (up to three years post-private equity ownership) whereas we deliberately capture the full life cycle of private equity and the differing effects at the time of investment versus divestment. And finally, the study is unable to speak to any effects on physician ownership stakes in affected ASCs—a measure rarely found in any data (e.g., see Munnich *et al*. 2021) but also one with considerable strategic importance when considering the potential market valuation of a given ASC (discussed further in Section 6).

3. Data

3.1 ASC ownership details

[3] An industry press article remarking on these forecasts can be found here: https://www.beckersasc.com/asc-news/asc-market-to-hit-33b-by-2028-7-other-analysis-takeaways.html.

Our key source of data on ASC ownership structure was obtained by a FOIA request to the Centers of Medicare and Medicaid Services (CMS) in April 2019. The data provide a detailed listing of individual owners (primarily physicians) and organizational owners (e.g., a hospital or ASC corporate chain) belonging to a uniquely identified ASC so long as the ASC was certified by Medicare and operational by January 1st, 2005 or later. Additional descriptions of the FOIA data as well as estimates of the effects of physician-level ownership in ASCs can be found in Munnich *et al*. (2021).

For our subsequent analyses, we first match all possible ASC ownership details to the specific ASCs observed in our Florida encounter data (described next).[4] We then leverage corporate structure information from S&P Capital IQ Pro, along with supporting data sources and web searches, to identify private equity owners among the universe of ASC equity holders observed.[5] These combined pieces of information allow us to identify all Florida ASC firms experiencing a private equity ownership stake as well as the precise date of the investment and (when relevant) the eventual divestment date over the 2004 through 2019 period.

3.2 All-payer encounter data

We benefit from the universe of outpatient (ambulatory) procedure discharge records that encompass all payers in Florida (including the self-insured and charity care). The data are maintained and distributed by the Florida Agency for Health Care Administration (AHCA). Because of the timing of different private equity investment events as well as the characteristically long lags until divestment (often 6 or more years), we exploit more than 15 years of discharge records, beginning in 2004 and ending 2019. However, as described in Section 4, our estimation strategy will not use all years of data for each firm in the analyses. The encounter data are at the quarter-year level and contain rich information on patient characteristics, health problems, and services received—including the type of firm where the care is taking place (i.e., ASC or hospital outpatient department) and the specific provider (normally a physician) that is performing the procedure(s) for the patient. Such historical and comprehensive data are crucial to studying

[4] Two ASCs in Florida experiencing a private equity investment event could not be confidently matched to the all-payer encounter data.

[5] Additional data sources include: Bloomberg Businessweek and Bloomberg terminal, Factivia, SDC Platinum's M&A lists for healthcare facilities, and SEC reports.

healthcare firm behavior over the full private equity lifecycle (i.e., private equity investment and divestment—including sufficient pre-investment and post-divestment time). Florida also falls in the middle of the national distribution in terms of the number of ASCs per 100,000 Medicare beneficiaries and does not limit ASC entry or expansion behavior via state certificate of need laws.

4. Empirical strategy for standalone ASCs

4.1 Analytic sample and outcomes

To focus our main analyses on the ASC firms of most general interest (i.e., individual firms experiencing direct private equity financial investments), we begin by excluding from the treatment group a subset of ASCs that are only found to be indirectly linked to private equity (e.g., through ownership by a parent healthcare company that eventually is sold to or enters into a joint venture with a private equity company). We also set aside ASCs ever belonging to the national chain, Surgery Partners, and return to these specific firms in Section 5.[6] We also restrict our treatment group ASCs to those with at least six years of private equity ownership duration and with at least nine years of Florida market presence. The plurality of potential treatment group ASCs easily satisfy each of these conditions; though, three ASCs' private equity investments are ongoing at the conclusion of our data—making them ineligible for a divestment-focused analyses. Figure 1 displays the distribution of private equity investment durations observed among our resulting treatment group ASCs. The majority lasts for at least seven years. Also, of note, roughly half of the private equity ownership events we use for identification (described in Section 4.2) involve multiple private equity investors; however, their investments are uniformly simultaneous, rather than in sequence (i.e., the private equity investment "treatment" occurs at a single time point).

Our control group ASCs are those that never have any direct or indirect private equity involvement, participate in Florida outpatient surgery markets for at least nine years, and are geographically located in counties separate from those where the private equity affected ASCs reside. In our encounter data, approximately 80% of an ASC's business is from patients living in the same county as the ASC, on average. Thus, ASCs from other counties can reasonably be assumed to be out-of-market and not exposed to any potential market-wide spillover effects from

[6] We also exclude a subset of ASCs that are ever part of the AmSurg chain. For these specific firms, we are concerned they may be poor candidates for control group inclusion since AmSurg underwent two substantial ownership transitions during our study period and is therefore worthy of its own study in isolation.

private equity ASC investments.[7] Subsequently, we have 24 unique ASCs that comprise our treatment group and 89 unique ASCs belonging to the control, comparison group for our following main empirical efforts.

For each of these treatment and control ASCs, we capture facility-quarter-level detailed measures of clinical activity, payer mix, and physician ownership (the most common type of ASC ownership by far). The clinical activity outcomes include the total number of outpatient surgery cases performed, the average number of procedures completed per case, the performance of laparoscopic surgery cases (which involve substantive capital investments, as these are technologically advanced procedures), and a proxy measure of average case complexity.[8] The latter measure is constructed by applying the corresponding Medicare facility fee to the main procedure performed in a given case. Our rationale is that Medicare fees are administratively set and aim to reimburse providers for average costs. The fees also exist on a deliberate spectrum that maps to the degree of complexity belonging to each procedure (i.e., higher reimbursing procedures are more complex and costly to perform, lower reimbursing procedures are the opposite). To avoid idiosyncratic year-to-year administrative fee fluctuations, we apply the 2011 Medicare ASC facility fee schedule to all encounter data years, which is also the year that the most substantive Medicare ASC facility fee updates were fully phased in (see Munnich and Richards (2022) for details). In this way, we have a consistent proxy measure of case complexity applied over time. We also measure the average total charges billed per case. While charges do not represent the negotiated price paid by private insurers or the administrative price paid by public insurers, they do influence price negotiations (which commonly include "percent of charges" price agreements) and are therefore a strategic lever that can financially impact these firms (Cooper *et al*. 2018; Weber *et al*. 2021; Linde and Egede 2022). Additionally, when examining private equity stakes in physician practices, Singh *et al*. (2022) find both a 20% increase in practices' charges and an 11% increase in actual reimbursements paid by insurers—in agreement with the well-known industry linkage between list prices from providers' chargemasters and transaction prices for their services.

[7] As discussed in Section 4.3, a supplementary spillover analysis does not show obvious evidence of any market-wide effects.

[8] Of note, the recent study from Singh and colleagues (2022) showing higher payments for physician practices receiving private equity investments did not investigate changes in case or service mix, which leaves ambiguity around the interpretation of their payment change findings.

With respect to payer mix, we allocate ASC's patients across four comprehensive and mutually exclusive insurance categories: private (i.e., commercial), traditional Medicare (i.e., government administered Medicare fee-for-service), Medicare Advantage (i.e., privatized Medicare coverage), and all others (e.g., Medicaid, military, uninsured, workman's compensation, etc.). Of note, more than 80% of outpatient surgical cases are typically paid for via private or fee-for-service Medicare insurance (Hall *et al*. 2017). We then calculate the representation of each of the four insurance categories belonging to the ASC in a given quarter in percentage-point terms.

Our final key outcomes of interest focus on the individual providers working within the ASC in a given quarter. We specifically measure the presence (extensive margin) and degree (intensive margin) of individual physician ownership belonging to each ASC in our treatment and control groups. We then supplement this information with the number of unique providers performing clinical cases at the ASC as well as the arrival rate of novel providers (i.e., those performing a procedure in the relevant ASC for the first time) to the ASC in a given quarter (as a percentage of all unique providers observed in that quarter). These latter measures can help interpret if a change in physician ownership activity is occurring among providers already working at the ASC or among providers newly relying on the ASC (i.e., ownership conversions versus ownership recruitments).

4.2 Investment estimation

Our empirical strategy is a straightforward application of a difference-in-differences (DD) research design, with the lone exception that we rely on a 'stacked' even study model to account for the differential timing in private equity investment occurrences across the treatment group ASCs. Doing so enhances transparency in our approach and findings and avoids the known interpretation problems from the two-way fixed effects DD estimator (Goodman-Bacon 2021).

For our treatment group ASCs, we confine their analytic data contributions to be a balanced panel including the 10 quarters (2.5 years) before their private equity investment event through the six years after the event—irrespective of the exact quarter-year a given event occurs. To do an analogous analytic data construction process for the control group ASCs, we have to first assign an 'anchor' (or placebo) date to each ASC since, by definition, none of these firms experience a private equity event at any time in our data time period. We consequently randomly assign an anchor date from the range of private equity event dates observed among the treatment group

ASCs. We then place identical balanced panel and eligible time period contribution restrictions on the control group ASCs based on the randomly assigned anchor date. A parsimonious event-time DD specification with ASC firm (λ) and time (γ) fixed effects can then be implemented:

$$Y_{at} = \delta_j \sum_{\substack{j=-10 \\ j\neq -4}}^{23} \mathbb{I}\left[Treated_a \times (Time = j)\right] + \lambda_a + \gamma_t + \varepsilon_{at} \quad (1)$$

The resulting series of delta coefficients can inform the presence or absence of differential trending across the treatment and control groups prior to the private equity event (t = 0) as well as any differential behavior (and any dynamics in the effects) after a private equity ownership stake has been made.

Table 1 lists the baseline quarter summary statistics for our two groups of ASCs: 1) those experiencing a private equity ownership event and 2) those that never have any private equity direct or indirect involvement and operate in markets different from the treatment group ASCs. It is clear that the ASCs targeted by private equity firms cater to a younger and privately insured population. These same ASCs have 48% more quarterly output, on average, than their control group counterparts and are more likely to have advanced surgical technology (60% can perform laparoscopic procedures). They also typically charge more for a given case—approximately 50% above the average control group ASC list price. Half of the treated ASCs have physician owners at baseline while 60% of the control group ASCs have physician ownership present—both have roughly two physician owners, on average.

4.3 Investment results

Figure 2 begins our stacked event study main findings. The top panel demonstrates that the aggregate case volume is stable over time—i.e., there are no statistically significant differential changes in the outcome when the private equity stake is made (t = 0). However, this is not the case for the average charge per case (i.e., the "list price" measure). Average charges per quarter show no differential trending between the treatment group and control group ASCs during the 10 quarters leading up to the private equity event, but as soon as private equity claims an ownership stake, list prices take an upward trajectory (panel B, Figure 2). The increases are gradual over the post-period (with a bit of stairstep pattern—consistent with the timing of annual price

renegotiations), and by 4 to 5 years post private-equity involvement, the average list price is approximately 50% above the baseline level (Table 1).

Figure 3 further illustrates that the post-private equity investment change in charges per case is evident across all payer groups. The pattern aligns with chargemaster rates being set at the firm, as opposed to payer, level and suggests a deliberate strategic change for the firm when the mix of owners now includes private equity. Importantly, the results in Figure 4 make clear that the increase in average list prices is not accompanied by more intensive or more complex care. The number of procedures per case is actually 13% lower four years after the private equity ownership event (panel A, Figure 4). There are no changes in the likelihood of technologically advanced surgical care (i.e., laparoscopic procedures). Moreover, the average procedure complexity (using our Medicare administrative pricing proxy measure) is flat for these firms over the full study period (panel C, Figure 4). These findings also align with the Braun, Bond, Qian, *et al*. (2021) study of dermatology practices and private equity in terms of the margins as well as the timing of responses and with the Singh *et al*. (2022) study showing higher charges and transaction prices after private equity ownership when using a wider variety of physician specialties.

Within Figure 5, we undertake a payer-specific decomposition of the within-case treatment intensity decline observed in panel A of Figure 4. Interestingly, the overall effect is predominantly driven by traditional Medicare cases. Medicare Advantage and the composite ('all other') group demonstrate stable treatment intensity over time, and the number of procedures per case does not fall for the privately insured until three years after the private equity investment. The decline for Medicare beneficiaries occurs right around the private equity event and grows with time. Because of how Medicare reimburses ASCs for multiple procedure cases (i.e., 100% for the most expensive procedure performed, 50% for any additional billable procedures performed in the same case), unbundling procedures would be consistent with strategic revenue maximization if doing so allows the physician and the ASC to spread the procedures across multiple encounters (i.e., separate cases) and therefore receive the full (100%) Medicare ASC facility payment for each procedure.

Figure 6 demonstrates that ASCs targeted by private equity investors do witness a change in payer mix, even though the volume of cases is largely unchanged (Figure 2). The portion devoted to privately insured business gradually declines in the years following private equity involvement and is down almost 10-percentage points by five years out (a nearly 20% decline relative to baseline—see Table 1). Much of the loss of private patients is replaced by traditional

Medicare patients, especially in the later post-period quarters (panel B, Figure 6)—and as noted above, the affected ASCs seem to be doing fewer procedures per case for Medicare beneficiaries just as more of their operating time (and potentially revenue stream) is being devoted to this market. Medicare Advantage shows a fairly sharp, positive increase around the time of the initial private equity investment and remains at least suggestively elevated in all subsequent years. The pattern of coefficients is fairly flat for all other payers belonging to panel D, however. When examining potentially competing ASCs (i.e., the in-market ASCs intentionally excluded from the analytic sample control group) in Appendix Figures A1 and A2, we see no clear evidence of similar changes in list prices or payer mix that could otherwise be indicative of spillover effects (e.g., strategic complementarities) or market-wide phenomena (e.g., a negative economic shock leading to a reduction in private insurance enrollment).[9]

Many of our sharpest and largest ASC behavior changes relate to physician equity stakes (Figure 7). Specifically, 1.5 to 2 years after private equity involvement, affected ASCs are roughly 20-percentage points (40% over baseline) more likely to have at least one physician owner. On the intensive margin, the number of individual physician owners has increased by 5 to 8 physicians by this same point in the post-investment period (panel B, Figure 7). At the higher end of this change, this represents a 3-fold (300%) increase over the baseline level of the degree of physician ownership (Table 1) for these firms. Interestingly, the bottom two panels of Figure 7 reveal that the uptick in individual physician owners is not in tandem with new providers being brought into the ASC's clinical activities; instead, the findings indicate that physicians with existing clinical attachments to the ASC are now being converted into partial owners of the firm not long after the private equity investment is made.[10]

4.4 Divestment estimation

[9] The analytic approach closely follows Section 4.2. The main difference is the treatment group ASCs are excluded and replaced by same-market ASCs never exposed to private equity ownership as a quasi (or spillover) treatment group. The key event time for this spillover group is the first instance of a private equity ownership stake among one or more competitors (i.e., the Section 4.2 treatment group ASCs that operate in the same geographic market). The control group from Section 4.2 remains the same.

[10] Of note, to comply with federal anti-kickback regulations, a physician cannot simply have an ownership stake in an ASC without performing a substantial (at least one third) share of her/his outpatient procedures at the specific facility.

Our divestment estimation procedure closely follows Section 4.2. The main difference is the eligible time window for the stacked event study approach. We now employ a three-year lookback period prior to the time of private equity divestment and then examine the subsequent six quarters following the divestment event—making ($t = 0$) the divestment quarter in this analysis. Of note, three of the treatment group ASCs cannot be a part of this analysis since their private equity investment is ongoing at the conclusion of our analytic data. The use of a randomly assigned 'anchor' date to extract a control comparison subset of ASCs takes place just as before; though, the number of control group ASCs is slightly different due to the randomization of a different subset of dates (i.e., divestment dates rather than investment dates) and the subsequent time window restrictions. The event study DD specification is a slight adaptation of Equation (1) and has the same interpretations:

$$Y_{at} = \theta_j \sum_{\substack{j=-12 \\ j\neq -4}}^{6} \mathbb{I}\left[Treated_a \times (Time = j)\right] + \lambda_a + \gamma_t + \varepsilon_{at} \quad (2)$$

4.5 Divestment results

Table 2 shows that, along most margins, ASC behavior after the initial private equity investment persists once the private equity entity divests from the ASC. The noteworthy exceptions in Table 2 are the physician ownership outcomes. Both measures seem to more or less return to their baseline levels (Table 1) once the private equity firm has liquidated its ownership position. This inference is further supported in Figure 8 that displays the estimates from the stacked event study specification described immediately above. The elevated levels of any physician ownership (extensive margin) and the number of physician owners (intensive margin) revealed in Figure 7 (Section 4.4) remain stable over the three years leading up to the private equity divestment decision but demonstrate a sharp drop at the time of divestment. In other words, the physicians convinced to take an ownership stake following the introduction of a private equity investment also cash-out their holdings simultaneously with the private equity investor(s). At the same time, there is no indication that these physicians stop performing procedures at the ASC (Appendix Figure A3). They are simply no longer directly tied to the financial performance of the firm. Figure 9

demonstrates that the residual owners of affected ASCs are overwhelmingly corporate structures––either a hospital chain or a parent ASC chain.[11]

5. Empirical strategy for ASC chain analysis

5.1 Background for ASC chain and private equity acquisition

As previously noted, the ASC chain, Surgery Partners, has features germane to this paper but also distinct from the analyses described in Section 4. We therefore conduct a second set of analyses to examine these horizontally integrated ASCs in isolation and over two separate financial events of interest in order to compare the findings with our prior results for standalone ASCs.

The Surgery Partners chain was founded in 2004 in Florida, and its entire network of ASCs were confined to Florida until it came under private equity ownership (H.I.G. Capital) in December of 2009. Subsequently, it began to build up its network in Florida as well as the rest of the US—leading to a market presence in nearly 30 states today. Importantly, this private equity transaction differs from our previous market events of interest not only because it takes place at a higher organizational level (i.e., a parent company, rather than an individual ASC firm) but also because the private equity's financial endpoint is not divestment via selling the ownership stake to another private party. Instead, the chain announces an IPO in September of 2015—making it a publicly as opposed to privately held company going forward.[12]

5.2 Analytic sample and estimation

Much of the analytic setup conforms to Sections 4.1 and 4.2. The key differences are: 1) we also exclude the ASCs belonging to the treatment group in Section 4 since they would be inappropriate controls and 2) we can rely on a traditional (rather than 'stacked') DD event study since all ASC members of the chain are exposed to financial events of interest simultaneously (i.e., no differential timing in treatment).

The analytic data span the first quarter of 2007 through the fourth quarter of 2017 to include the private equity and IPO events for the ASC chain. ASCs owned by Surgery Partners prior to

[11] Of note, when examining the timing of hospital ownership in the affected ASCs relative to that of the private equity firms, we see that private equity preceded hospital investments about half of the time, with the reverse being true the other half of the time.

[12] H.I.G. Capital retained a controlling amount of shares in the publicly traded company until 2017 when Bain Capital purchased a controlling stake from H.I.G.

private equity ownership and present over this 11-year period are considered treated. Remaining out-of-market ASCs (i.e., those located in other counties) also observed consistently over this time period and not excluded for the reasons previously noted serve as the controls. We set the event study time point ($t = 0$) to be the initiation of private equity ownership of the ASC chain. The DD specification is as follows:

$$Y_{at} = \beta_j \sum_{\substack{j=-12 \\ j\neq -4}}^{30} \mathbb{I}\left[Treated_a \times (Time = j)\right] + \lambda_a + \gamma_t + \varepsilon_{at} \quad (3)$$

We are ultimately interested in firm-level differential behavior change with the advent of private equity ownership as well as the chain's official IPO nearly six years later.

5.3 Results

Table 3 summarizes the pre-private equity period for our included treatment group and control group analyses. The chain ASCs have lower case volumes, on average, but also perform more procedures per case and have charges that are more than twice that of the control group ASCs, which could be indicative of more complex cases performed at Surgery Partner ASCs at baseline and/or greater negotiation leverage due to their horizontal integration.[13] A higher share of their payer mix (60%) is devoted to the privately insured market, and they have more physician owners per ASC as well.

The event study estimates for the private equity involvement in a large ASC chain have some similarities to the findings in Section 4 (standalone ASCs) but also significant departures. Throughput is largely unchanged for the chain; though, there are suggestive increases in the lead up to the IPO that persist after it is publicly traded company (panel A, Figure 10). In contrast to the behavior of individual ASCs experiencing private equity involvement, the chain's list prices remain stable up until the year prior to the IPO—they also remain elevated after the IPO. Figure 11 shows that this particular behavior change is somewhat evident among the privately insured payer group but is most compelling among the composite 'all other' payer group. Just as before, there is nothing to suggest that the intensity or complexity of cases has increased with the

[13] At baseline, our proxy measure for case complexity is roughly 30% greater for Surgery Partner ASCs when compared to those comprising the control group.

introduction of private equity or when the chain becomes publicly traded (Figure 12). In fact, the number of procedures per case is down roughly 40% relative to baseline (Table 3) following the IPO event (panel A, Figure 12). Interestingly, the fall in procedures per case after the IPO is more evenly spread across the various payer groups (Appendix Figure A4). In the 2-3 years leading up to the IPO, Medicare beneficiaries actually receive an additional procedure per case, which is reversed immediately after the IPO. Such behavior could be consistent with a revenue maximization strategy from the public insurer in the context of capacity constraints (i.e., needing to do more billable activity within a case due to a lack of ability to spread services over multiple cases)—though this is only a speculative interpretation.[14]

Shifts in payer mix, however, closely parallel the findings from Section 4—especially with respect to the substantive decline in privately insured business following private equity ownership and persisting throughout the post-period (panel A, Figure 13). The 10 to 15-percentage point slide in privately insured portion of the payer mix translates to a 17-26% relative reduction over the pre-private equity share (Table 3). In alignment with Section 4 findings, there is a substitution toward the two Medicare markets (i.e., traditional fee-for-service and Medicare Advantage) after the loss of privately insured business. Also, of note, just as this collection of ASCs is charging the 'all other' payer group more per case around the timing of the IPO (panel B, Figure 11), they are also devoting 5 to 7-percentage points more of their payer mix to patients from this group (panel D, Figure 13)—a relative increase of approximately one-third over their pre-private equity rate in Table 3.

Introducing private equity to the chain's ownership structure does not seem to influence individual physician ownership stakes; however, the estimates suggest that physicians tend to sell their equity investments as the company is about to be publicly traded (panels A and B, Figure 14). There is also some evidence that the supply of providers working in the ASC chain facilities increases, especially after the IPO which also coincides with the timing of seemingly increased output (Appendix Figure A5). That said, these additional providers are not novel to the affected ASCs (panel B, Appendix Figure A5)—perhaps indicating that more space has been made available and thereby relaxed some previous capacity constraints.

[14] Recall, Medicare pays 100% of the ASC facility fee for the highest reimbursing procedure and then 50% of the facility fee attached to any other billable procedures performed in the same case.

6.Conclusions

Private equity is not new to US healthcare, but its involvement has been rapidly increasing. The potential misalignment between private equity's financial motivations and physician agency on behalf of patients also raises a variety of stakeholder and regulatory concerns. Theoretical arguments lead to indeterminate conclusions in this context, but sufficiently granular data over long time horizons for robust empirical investigation can be difficult to obtain. We ultimately benefit from a unique combination of data resources that allow us to provide a novel empirical contribution to the relatively small and incomplete existing literature examining private equity in the healthcare sector. We also focus on a domain of US healthcare with considerable and growing importance that is also known to attract private equity attention.

When examining private equity investment and divestment actions, we find that that the clinical conduct of affected ASCs is virtually unfazed by the presence of private equity ownership. These firms neither increase their procedural output nor alter the mix of procedures performed. Thus, physicians' medical decision-making discretion and agency on behalf of patients appear largely preserved. Perhaps the one exception is the potential unbundling of procedures for Medicare beneficiaries, which is at least suggestive of seeking greater revenue from the public insurer as these ASCs simultaneously devote more care delivery to the Medicare market.[15] The evidence is therefore most consistent with private equity engaging in strategic financial engineering in order to enhance the ASC's market value—and hence the value of investors' financial stakes at the time of liquidation. Specifically, ASCs list prices experience substantive upward revisions immediately after a private equity ownership stake is made, despite being stable over the preceding years. At the same time, private insurers appear to steer their enrollees away from these ASCs—consistent with greater price sensitivity and perhaps even a failure to reach price agreement for network inclusion. ASC owners and managers appear willing to make this tradeoff, however, since the loss of privately insured patients is strongly evident in the main analyses as well as the second set of findings focused on the national ASC chain (Section 5).

The other striking standalone ASC behavior changes evident following private equity involvement are tied to individual physician equity attached to these firms. Private equity seems

[15] In a similar way, Singh *et al*. (2022) found a 16% increase in physician practice visit volume, which included more frequent return visits for established patients—also indicative of seeking greater revenue from repeat customers.

to crowd-in physician ASC investments among those already performing clinical cases at the relevant ASC. Doing so can make more financial capital available to the firm, and importantly, better align incentives between all interested parties. Having more physician ASC co-owners can also build stronger (or at least more credible and salient) linkages between the ASC and crucial sources of human capital that influence the reputation of the firm as well as associated referrals and revenue streams. This seems to contrast with the broader private equity literature and industry assumptions around workforce reductions, but it also points toward the likelihood of bespoke private equity strategies that reflect the industry where the investments are being made. For instance, while private equity firms often shrink labor costs belonging to their portfolio companies (inside and outside of healthcare), there is likely to be much less scope to squeeze out efficiency improvements among their ASC targets in this way. ASCs are small organizations with lean staffs when compared to much larger facilities, such as hospitals or nursing homes. Moreover, the human capital present in an ASC is overwhelmingly high-skilled (e.g., nurses, surgical technicians, and physicians) and vital to its core business. The results also indicate that the private equity and physician owners in standalone ASCs coordinate their divestment timing, with both exiting their ownership positions simultaneously. That said, the private equity acquisition of an ASC chain typically does not induce similar behavior changes, which may reflect the fact that horizontally integrated ASCs have already leveraged negotiation advantages vis-à-vis insurers and attracted above average numbers of physician equity holders at baseline. Their behavior does appear responsive to a looming public offering, however, especially with respect to activities that can increase revenue and potential market valuation immediately prior to the IPO.

Our collection of findings therefore indicates deliberate and tailored private equity strategies applied to the ASC industry that are also context specific in terms of the organizational structure of the targeted firm(s) and anticipated financial endpoints. Yet, these strategies are not obviously harmful to consumers so long as patients are not a captive market and thereby forced to accept higher prices for the same services. Physicians' clinical activities also do not seem to be disrupted or constrained when private equity enters the ASC ownership mix. Regulators and policymakers might consequently better serve consumers by focusing their efforts on preserving and promoting provider competition (i.e., the structure of outpatient surgery markets), rather than prohibiting certain sources of financial capital (i.e., the specific outside equity investors in outpatient surgery firms).

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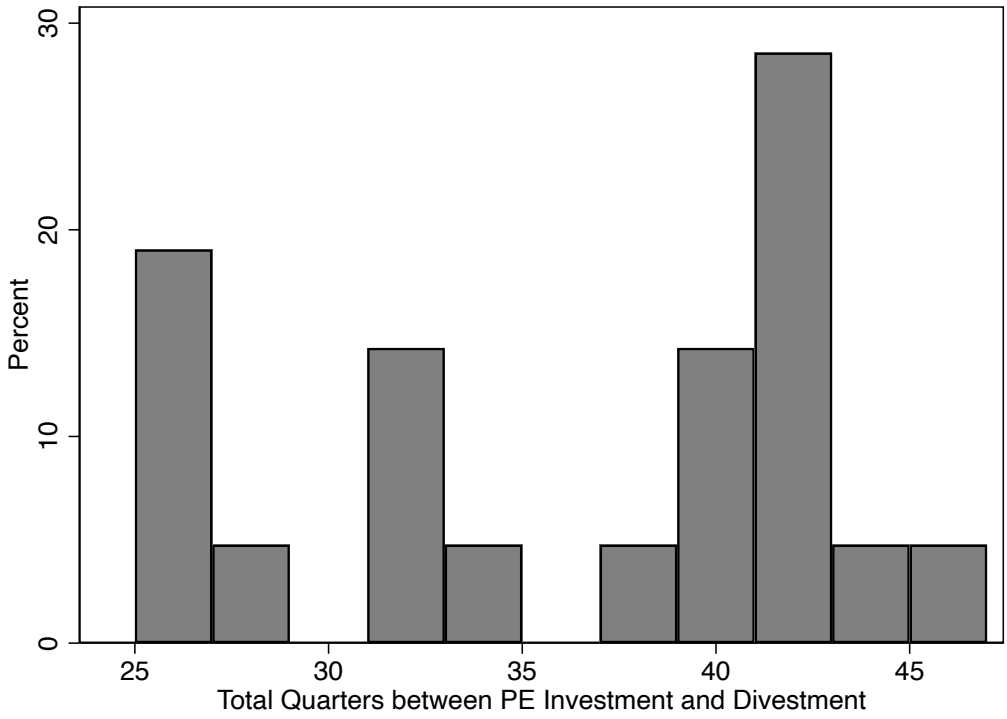
FIGURE 1
DISTRIBUTION OF PRIVATE EQUITY ASC OWNERSHIP STAKE DURATION



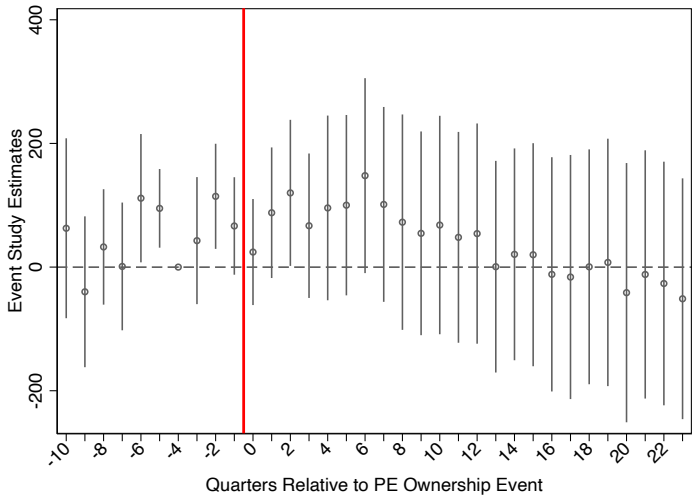
Source: Restricts to ASCs belonging the analytic sample for our stacked differences-in-differences event study estimations. Three treatment group ASCs have an ongoing private equity (PE) investment by the conclusion of our analytic data (i.e., a divestment time point has not been reached) and are consequently not included in this figure since their total PE duration is not yet known.

TABLE I Baseline Summary Statistics for Analytic Sample

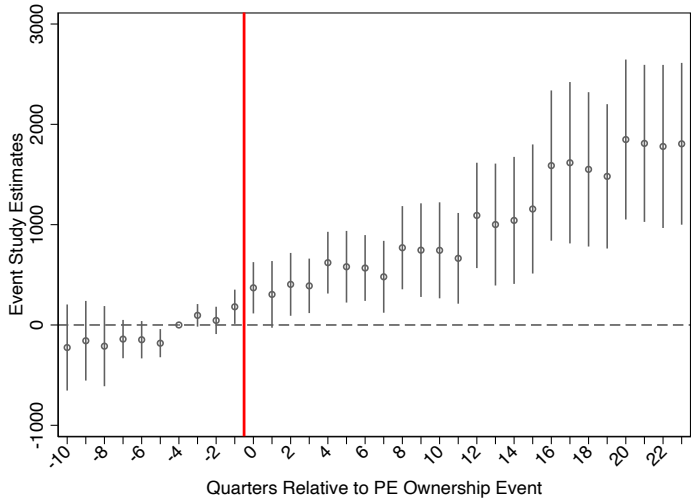
	Treatment Group	Control Group
	Mean	*Mean*
Case Volume	1,468	989
Procedures Per Case	1.5	1.4
Any Laparoscopic Procedures	0.6	0.2
Total Charges Per Case	$3,772	$2,453
% Private	52.2	33.7
% Traditional Medicare	34.8	53.3
% Medicare Advantage	1.0	3.9
% All Other Payers	12.0	9.0
Any Physician Owners	0.5	0.6
No. Physician Owners	2.2	1.7
Unique ASCs (N)	24	89

Treatment and control group ASCs from private equity investment analyses described in Section 4.1 and 4.2.

FIGURE 2
PRIVATE EQUITY INVESTMENT EFFECTS ON ASC CASE VOLUMES AND AVG. CHARGES PER CASE



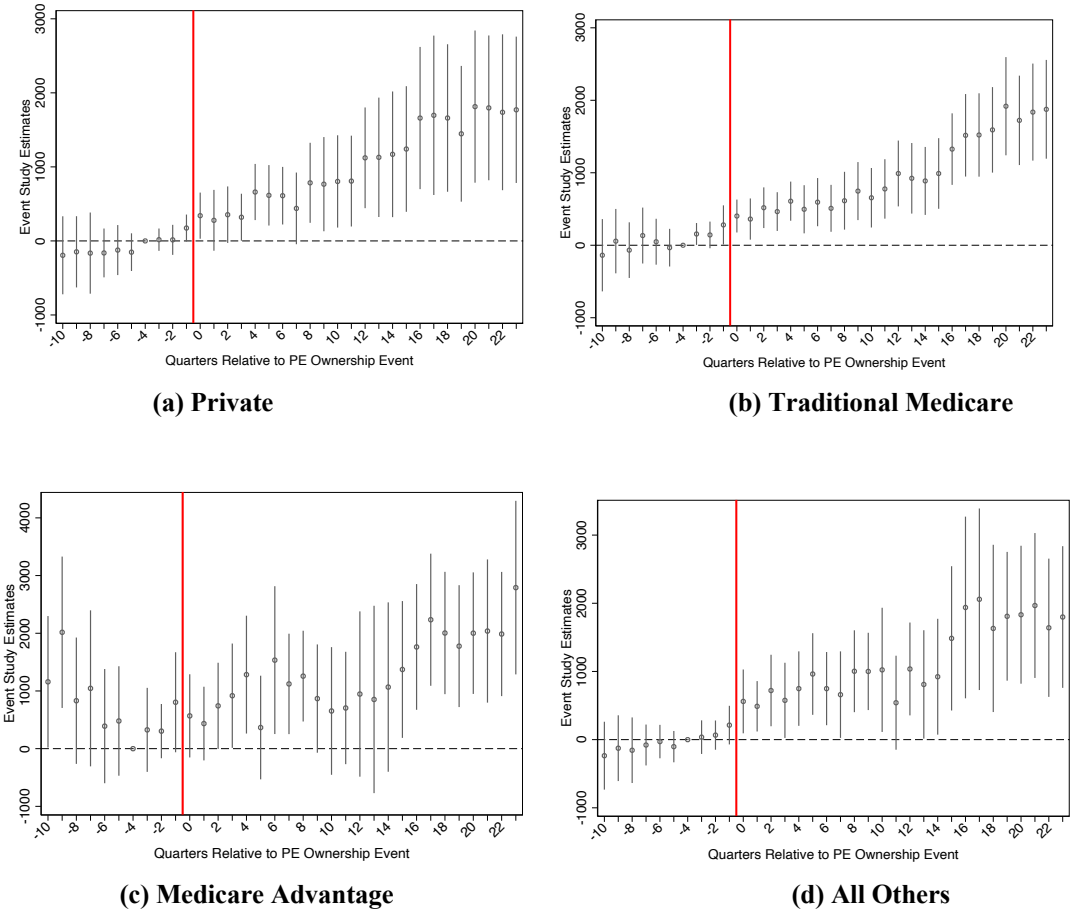
(a) Total Cases



(b) Average Total Charges Per Case

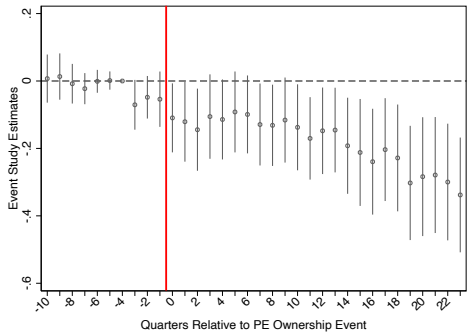
Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 4.

FIGURE 3
PRIVATE EQUITY INVESTMENT EFFECTS ON CHARGES PER CASE BY PAYER

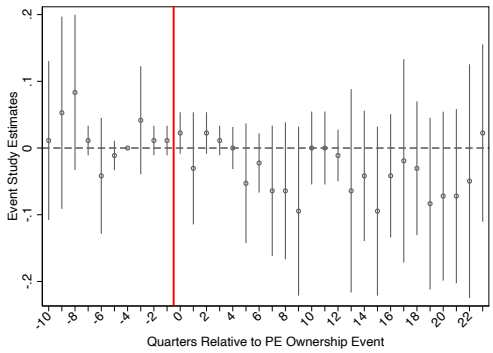


Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 4. When restricting to specific payers, some ASC-quarter combinations will have missing data if no such cases are performed for the specific payer. This is mostly an issue with Medicare Advantage, which had only modest market penetration during the early years of the analytic data.

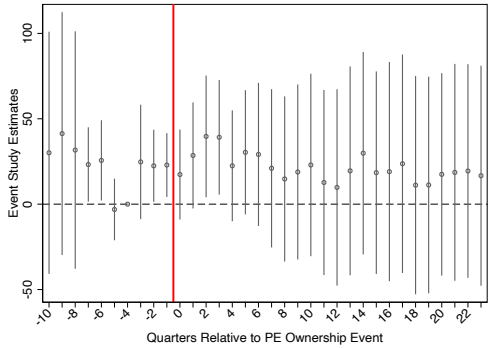
FIGURE 4
PRIVATE EQUITY INVESTMENT EFFECTS ON ASC CASE INTENSITY AND COMPLEXITY



(a) Procedures Per Case



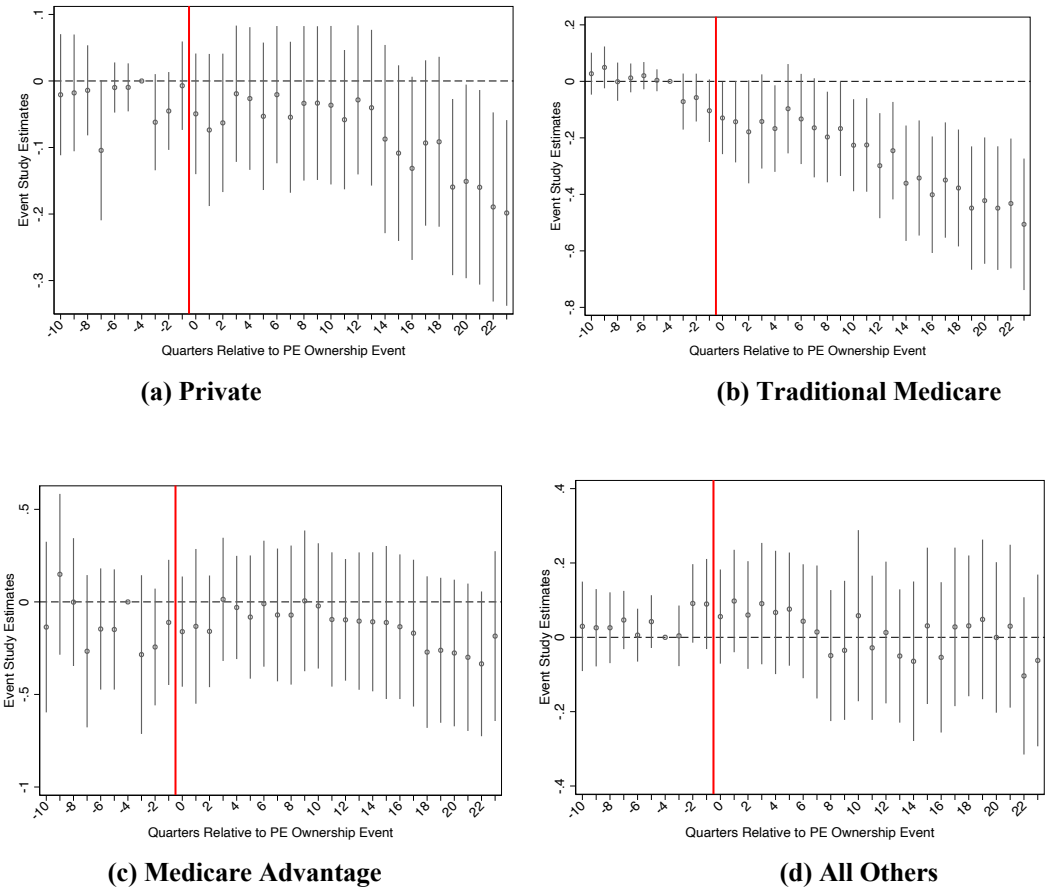
(b) Any Laparoscopic Procedures



(c) Average Complexity of Procedures

Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 4.

FIGURE 5
PRIVATE EQUITY INVESTMENT EFFECTS ON ASC CASE INTENSITY BY PAYER

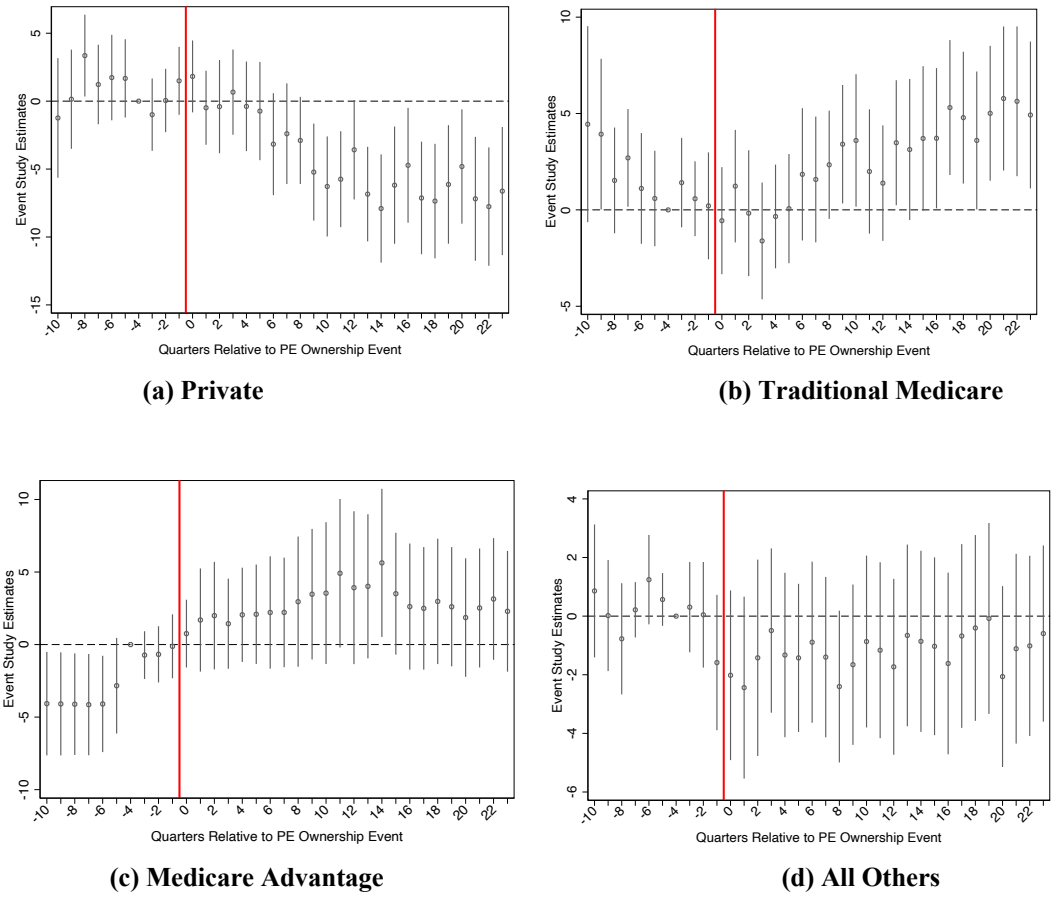


(a) Private **(b) Traditional Medicare**

(c) Medicare Advantage **(d) All Others**

Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 4. The outcome is the average number of procedures performed per case. When restricting to specific payers, some ASC-quarter combinations will have missing data if no such cases are performed for the specific payer. This is mostly an issue with Medicare Advantage, which had only modest market penetration during the early years of the analytic data.

FIGURE 6
PRIVATE EQUITY INVESTMENT EFFECTS ON ASC PAYER MIX

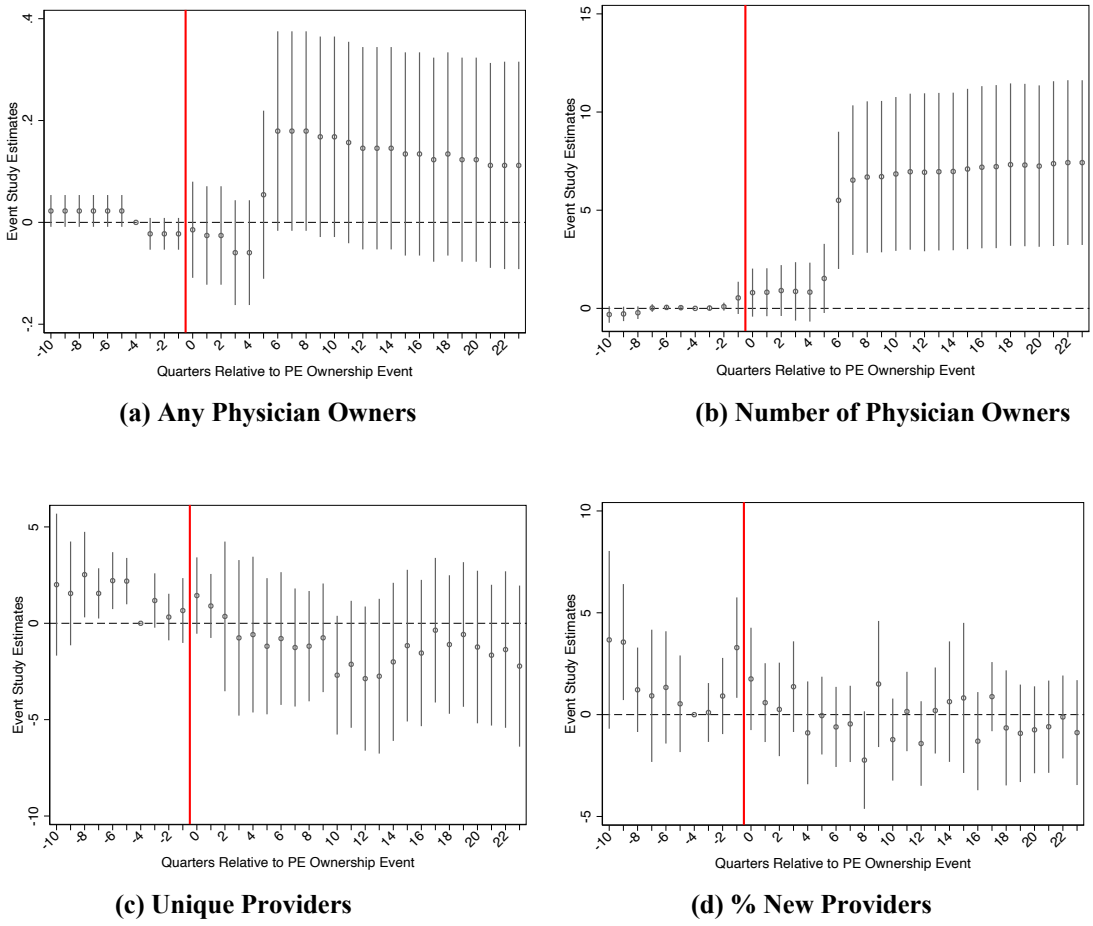


(a) Private **(b) Traditional Medicare**

(c) Medicare Advantage **(d) All Others**

Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 4.

FIGURE 7
PRIVATE EQUITY INVESTMENT EFFECTS ON ASC PHYSICIAN EQUITY HOLDINGS AND RELIANCE ON THE ASC



(a) Any Physician Owners

(b) Number of Physician Owners

(c) Unique Providers

(d) % New Providers

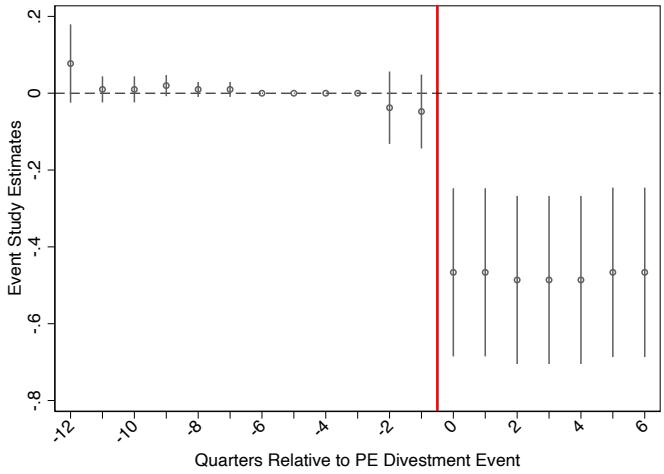
Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 4.

TABLE II Summary Statistics for Analytic Sample Treatment Group at Time of PE Divestment

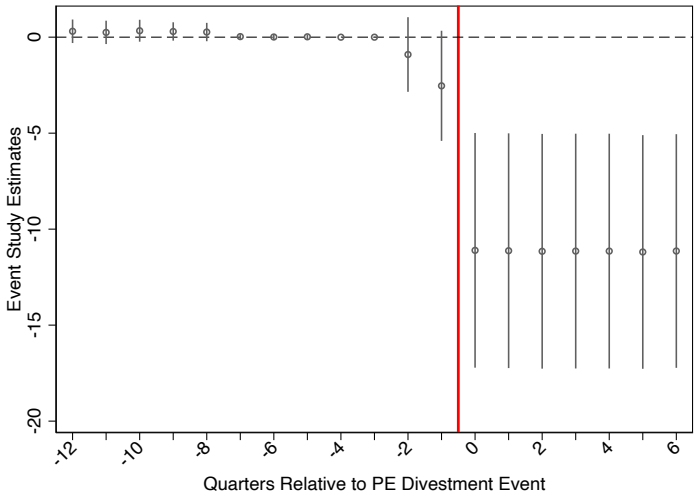
	2 Years Preceding Divestment	1.75 Years Since Divestment
	Mean	*Mean*
Case Volume	1,363	1,411
Procedures Per Case	1.5	1.5
Any Laparoscopic Procedures	0.65	0.61
Total Charges Per Case	$9,019	$10,325
% Private	46.5	46.4
% Traditional Medicare	26.9	26.3
% Medicare Advantage	17.4	18.4
% All Other Payers	9.2	8.9
Any Physician Owners	0.75	0.29
No. Physician Owners	12.3	1.5
Unique ASCs (N)	21	21

Restricts to treatment group ASCs described in Table 1, with the exception of three ASCs that have an ongoing private equity (PE) investment by the conclusion of our analytic data (i.e., a divestment time point has not been reached).

FIGURE 8
PRIVATE EQUITY DIVESTMENT EFFECTS ON PHYSICIAN ASC EQUITY HOLDINGS



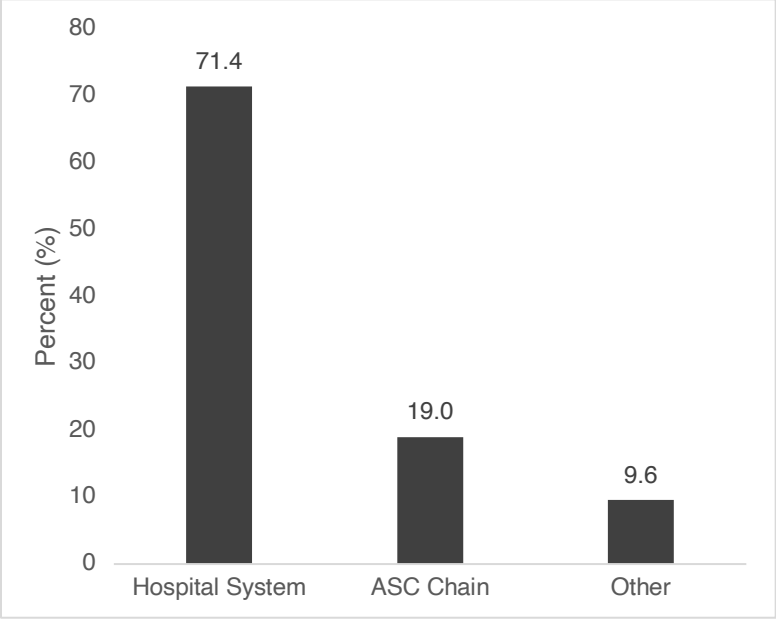
(a) Any Physician Owners



(b) Number of Physician Owners

Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 4.

FIGURE 9
POST-PRIVATE EQUITY DIVESTURE REMAINING CORPORATE OWNERSHIP BREAKDOWN



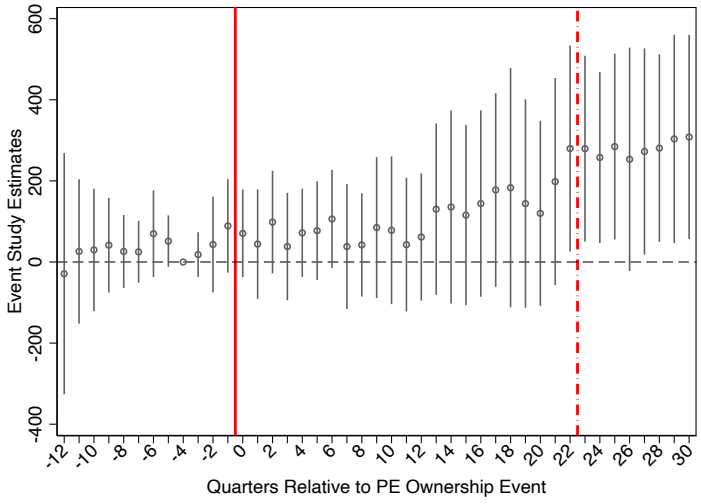
Source: Restricts to treatment group ASCs described in Table 1, with the exception of three ASCs that have an ongoing private equity (PE) investment by the conclusion of our analytic data (i.e., a divestment time point has not been reached). Examination of remaining corporate ownership mix at the conclusion of our analytic data.

TABLE III Summary Statistics for Analytic Sample 2007-2009

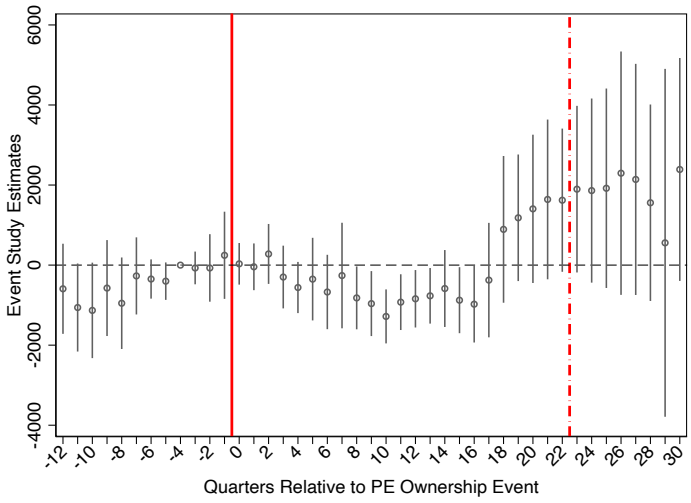
	Treatment Group (Surgery Partners ASC Chain)	Control Group
	Mean	*Mean*
Case Volume	758	1,076
Procedures Per Case	2.5	1.6
Any Laparoscopic Procedures	0.13	0.29
Total Charges Per Case	$7,616	$3,046
% Private	59.8	39.6
% Traditional Medicare	22.0	47.7
% Medicare Advantage	0.3	2.8
% All Other Payers	17.9	9.8
Any Physician Owners	0.74	0.73
No. Physician Owners	5.7	2.7
Unique ASCs (N)	8	66

Treatment group is comprised of ASCs owned by the Surgery Partners chain prior to year of private equity's investment into Surgery Partners (i.e., 2010) and continuously in the market from the start of 2007 through 2017. Control group ASCs have the same exclusions as the main analysis (Table 1) and also cannot be part of the treatment group in Table 1. Control group firms also must be observed continuously from 2007-2017.

FIGURE 10
PRIVATE EQUITY INVESTMENT AND IPO EFFECTS ON ASC CHAIN CASE VOLUMES AND AVERAGE CHARGES PER CASE



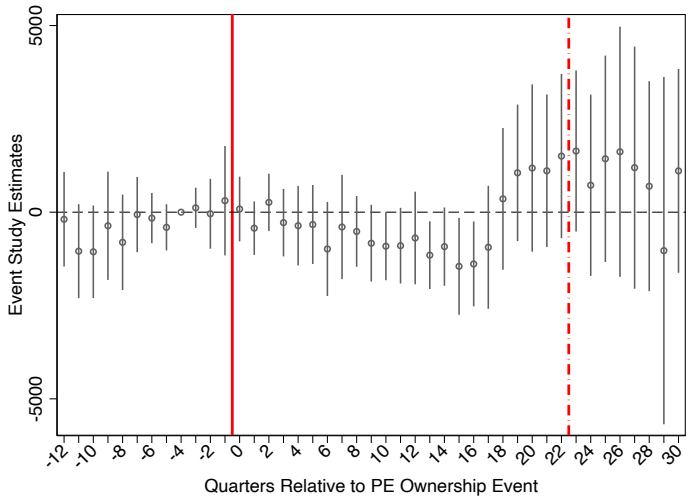
(a) Total Cases



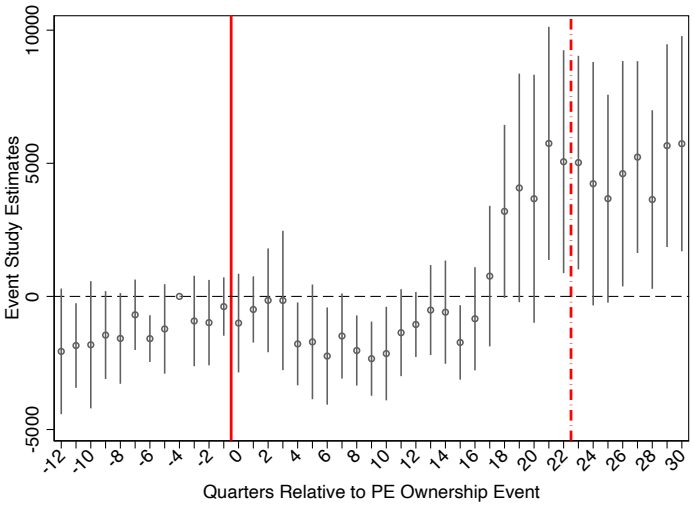
(b) Average Total Charges Per Case

Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 5. Solid line demarcates the introduction of private equity ownership for the Surgery Partners chain, and the dashed line represents its IPO.

FIGURE 11
PRIVATE EQUITY INVESTMENT AND IPO EFFECTS ON ASC CHAIN CHARGES PER CASE AMONG KEY PAYERS



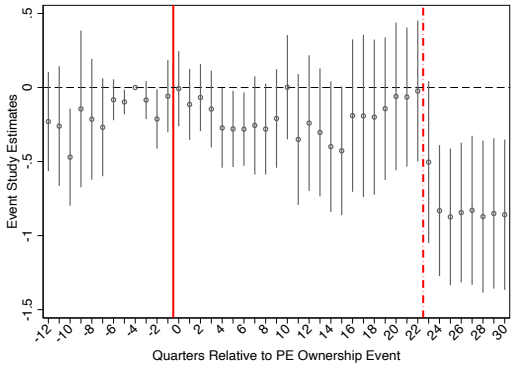
(a) Private



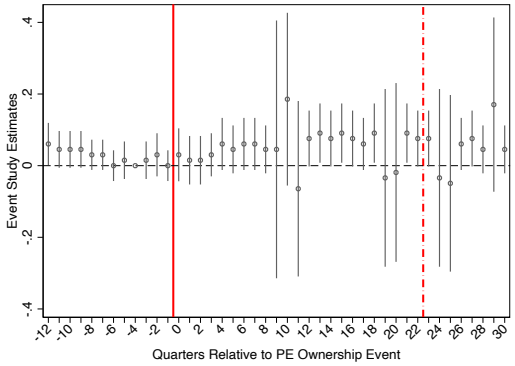
(b) All Others (non-Medicare)

Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 5. Solid line demarcates the introduction of private equity ownership for the Surgery Partners chain, and the dashed line represents its IPO

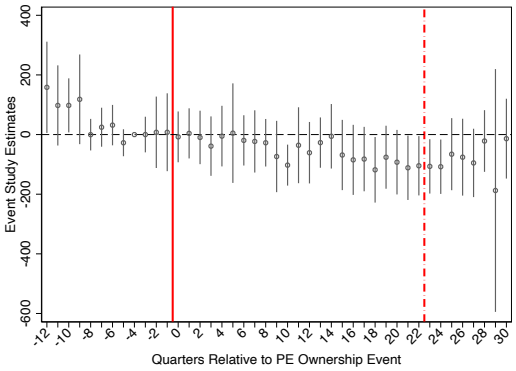
FIGURE 12
PRIVATE EQUITY INVESTMENT AND IPO EFFECTS ON ASC CASE INTENSITY AND COMPLEXITY



(a) Procedures Per Case



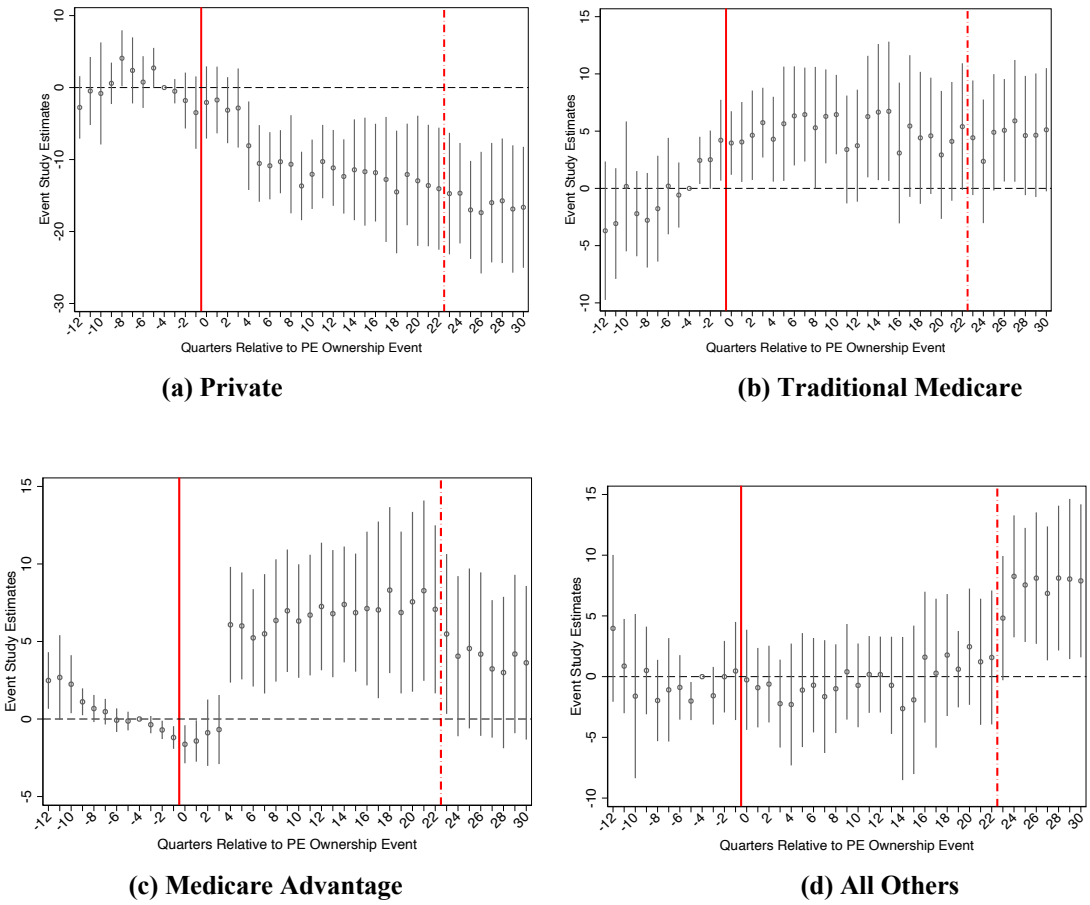
(b) Any Laparoscopic Procedures



(c) Average Complexity of Procedures

Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 5. Solid line demarcates the introduction of private equity ownership for the Surgery Partners chain, and the dashed line represents its IPO.

FIGURE 13
PRIVATE EQUITY INVESTMENT AND IPO EFFECTS ON ASC CHAIN PAYER MIX

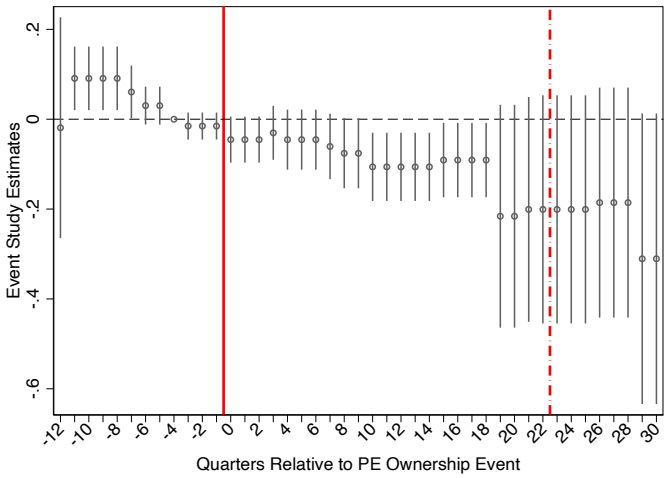


(a) Private **(b) Traditional Medicare**

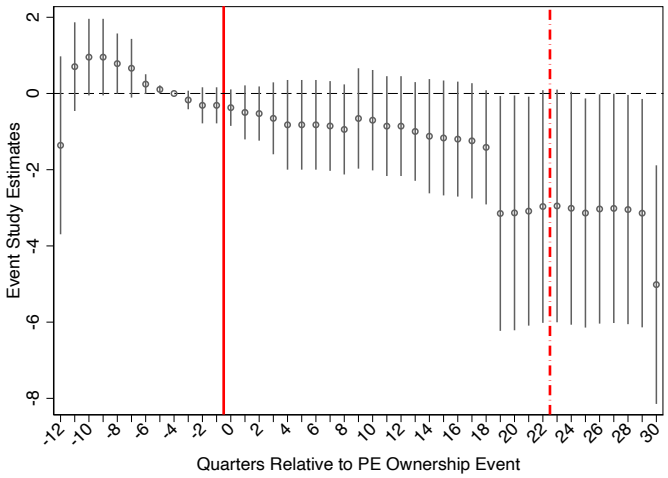
(c) Medicare Advantage **(d) All Others**

Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 5. Solid line demarcates the introduction of private equity ownership for the Surgery Partners chain, and the dashed line represents its IPO.

FIGURE 14
PRIVATE EQUITY INVESTMENT AND IPO EFFECTS ON PHYSICIAN ASC EQUITY HOLDINGS



(a) Any Physician Owners

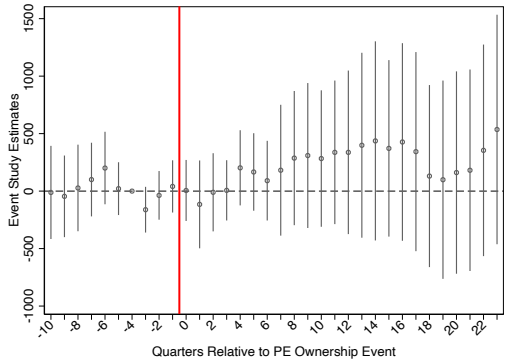


(b) Number of Physician Owners

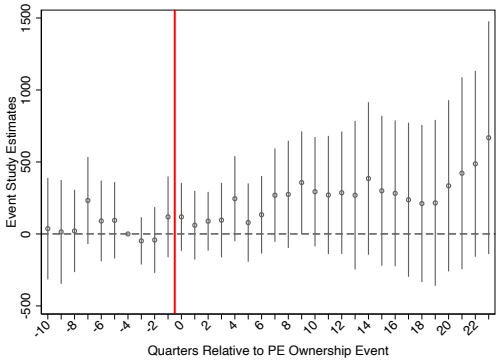
Source: Authors' calculations using the Florida AHCA universe of ambulatory discharge records and subset to our ASCs of interest described in Section 5. Solid line demarcates the introduction of private equity ownership for the Surgery Partners chain, and the dashed line represents its IPO.

Appendix

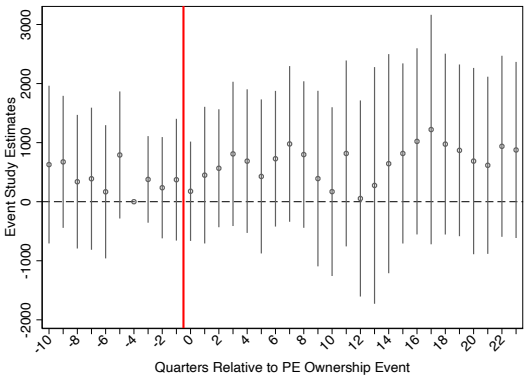
Appendix Figure A1: Within-Market Competitor ASCs' Average Charges Per Case by Payer



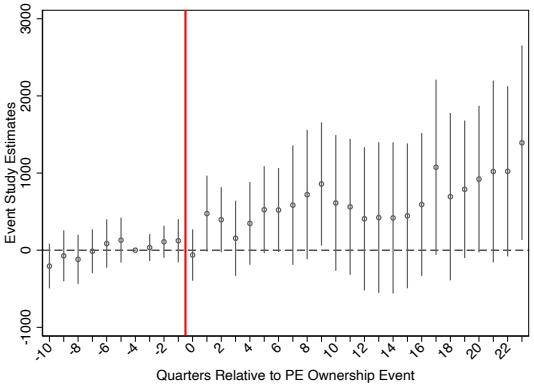
(a) Private



(b) Traditional Medicare

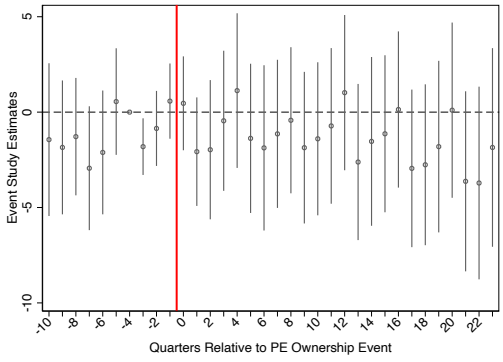


(c) Medicare Advantage

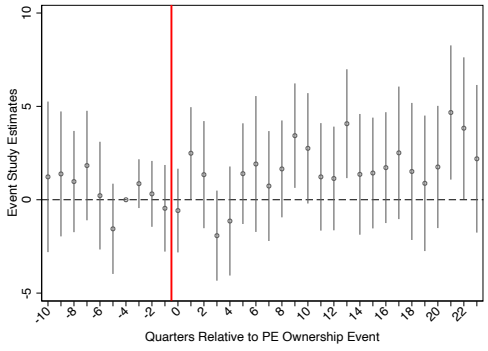


(d) All Others

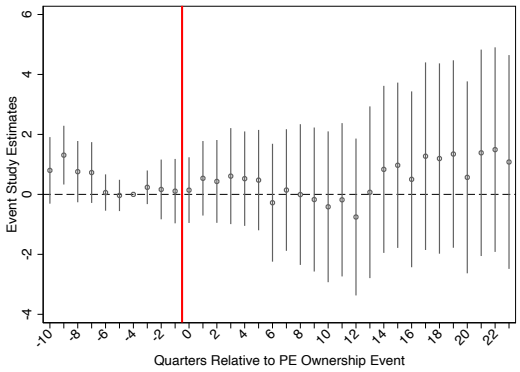
Appendix Figure A2: Within-Market Competitor ASCs' Payer Mix Changes



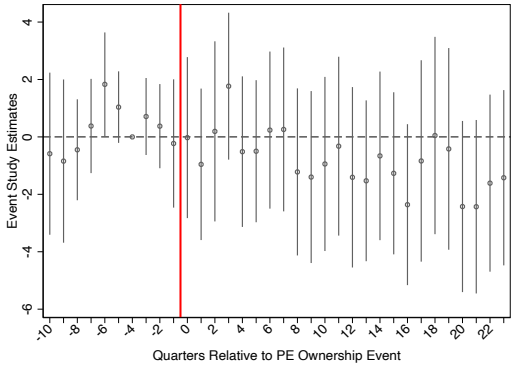
(a) Private



(b) Traditional Medicare

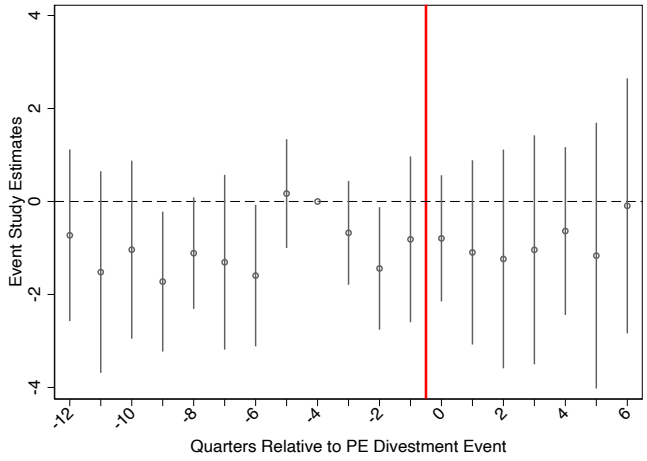


(c) Medicare Advantage

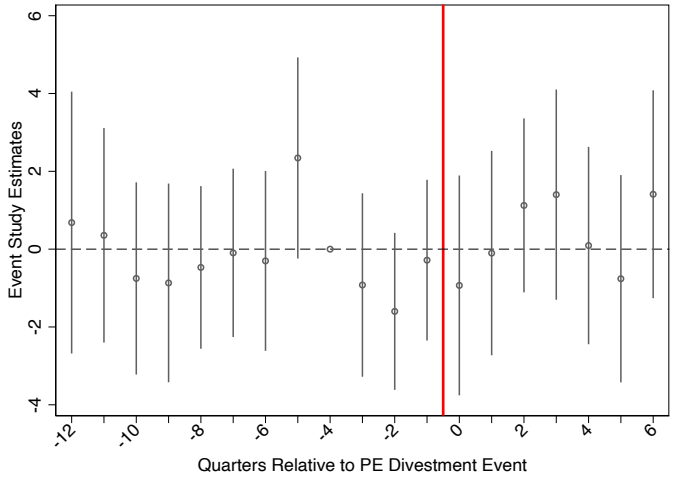


(d) All Others

Appendix Figure A3: Private Equity Divestment Effects on Provider Counts and Likelihood of New Provider-ASC Pairing

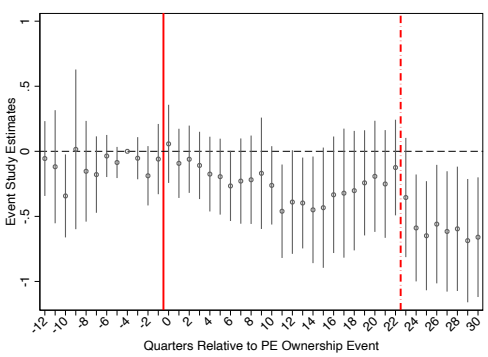


(a) Unique Providers

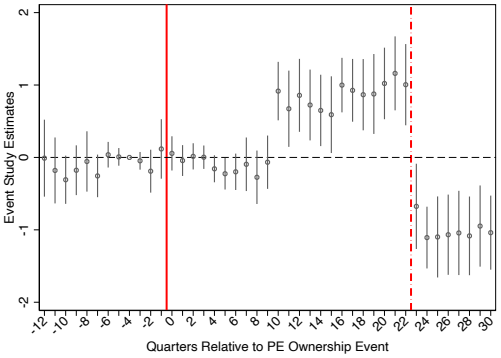


(b) % New Providers

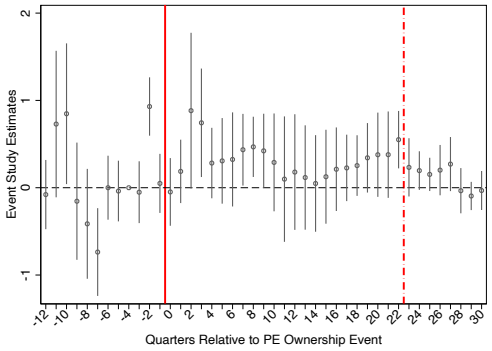
Appendix Figure A4: Private Equity Investment and IPO Effects on Avg. Number of Procedures Per Case by Payer



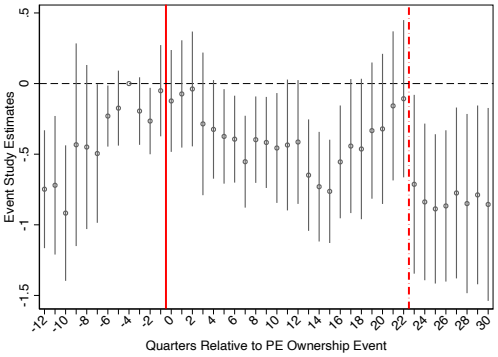
(a) Private



(b) Traditional Medicare

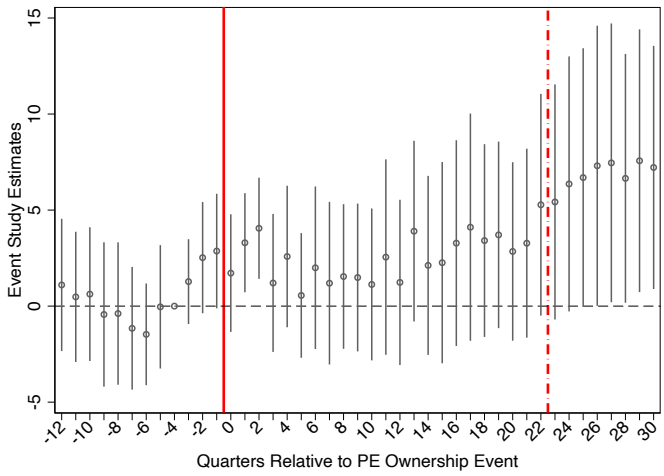


(c) Medicare Advantage

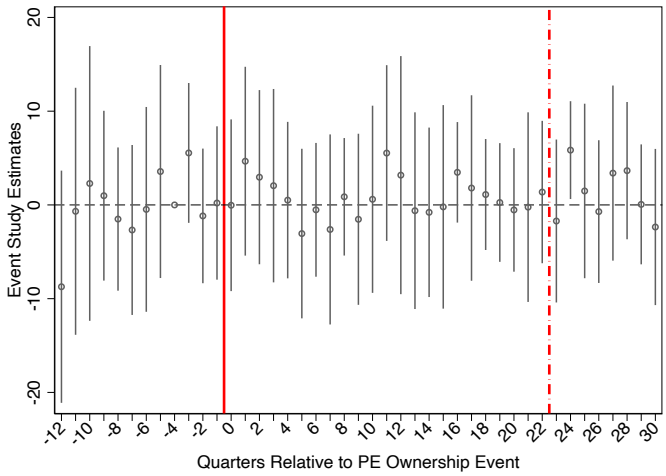


(d) All Others

Appendix Figure A5: Private Equity Investment and IPO Effects on Provider Counts and Likelihood of New Provider-ASC Pairing



(a) Unique Providers



(b) % New Providers