Internet Appendix
Private Equity in the Hospital Industry

I Description of the HCCI Data and Other Results

I.A Data Construction

The HCCI dataset is used to analyze how PE acquisitions of hospitals shape treatment prices and patient demographics in the acquired hospitals relative to control hospitals and non-PE-acquired hospitals.

To do this, we match our hospital panel dataset with the HCCI dataset using the encrypted NPIs of the healthcare billing entity delivering the service. Since the hospital identifiers in our hospital panel dataset are the AHA identifier and the CMS Certification Number (CCN), we use a crosswalk between NPIs and CCNs constructed by the NBER.[21] To ensure accuracy, we further require that the provider location (state and city) recorded in the NPI registry matches that in the CMS HCRIS file.

We construct a risk-adjusted price at the hospital-year level for (i) inpatient cases and (ii) seven specific medical procedures, closely following the methodology outlined by Cooper et al. (2019). The inpatient cases dataset aggregates all inpatient claims to the level of individual hospital admissions, with each admission linked to a unique DRG.[22] The procedure datasets are defined using combinations of ICD-9 codes (or ICD-10 codes when ICD-9 is not available) and DRGs. For MRI procedures, cases are identified using CPT-4 codes. The specific codes utilized to define these datasets include:

Procedure	ICD9-DIAG (ICD10-DIAG)	AND	DRG_DRVD	OR	PROC_CD
Hip Replacement	8151 (0SR[9B]***)		470, 522		
Knee Replacement	8154 (0SR[CD]***)		470, 522		
Cesarean Section	741 (10D00Z1)		766, 785, 788		
Vaginal Delivery	7359 (10E0XZZ)		775, 798, 807		
PTCA	0066 (027[0123][34]*Z)		247		
Colonoscopy	V7651 (Z1211) (PROC)				
MRI					73721

For hip and knee replacements, our analysis focuses on individuals aged forty-five to sixty-four. For vaginal deliveries and cesarean sections, we concentrate on mothers aged twenty-five to thirty-four. MRI cases are included in the sample only if a separate physician payment is recorded, and we exclude any MRI cases where additional treatments are performed on the same day as the MRI.

[21] This crosswalk is obtained from https://www.nber.org/research/data/national-provider-identifier-npi-medicare-ccn-crosswalk.

[22] HCCI provides a standard protocol for this aggregation.

We also remove cases that fall above the 99th percentile for length of stay, as well as cases with prices below the 1st percentile or above the 99th percentile for each procedure. These same criteria are applied to the inpatient sample.

Then, we regress transaction prices of each procedure ($p_{i,h,d,t}$) on hospital-year fixed effects ($\alpha_{h,t}$), controlling for patient characteristics ($X_{i,h,t}$):

$$p_{i,h,d,t} = \alpha_{h,t} + X_{i,h,t}\beta + \varepsilon_{i,h,t}. \tag{4}$$

The price index of procedure d for hospital h at year t is given by its corresponding hospital-year fixed effects plus a constant:

$$\hat{p}_{h,t} = \hat{\alpha}_{h,t} + \bar{X}\hat{\beta}, \tag{5}$$

where $\bar{X}$ is a vector of the mean values of patient characteristics in the sample.

Similarly, we run the following regression using the inpatient sample:

$$p_{i,h,d,t} = \alpha_{h,t} + X_{i,h,t}\beta + \gamma_d + \varepsilon_{i,h,t} \tag{6}$$

where γ_d is DRG code d fixed effects. The price index of inpatient admissions is given by:

$$\hat{p}_{h,t} = \hat{\alpha}_{h,t} + \bar{X}\hat{\beta} + \bar{d}\gamma_d. \tag{7}$$

I.B Changes in Hospital Procedure Choices

Do PE firms push portfolio hospitals to opt for more profitable procedures? To answer this question, we follow Adelino et al. (2021) and examine whether PE-acquired hospitals are more likely to choose more intensive and profitable procedures, such as cesarean sections (C-section) in lieu of vaginal delivery for child delivery, and catheterization instead of intensive drug treatment for heart attacks (AMI).

To analyze hospitals' procedural choices in birth delivery, we focus on a set of insurance claims for C-section and vaginal delivery by mothers, which we identify following the procedure described in Section I.A. Using this claim-level sample, we create an indicator for C-section that equals one if C-section is used during the delivery process, and zero otherwise.

For the test on AMI treatments, we first identify AMI cases using ICD-9 diagnosis code 410 or ICD-10 diagnosis code I21 or I22. Among those AMI cases, the inclusion of a cardiac catheterization is identified by ICD-9 procedure code 3721, 3722, or 3723 or ICD-10 procedure code 4A020N6, 4A020N7, 4A020N8, 4A023N6, 4A023N7, or 4A023N8. The variable of interest is an indicator for *Catheterization*, which equals one if Catheterization is used in an AMI treatment. We then regress both indicators on *PE Target* and *NonPE Target*. Given that in these samples, the unit of observation is an insurance claim, we control for detailed patient information such as patient age-gender-year fixed effects, and patient residential zipcode fixed effects. These controls help remove potential confounding factors related to patient demographics, health risk, and wealth (or socio-economic status).

Table IA1 reports the results. We do not find PE target hospitals to increasingly choose more intensive and profitable treatment options.

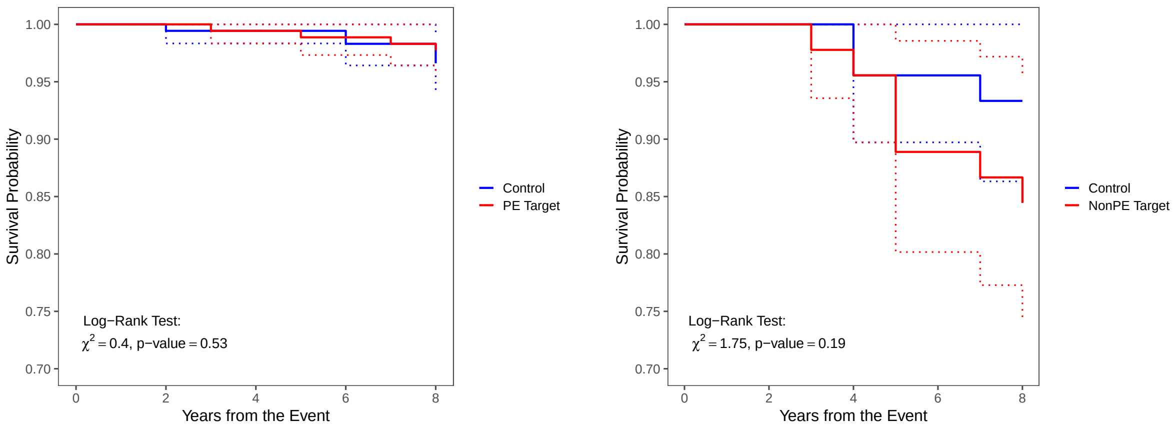
Table IA1
Procedure Choices at Target Hospitals

This table examines changes in procedure choices at target hospitals around the [−4,+8] acquisition event window. The results come from the matched sample in our main analysis. In column (1), we analyze the choice between C-section and vaginal delivery among childbirth patients. In column (2), we examine the use of cardiac catheterization among all patients with AMI. Rows with H_0's provide p-values from Wald Chi-square tests indicating whether the two coefficients are statistically significantly different from each other. Control variables are the same as in Table 3. See Appendix A for variable definitions. t-statistics are reported in parentheses and standard errors are heteroskedasticity robust and clustered by hospital. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Dep. Var.:	*C-Section*	*Cardiac Catheterization*
	(1)	(2)
PE Target	−0.065	0.046
	(−1.30)	(0.88)
NonPE Target	0.132**	−0.046
	(2.13)	(−0.66)
Hospital Controls	Yes	Yes
County Controls	Yes	Yes
Hospital FEs	Yes	Yes
Matched Pair FEs	Yes	Yes
Event Time FEs	Yes	Yes
Patient Age-Sex-Year FEs		Yes
Patient Zipcode FEs	Yes	Yes
H_0: PE=NonPE	0.01	0.20
Obs	20,291	4,564
Adj. R^2	0.07	0.00

II Survival Rates: Target versus Matched Control Hospitals

In Figure IA1, we show the survival rates of hospitals in each year after the acquisition. We compare survival likelihoods of PE-acquired hospitals, non-PE acquired-hospitals, and their respective matched control hospitals. Panel A represents the difference between PE targets (red solid line) and their matched control hospitals (blue solid line), while Panel B reports the difference between non-PE targets (red solid line) and their matched control hospitals (blue solid line). The dashed lines represent the 95-percent confidence interval of the Kaplan–Meier estimates. In the bottom-left corner, we present the chi-squared statistics of the log-rank test, which compares the survival distributions of PE targets (non-PE targets) and their matched control hospitals, along with the p-value for the null hypothesis that the survival distributions between the two groups are identical. From these empirical patterns, the survival likelihoods of targets and their matched control hospitals do not appear significantly different. However, the lack of statistical significance may result from the limited statistical power. Among our matched sample of hospitals, there are only 20 hospitals that closed within 8 years after the acquisition events, including 4 among PE target hospitals, 7 among the targets of non-PE acquirers, and 9 among their matched control hospitals.



(A) *Survival Analysis*, PE Targets

(B) *Survival Analysis*, Non-PE Targets

Figure IA1. Survival Analysis of PE and Non-PE Targets. This figure shows the survival rates of hospitals in each year after the acquisition. We compare survival likelihoods of PE-acquired hospitals, non-PE-acquired hospitals, and their respective matched control hospitals. The left-side panel represents the difference between PE targets (red solid line) and their matched control hospitals (blue solid line), while the right panel reports the difference between non-PE targets (red solid line) and their matched control hospitals (blue solid line). The dashed lines represent the 95-percent confidence interval of the Kaplan–Meier estimates.

III Additional Robustness of Main Results

In this section, we provide several robsutness checks of our baseline results.

In Table IA2, we show that our inferences remain unchanged when we scale total employment, core worker counts, and administrative worker counts with the number of patients. The number of patients is computed by $inpatient \times (1 + \frac{outpatient\ charges}{inpatientcharge})$.

Table IA3 provides the minimum detectable effect size (MDES) for the differences in the coefficient estimates of *PE Target* and *NonPE Target*. The MDES indicates the minimum size of the differential effects for there to be statistical significance, given our sample size and the standard error of the coefficients Bloom (1995). For example, the MDES in column (4) suggests that the differences in the decline in administrative workers between PE and non-PE acquired hospitals need to reach 40 percentage points for us to detect statistics difference at 10% level.

In Table IA4, we find our results to be robust to the addition of commuting zone (CZ)-by-event time fixed effects to further remove confounding effects related to local economic conditions, healthcare demand, and other dynamics.

In Table IA5, we restrict the definition of core workers to nurses and pharmacists, because physician counts may not be accurate in the HCRIS data. We inferences remain unchanged. In particular, the number of nurses and pharmacists also exhibits a significant reversal in the long-run window (column (3)).

Table IA2
Workers per Patient
This table examines the changes in employment, core workers, and administrative workers at target hospitals around acquisitions. The dependent variable for columns (1) and (2) is the total employees per patient. The number of patients is estimated by adjusted discharges, defined as the number of discharged inpatients multiplied by (1+outpatient charges/inpatient charges). Columns (3) and (4) analyze the number of core workers per patient, while columns (5) and (6) analyze the number of administrative workers per patient. *PE Target* turns to one after a hospital is acquired by a PE acquirer. *Non-PE Target* turns to one after a hospital is acquired by a non-PE, for-profit acquirer. *Long-run* turns to one if event time falls in [5,8]. Hospital Controls and County Controls are defined in the same way as in Table 3. See Appendix A for variable definitions. *t*-statistics are reported in parentheses and standard errors are heteroskedasticity robust and clustered by hospital. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Dep. Var.: (×100)	*Employment/Patients*		*Core Workers/Patients*		*Admin Workers/Patients*	
	(1)	(2)	(3)	(4)	(5)	(6)
Post-Event Window	[0, 4]	[5, 8]	[0, 4]	[5, 8]	[0, 4]	[5, 8]
PE Target	−0.2499**	−0.2949	−0.0605***	−0.0301	−0.0752***	−0.1144**
	(−2.44)	(−1.15)	(−3.53)	(−0.78)	(−3.63)	(−2.26)
NonPE Target	0.2028	−0.2147	−0.0827***	−0.1489**	0.0202	0.0036
	(0.72)	(−0.51)	(−2.65)	(−2.29)	(0.56)	(0.04)
Hospital Controls	Yes	Yes	Yes	Yes	Yes	Yes
County Controls	Yes	Yes	Yes	Yes	Yes	Yes
Hospital FEs	Yes	Yes	Yes	Yes	Yes	Yes
Matched Pair FEs	Yes	Yes	Yes	Yes	Yes	Yes
Event Time FEs	Yes	Yes	Yes	Yes	Yes	Yes
H_0: PE=NonPE	0.11	0.84	0.50	0.07	0.01	0.19
Obs	3,690	2,231	3,690	2,231	3,690	2,231
Adj. R^2	0.89	0.89	0.78	0.77	0.83	0.81

Table IA3
Minimum Detectable Effect Size

This table analyzes the minimum detectable effect size (MDES) regarding the difference in coefficients between *PE Target* and *NonPE Target* in Table 5. The dependent variable for columns (1) and (2) is the log of the total number of core workers, i.e., *Log(Core Workers)*. The dependent variable for columns (3) and (4) is the log of the total number of administrative workers, i.e., *Log(Admin Workers)*. Rows with MDES (80%) and MDES (90%) show the minimum detectable effect sizes, computed as the standard error of the coefficient estimates multiplied by 2.49 and 2.93, respectively. Hospital Controls and County Controls are defined in the same way as in Table 3. See Appendix A for variable definitions. t-statistics are reported in parentheses and standard errors are heteroskedasticity robust and clustered by hospital. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Dep. Var.:	*Log(Core Workers)*		*Log(Admin Workers)*	
	(1)	(2)	(3)	(4)
Post-Event Window	$[0, 4]$	$[5, 8]$	$[0, 4]$	$[5, 8]$
PE Target−NonPE Target	0.1249*	0.3478**	−0.1347**	−0.1713
	(1.96)	(2.01)	(−2.52)	(−1.25)
MDES (80%)	0.1587	0.4309	0.1333	0.3423
MDES (90%)	0.1868	0.5070	0.1568	0.4028
Hospital Controls	Yes	Yes	Yes	Yes
County Controls	Yes	Yes	Yes	Yes
Hospital FEs	Yes	Yes	Yes	Yes
Matched Pair FEs	Yes	Yes	Yes	Yes
Event Time FEs	Yes	Yes	Yes	Yes
Obs	3,690	2,230	3,690	2,230
Adj. R^2	0.91	0.90	0.90	0.90

Table IA4

Core and Administrative Workers, Controlling for Commuting Zone-Year Fixed Effects

This table examines changes in core workers and administrative workers at target hospitals, while controlling for commuting zone-by-year interactive fixed effects. The dependent variable for columns (1) and (2) is the log of the total number of core workers, i.e., *Log(Core Workers)*. The dependent variable for columns (3) and (4) is the log of the total number of administrative workers, i.e., *Log(Admin Workers)*. *PE Target* turns to one after a hospital is acquired by a PE acquirer. *Non-PE Target* turns to one after a hospital is acquired by a non-PE acquirer. Rows with H_0's provide p-values from Wald Chi-square tests indicating whether the two coefficients are statistically significantly different from each other. Hospital Controls and County Controls are defined in the same way as in Table 3. See Appendix A for variable definitions. t-statistics are reported in parentheses and standard errors are heteroskedasticity robust and clustered by hospital. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Dep. Var.:	*Log(Core Workers)*		*Log(Admin Workers)*	
	(1)	(2)	(3)	(4)
Post-Event Window	$[0,4]$	$[5,8]$	$[0,4]$	$[5,8]$
PE Target	−0.1369***	0.0850	−0.1354***	−0.2778***
	(−3.30)	(0.61)	(−3.63)	(−3.02)
NonPE Target	−0.2584***	−0.0235	0.0481	0.2185
	(−3.44)	(−0.11)	(0.64)	(1.05)
Hospital Controls	Yes	Yes	Yes	Yes
County Controls	Yes	Yes	Yes	Yes
Hospital FEs	Yes	Yes	Yes	Yes
Matched Pair FEs	Yes	Yes	Yes	Yes
CZ-by-Event Time FEs	Yes	Yes	Yes	Yes
H_0: PE=NonPE	0.12	0.63	0.02	0.02
Obs	3,691	2,231	3,691	2,231
Adj. R^2	0.91	0.89	0.91	0.90

Table IA5
Nurses and Pharmacists at Target Hospitals

This table examines changes in the number of nurses and pharmacists at target hospitals around acquisitions. The dependent variable is the log of total number of nurses and pharmacists, i.e., *Log(Nurses & Pharma)*. *Long-run* turns to one for year [5, 8] following the acquisition event. *PE Target* turns to one after a hospital is acquired by a PE acquirer. *NonPE Target* turns to one after a hospital is acquired by a non-PE acquirer. Rows with H_0's provide p-values from Wald Chi-square tests indicating whether the two coefficients are statistically significantly different from each other. Hospital Controls and County Controls are defined in the same way as in Table 3. See Appendix A for variable definitions. t-statistics are reported in parentheses and standard errors are heteroskedasticity robust and clustered by hospital. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

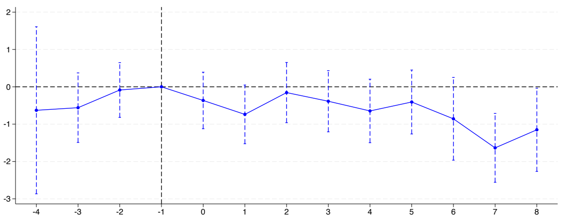
Dep. Var.:	*Log(Nurses & Pharma)*		
	(1)	(2)	(3)
Post-Event Window	$[0, 4]$	$[5, 8]$	$[0, 8]$
PE Target	-0.1846^{***}	0.0315	-0.1823^{***}
	(-5.00)	(0.44)	(-5.03)
PE Target × *Long-run*			0.1277^{***}
			(2.81)
NonPE Target	-0.2256^{***}	-0.4348^{***}	-0.2247^{***}
	(-3.61)	(-2.68)	(-3.62)
NonPE Target × *Long-run*			-0.1805^{*}
			(-1.85)
Hospital Controls	Yes	Yes	Yes
County Controls	Yes	Yes	Yes
Hospital FEs	Yes	Yes	Yes
Matched Pair FEs	Yes	Yes	Yes
Event Time FEs	Yes	Yes	Yes
H_0: PE=NonPE	0.53	0.01	
Obs	3,683	2,226	4,274
Adj. R^2	0.90	0.91	0.90

IV Further Addressing Selection Concerns

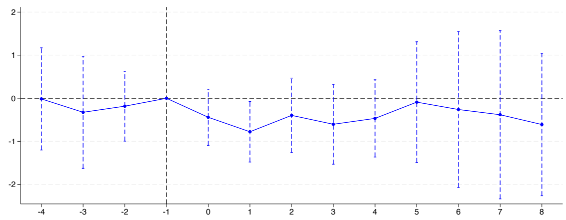
Lewellen et al. (2023) document that PE acquirers are more likely to acquire hospitals with low profitability, higher charity services, and lower healthcare quality. To what extent can our matching methodology address these selection concerns? Our covariate balance result in Figure 3 suggests that the target and control hospitals in our matched sample do not differ significantly in terms of their profitability. In this section, we perform two additional analyses to test whether our results can be driven by PE investors' selection based on hospital charity services and healthcare quality.

First, we directly track the evolution of healthcare quality at target and control hospitals around the acquisition event. Healthcare quality is measured by mortality rate and unplanned readmission rate, in a three-year rolling window (Section 3.3). Figure IA2 depicts the variation in healthcare quality around acquisitions. The coefficients represent the changes in target hospitals' healthcare quality relative to the changes in control hospitals. We do not find any significant deviations in terms of healthcare quality between target and control hospitals either before or after the acquisitions.

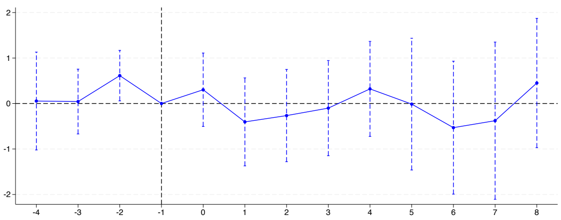
Next, we examine how charity services change in target and control hospitals. The data on the cost of charity services comes from HCRIS Worksheet S-10, Line 23 and is only available from 2010 onwards. Following Lewellen et al. (2023), we scale this charity cost by total operating expenses. Given that our acquisition sample ends in 2018, the limited time series of charity data makes it difficult to perform dynamic analyses. We thus directly test whether PE acquisitions lead to significant changes in charity services at target hospitals, relative to their matched control peers. Results are shown in Table IA6. We do not find hospitals charity services to change significantly around PE takeover. This indicates that the selection on charity services is unlikely to be driving our results.



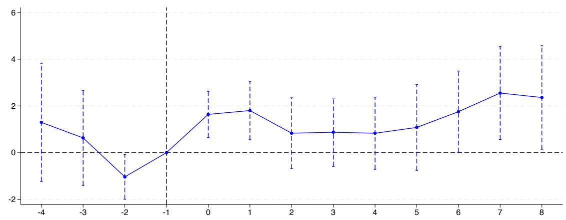
(A) *AMI*, Mortality



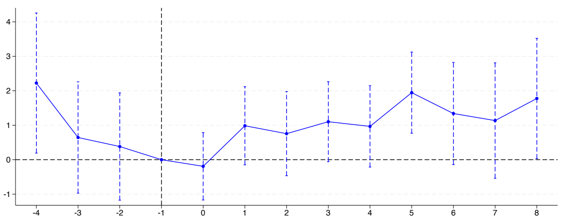
(B) *AMI*, Readmission



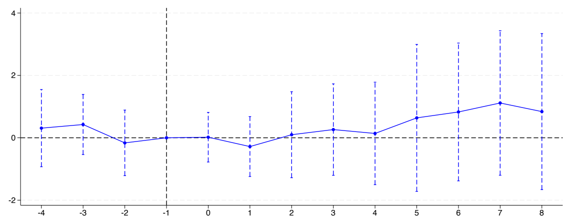
(C) *Heart Failure*, Mortality



(D) *Heart Failure*, Readmission



(E) *Pneumonia*, Mortality



(F) *Pneumonia*, Readmission

Figure IA2. Dynamic Changes in Healthcare Quality around PE Acquisition. This figure shows the changes in patient outcomes for PE-acquired hospitals relative to their matched control hospitals over the [-4, +8]-year event window. The left (right) column presents the changes in the mortality (readmission) rates of patients at PE-acquired hospitals relative to the control hospitals. In each panel, the dots and intervals represent the coefficients and the associated 95-percentile confidence intervals, respectively. Year -1 is absorbed as the base year.

Table IA6
Cost of Charity Care
This table examines changes in the cost of charity care at target hospitals around acquisitions. The cost of charity care comes from HCRIS Worksheet S-10, Line 23, and is scaled by total operating expenses. In columns (1) and (2), we present results related to the cost of charity care over total operating expenses. *PE Target* turns to one after a hospital is acquired by a PE acquirer. *Non-PE Target* turns to one after a hospital is acquired by a non-PE acquirer. Rows with H_0's provide p-values from Wald Chi-square tests indicating whether the two coefficients are statistically significantly different from each other. Hospital Controls and County Controls are defined in the same way as in Table 3. See Appendix A for variable definitions. t-statistics are reported in parentheses and standard errors are heteroskedasticity robust and clustered by hospital. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Dep. Var.:	*Charity*	
	(1)	(2)
Post-Event Window	$[0, 4]$	$[5, 8]$
PE Target	−0.0009	−0.0072
	(−0.16)	(−0.50)
NonPE Target	−0.0043	−0.0052
	(−0.58)	(−0.37)
Hospital Controls	Yes	Yes
County Controls	Yes	Yes
Hospital FEs	Yes	Yes
Matched Pair FEs	Yes	Yes
Event Time FEs	Yes	Yes
H_0: PE=NonPE	0.69	0.86
Obs	666	611
Adj. R^2	0.46	0.72

V Details of the CPOM Analysis

V.A The List of CPOM Events

We identify a list of events in which CPOM implementation becomes more relaxed or strict during our sample period 2001–2018. Information regarding changes to a state's CPOM status comes from several sources. We begin with *Corporate Practice of Medicine: A Fifty State Survey*, a publication by the American Health Lawyers Association that details changes and the status of CPOM regulations across states. We also collect news articles about CPOM from Nexis Uni and CPOM compliance guidelines issued by Permit Health, a private business advising practitioners on CPOM compliance.[23] These sources supplement the list of CPOM regulation changes. Some CPOM changes may not be related to medical practices in hospitals, so we carefully verify their contents and relevance through additional manual internet searches.

Table IA7 presents a list of CPOM relaxation or tightening events during our sample period 2001–2018, collected as described above. We define a CPOM event to be a state-year where the state experiences changes in legislation, case laws, or opinions that either relax or tighten the implementation of CPOM doctrines, thus making it easier or harder for PE firms to acquire hospitals. If the event date falls in June or later, we adjust the event year to the following year.

We label states that experience at least one CPOM relaxation or tightening event as treated states. Control states are ones that did not experience any CPOM event. We exclude states that have experienced both CPOM relaxation and tightening during our sample period from the analysis (AL, CA, CO, ID, MI, MN, SC, VA, WA). If a state experiences more than one CPOM event in the same direction, we only consider the first event. This procedure results in 11 CPOM tightening states (event year in parentheses): AR (2015), GA (2005), IL (2003), LA (2001), NC (2016), ND (2008), NJ (2017), NV (2002), NY (2006), OR (2018), WV (2015); and 13 CPOM relaxation states: AK (2004), AZ (2009), CT (2006), FL (2004), IA (2012), KY (2004), MA (2012), MS (2002), NM (2014), OH (2012), OK (2002), TN (2013), TX (2012).

[23] See sources at https://www.permithealth.com/blog-categories/guides.

Table IA7
CPOM Events
This table provides the list of CPOM events identified for the CPOM analysis. There are three types of events that can strengthen or relax CPOM: (i) state statutes or regulations (*legislature*), (ii) case law (*case*), and (iii) opinions issued by the state attorney general or medical board (*opinion*). Direction is 1 (-1) if the event makes regulations stricter (more relaxed).

Time	State	Type	Direction	Content
2003/12	AK	case	-1	Sisters Of Providence In Washington V. Pain Clinic Inc Llc (2003)
2001/02	AL	opinion	-1	Ala. Att'y Gen. Op. No. 2001-089 (Feb. 1, 2001)
2007/04	AL	opinion	1	Declaratory Ruling Of The Ala. Med. Licensure Comm'n, Apr 17, 2007.
2015/03	AR	opinion	1	Ark. Att'y Gen. Op. No. 2014-118 (Mar. 10, 2015)
2008/12	AZ	case	-1	Midtown Med. Grp., Inc V. State Farm Mut. Auto. Ins. Co (Ariz. Ct. App. 2008)
2000/07	CA	opinion	1	Op. Cal. Atty. Gen. 170 (July 27, 2000)
2006/06	CA	case	-1	People V. Cole, 38 Cal.4th 964
2008/06	CA	case	-1	California Physicians' Service V. Aoki Diabetes Research Institute
2009/09	CA	opinion	1	Op. Cal. Atty. Gen. 56 (September 24, 2009)
2013/02	CA	case	-1	Nat'l Ass'n Of Optometrists & Opticians V. Harris
2015/12	CA	case	-1	Epic Medical Management V. Paquette
2017/01	CA	legislature	-1	Amended California Business And Professions Code Section 2401
2002/04	CO	case	-1	Pediatric Neurosurgery, Pc V. Russell
2002/06	CO	legislature	-1	Senate Bill No. 224
2004/06	CO	opinion	1	Cbme Policy 20-02
2005/10	CO	case	1	Daly V. Aspen Center For Women's Health
2006/05	CO	case	1	Estate Of Harper Al Hamim V. Denver Health And Hospital Authority
2006/02	CT	case	-1	Oca V. Christie
2016/07	CT	legislature	-1	Senate Bill No. 351
2003/09	FL	legislature	-1	In Re: Petition For Declaratory Statement Of Mergency Med. Associates Of New Jerjey, P.a.
2004/09	GA	case	1	Clower V. Orthalliance, Inc. 337 F.supp.2d 1322 (2004)
2012/06	GA	opinion	1	Georgia Composite Medical Board Issued Opinions
2011/06	IA	legislature	-1	2011 Iowa Senate Study Bill No. 1001
2007/02	ID	opinion	1	Memo. From Jean Urganga To The Idaho State Bd. Of Med. Regarding Corporate Practice Of Medicine
2016/03	ID	opinion	-1	Idaho Board Of Medicine Disavows The Cpom Prohibition
2002/09	IL	case	1	Carter-Shields V. Alton Health Institute
2003/06	KY	legislature	-1	Opinion E-8.0501, "Professionalism And Contractual Relations"
2001/03	LA	opinion	1	Louisiana State Bd. Of Med. Exm'rs Statement Of Position, Reviewed
2012/02	MA	legislature	-1	The Massachusetts Board Of Registration In Medicine Revised Regulations
2001/12	MI	case	1	People V. Rogers, 641 N.w.2d 595 (Mich Ct. App. 2001)

Time	State	Type	Direction	Content
2015/10	MI	legislature	-1	Senate Bill No. 65
2005/06	MN	case	1	Isles Wellness, Inc. V. Progress N. Ins. Co., 703 N.w.2d 513 (Minn. 2005)
2014/03	MN	case	-1	State Farm Mutual Automobile Insurance V. Mobile Diagnostic Imaging
2001/09	MS	opinion	-1	Mississippi Board Of Medicine Licensure Policy 3.02 Corporate Practice Of Medicine (Revised Sept. 20, 2001)
2016/03	NC	opinion	1	North Carolina Medical Board Adopted A Position Statemen
2007/12	ND	case	1	Hsu V. Marian Manor Apts., Inc., 743 N.w.2d 672 (N.d. Dist. Ct. 2007)
2017/05	NJ	case	1	Allstate Ins. Co. V. Northfield Med. Ctr., P.c., 159 A.3d 412 (N.j. 2017)
2013/09	NM	case	-1	Baker V. Hedstrom 284 P.3d 400, 2012-Nmca-073
2002/02	NV	opinion	1	Nev. Att'y Gen. Op. No. 2002-10 (Feb. 26, 2002)
2010/04	NV	opinion	1	Nevada Attorney General Opinion Prohibits Cpom
2006/03	NY	opinion	1	The Doh Letter
2009/12	NY	opinion	1	Board Of Regents Report
2015/06	NY	opinion	1	Attorney General Of New York Opined The Prohibition Of Cpom
2017/06	NY	case	1	Andrew Carothers, M.d., P.c. V. Progressive Ins. Co., 128 N.e.3d 153 (N.y. 2019)
2012/03	OH	opinion	-1	State Medical Board Of Ohio Published A Statement
2002/05	OK	opinion	-1	Okla. Att'y Gen. Op. No. 02-20 (May 8, 2002).
2018/01	OR	legislature	1	House Bill No. 3439
2010/03	SC	case	1	Orthaliance, Inc. V. Mcconnell, 2010 U.s. Dist. Lexis 30918 (D.s.c. 2010)
2017/10	SC	legislature	-1	South Carolina State Board Of Medical Examiners Approved The Cpom
2017/10	SC	opinion	-1	S.c. Bd. Of Med. Exm'rs, The Supervision Of Unlicensed Personnel And The Corporate Practice Of Medicine (Oct. 4, 2017).
2012/07	TN	legislature	-1	Senate Bill No. 3263
2011/09	TX	legislature	-1	Senate Bill No. 894
2006/06	VA	legislature	-1	Va. Code 54.1-111(D)
2007/03	VA	case	1	Parikh V. Family Care Center
2010/06	WA	case	1	Columbia Physical Therapy, Inc. V. Benton Franklin Orthopedic Assocs., 228 P.3d 1260 (Wash. 2010)
2011/07	WA	legislature	-1	House Bill No. 1315
2014/11	WV	opinion	1	State Of West Virginia Board Of Medicine Issued A Position Statement
2018/03	WV	opinion	1	West Virginia Board Of Medicine's Position Statement On The Corporate Practice Of Medicine (Mar. 19,2018)

V.B Determinants of CPOM Changes

In this section, we examine whether CPOM regulation changes are correlated with economic fundamentals. To do so, we compile state×year-level panel data and regress an indicator for states experiencing changes in CPOM regulations in a given year on state-level economic fundamentals, including:

- *Log(Hospital Care Spending)*: The log of state-level total hospital care spending per capita, obtained from CMS' residence state estimates.
- *Log(Other Care Spending)*: The log of state-level total healthcare spending per capita, excluding hospital care, obtained from CMS' residence state estimates.
- *Log(Population)*: The state population, obtained from CMS' residence state estimates.
- *Log(Income per Capita)*: State-level income per capita, obtained from the Bureau of Economic Analysis (BEA).
- *Unemployment Rate*: The state-level unemployment rate, obtained from the Bureau of Labor Statistics (BLS).
- *Number of Hospitals*: The number of hospitals in a state.
- *Age-adjusted Mortality Rate*: The age-adjusted mortality rate in a state, obtained from CDC's Wide-ranging ONline Data for Epidemiologic Research (CDC WONDER). This variable is available up to 2016.

In Table IA8, we analyze states experiencing CPOM relaxation events and states experiencing CPOM tightening events. We consider specifications where covariates are measured contemporaneously (t) and with a one-year lag ($t-1$). Overall, we find no evidence that CPOM regulation changes are correlated with economic fundamentals, either statistically or economically.

Table IA8
Determinants of CPOM Events
This table examines determinants of CPOM relaxation and tightening events. In columns (1) and (2), the dependent variable is an indicator for states experiencing CPOM relaxation events in a given year (*CPOM Relaxation*. In columns (3) and (4), the dependent variable is an indicator for states experiencing CPOM tightening events in a given year (*CPOM Tightening*. *Log(Hospital Care Spending)* is the log of state-level total hospital care spending per capita, obtained from CMS' residence state estimates. *Log(Other Care Spending)* is the log of state-level total healthcare spending per capita, excluding hospital care, obtained from CMS' residence state estimates. *Log(Population)* is the state population, obtained from CMS' residence state estimates. *Log(Income per Capita)* is state-level income per capita, obtained from BEA. *Unemployment Rate* is the state-level unemployment rate, obtained from BLS. *Number of Hospitals* is the number of hospitals in a state. *Age-adjusted Mortality Rate* is the age-adjusted mortality rate in a state, obtained from CDC's Wide-ranging ONline Data for Epidemiologic Research (CDC WONDER). This variable is available up to 2016. *t*-statistics are reported in parentheses and standard errors are heteroskedasticity robust and clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Dep. Var.:	*CPOM Relaxation*		*CPOM Tightening*	
	(1)	(2)	(3)	(4)
Log(Hospital Care Spending)	0.0423		0.0245	
	(0.68)		(0.41)	
Log(Other Healthcare Spending)	−0.0985		−0.1049	
	(−1.39)		(−1.37)	
Log(Population)	0.0105		0.0206	
	(1.08)		(1.51)	
Log(Income per Capita)	0.0388		0.0702	
	(0.99)		(1.26)	
Unemployment Rate	0.0792		0.1854	
	(0.27)		(0.40)	
Number of Hospitals	0.0001		−0.0001	
	(0.85)		(−0.79)	
Age-adjusted Mortality Rate	−0.0001		0.0000	
	(−1.15)		(0.35)	
Log(Hospital Care Spending) (t − 1)		0.0231		−0.0138
		(0.37)		(−0.26)
Log(Other Healthcare Spending) (t − 1)		−0.1125		−0.0451
		(−1.46)		(−0.65)
Log(Population) (t − 1)		0.0066		0.0178
		(0.69)		(1.53)
Log(Income per Capita) (t − 1)		0.0685		0.0338
		(1.43)		(0.58)
Unemployment Rate (t − 1)		0.1350		0.2482
		(0.53)		(0.65)
Number of Hospitals (t − 1)		0.0001		−0.0001
		(0.99)		(−1.63)
Age-adjusted Mortality Rate (t − 1)		−0.0001		−0.0000
		(−1.14)		(−0.12)
Constant	−0.2179	−0.4644	−0.6758	−0.3502
	(−0.58)	(−1.07)	(−1.36)	(−0.64)
Obs	816	816	816	816
Adj. R^2	0.01	0.01	0.00	0.00

V.C The Effects of CPOM Events on Non-PE Acquisitions

We analyze the effects of CPOM events on hospital acquisitions by non-PE, for-profit acquirers. As these acquirers are standalone hospitals or hospital systems that are not backed by PE investors, we expect that CPOM events would not affect the probability of acquisitions by these acquirers. Table IA9 summarizes the results from this analysis. We find no significant effects of CPOM events on hospital acquisitions by non-PE acquirers.

Table IA9
CPOM Analysis: The Effects on Non-PE Acquisitions
This table analyzes the effects of CPOM events on hospitals acquisitions by non-PE, for-profit acquirers. The dependent variables is *NonPE Target*, which turns to one after a hospital is acquired by a non-PE acquirer. *CPOM Relaxation* is an indicator for states that experienced a relaxation in CPOM doctrines. *CPOM Tightening* is an indicator that turns to one for states that experienced a tightening in CPOM doctrines. *Post* indicates years after the relaxation or tightening event. Controls are the same as in Table 3. See Appendix A for variable definitions. *t*-statistics are reported in parentheses and standard errors are heteroskedasticity robust and clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Dep. Var.: *NonPE Target*	(1)
CPOM Relaxation×Post	−0.0121
	(−1.45)
CPOM Tightening×Post	−0.0134
	(−1.46)
Hospital Controls	Yes
County Controls	Yes
Hospital FEs	Yes
Matched Pair FEs	Yes
Event Time FEs	Yes
Obs	7,999
Adj. R^2	0.70

V.D An Instrumental Variable Approach

We perform an instrumental variable approach to the CPOM analysis. Specifically, we estimate the following two-stage regressions:

$$
\begin{aligned}
PE\ Target_{e,i,t} &= \beta_1 CPOM\ Relaxation_{e,i,t} \times Post_{e,t} \\
&\quad + \beta_2 CPOM\ Tightening_{e,i,t} \times Post_{e,t} + \gamma \cdot X_{i,t} + \alpha_i + \mu_e + \tau_{e,t} + \nu_{e,i,t} \\
Y_{e,i,t} &= \beta \widehat{PE\ Target}_{e,i,t} + \gamma \cdot X_{i,t} + \alpha_i + \mu_e + \tau_{e,t} + \varepsilon_{e,i,t},
\end{aligned}
$$

where e indicates a matched pair that includes a hospital located in a treated state (i.e., a state that changes its CPOM doctrine) and a matched hospital in control states, i indexes a hospital, and t indicates a year around the event. *CPOM Relaxation* is an indicator that turns to one for hospitals in states that relaxed their CPOM doctrines during our sample period, and 0 otherwise. Analogously, *CPOM Tightening* is an indicator that turns to one for hospitals in states that tightened their CPOM doctrine during our sample period, and 0 otherwise. *Post* indicates years following the changes in CPOM doctrines. *PE Target* turns to one after a hospital is acquired by a PE acquirer.

Table IA10 provides the results from the second stage. We find a significant decline in total employment at hospitals acquired by PE investors. However, when comparing core and administrative workers, the reduction in employment is observed only among administrative workers. Note that while the IV framework generates similar inferences as those in Table 6, the coefficients here generally have much larger magnitudes. This is because in the first stage, changes in CPOM doctrines only lead to small changes in PE acquisition likelihood, while in the data, such changes correspond to binary realizations of *PE Target*, i.e., the difference in acquired and non-acquired hospitals. Thus, the magnitudes from the second stage are artificially inflated.

Table IA10
CPOM Analysis: IV Estimates
This table provides results from IV specifications of the CPOM analysis. *PE Target* is instrumented by *CPOM Relaxation*×*Post* and *CPOM Tightening*×*Post* in Table 6. Controls are the same as in Table 3. See Appendix A for variable definitions. *t*-statistics are reported in parentheses and standard errors are heteroskedasticity robust and clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Dep. Var.:	*OI/AT*	*ROA*	*log(Total Employment)*	*log(Core Workers)*	*log(Admin Workers)*
	(1)	(2)	(3)	(4)	(5)
PE Target	0.0863	0.2117	−0.5800**	0.1538	−1.0699**
	(0.80)	(1.07)	(−2.22)	(0.47)	(−2.41)
Hospital Controls	Yes	Yes	Yes	Yes	Yes
County Controls	Yes	Yes	Yes	Yes	Yes
Hospital FEs	Yes	Yes	Yes	Yes	Yes
Matched Pair FEs	Yes	Yes	Yes	Yes	Yes
Event Time FEs	Yes	Yes	Yes	Yes	Yes
Obs	5,278	5,278	5,287	5,286	5,282

VI Alternative Matching

Table IA11
Alternative Matching
This table shows the robustness of our main results when we match target hospitals to control hospitals using alternative approaches. In Panel A, we switch the employment matching variable in our main approach from pre-event *Log(Core Workers)* and *Log(Admin Workers)* to pre-event *Log(Employment)*. In Panel B, we match hospitals based on a smaller set of variables, namely the pre-event average of the outpatient ratio, CMI, and the log of total employment in the year prior to the acquisition. We also require acquired and control hospitals to be in the same Census division and to have the same Metropolitan area status. In Panel C, we match hospitals based on the pre-event average of the outpatient ratio and CMI, and we require the matched pair to be in the same Census division, have the same Metropolitan area status, and fall within the same decile for the number of beds. Controls are the same as in Table 3. See Appendix A for variable definitions. t-statistics are reported in parentheses and standard errors are heteroskedasticity robust and clustered by hospital. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

(A) Alternative Matching: Approach 1

Dep. Var.:	*Log(Employment)*		*Log(Total Wages)*		*Log(Core Workers)*		*Log(Admin Workers)*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-Event Window	[0, 4]	[5, 8]	[0, 4]	[5, 8]	[0, 4]	[5, 8]	[0, 4]	[5, 8]
PE Target	−0.0683***	−0.1112***	−0.0775***	−0.1485***	−0.1765***	−0.0550	−0.1325***	−0.1561**
	(−4.27)	(−3.04)	(−3.80)	(−3.31)	(−5.12)	(−0.64)	(−4.19)	(−2.33)
NonPE Target	−0.0495*	−0.0849*	−0.0813***	−0.1083*	−0.2983***	−0.3795**	−0.0241	−0.0436
	(−1.75)	(−1.66)	(−2.60)	(−1.78)	(−4.71)	(−2.43)	(−0.46)	(−0.35)
Hospital Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hospital FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Matched Pair FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event Time FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
H_0: PE=NonPE	0.51	0.62	0.90	0.51	0.06	0.05	0.04	0.39
Obs	3,869	2,310	3,869	2,310	3,869	2,310	3,869	2,310
Adj. R^2	0.98	0.98	0.98	0.98	0.90	0.90	0.91	0.91

(B) Alternative Matching: Approach 2

Dep. Var.:	*Log(Employment)*		*Log(Total Wages)*		*Log(Core Workers)*		*Log(Admin Workers)*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-Event Window	[0, 4]	[5, 8]	[0, 4]	[5, 8]	[0, 4]	[5, 8]	[0, 4]	[5, 8]
PE Target	−0.0584***	−0.1128***	−0.0745***	−0.1626***	−0.1470***	−0.0929	−0.1231***	−0.1304*
	(−3.56)	(−3.02)	(−3.68)	(−3.58)	(−4.19)	(−1.15)	(−3.82)	(−1.79)
NonPE Target	−0.0421	−0.0507	−0.0878***	−0.0967	−0.2037***	−0.2666*	−0.0049	0.0070
	(−1.28)	(−0.75)	(−2.59)	(−1.37)	(−2.80)	(−1.66)	(−0.08)	(0.06)
Hospital Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hospital FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Matched Pair FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event Time FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
H_0: PE=NonPE	0.61	0.39	0.69	0.38	0.43	0.30	0.04	0.28
Obs	4,323	2,596	4,323	2,596	4,323	2,596	4,321	2,594
Adj. R^2	0.97	0.96	0.98	0.97	0.91	0.90	0.92	0.91

(C) Alternative Matching: Approach 3

Dep. Var.:	*Log(Employment)*		*Log(Total Wages)*		*Log(Core Workers)*		*Log(Admin Workers)*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-Event Window	[0, 4]	[5, 8]	[0, 4]	[5, 8]	[0, 4]	[5, 8]	[0, 4]	[5, 8]
PE Target	−0.0767***	−0.1069***	−0.0936***	−0.1493***	−0.1665***	−0.1164	−0.1619***	−0.1809**
	(−5.47)	(−2.73)	(−5.21)	(−3.39)	(−4.82)	(−1.42)	(−5.57)	(−2.42)
NonPE Target	−0.0496	−0.0372	−0.0974***	−0.0720	−0.2569***	−0.3605**	−0.0327	−0.0295
	(−1.59)	(−0.53)	(−3.01)	(−0.97)	(−4.11)	(−2.23)	(−0.53)	(−0.23)
Hospital Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hospital FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Matched Pair FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event Time FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
H_0: PE=NonPE	0.39	0.33	0.91	0.31	0.14	0.15	0.04	0.26
Obs	4,299	2,596	4,299	2,596	4,299	2,596	4,298	2,595
Adj. R^2	0.98	0.97	0.98	0.98	0.91	0.91	0.92	0.90

VII Spillover Effects of Local Acquisitions

Table IA12

Alleviating Concerns Regarding the Spillover Effects of Local Acquisitions.

This table provides results from an analysis to alleviate concerns regarding the spillover effects of local acquisitions. In Panel A, we drop matched pairs where the control hospital is located in the same HRR as the target hospital. In Panel B, we drop matched pairs where the control hospital is located in an HRR where over 25% of hospitals in that region are acquired by PEs over the $[-4, +8]$-year event period. Controls are the same as in Table 3. See Appendix A for variable definitions. t-statistics are reported in parentheses and standard errors are heteroskedasticity robust and clustered by hospital. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

(A) Dropping Pairs with Control Located in the Same HRR as Target

Dep. Var.:	*Log(Employment)*		*Log(Total Wages)*		*Log(Core Workers)*		*Log(Admin Workers)*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-Event Window	$[0, 4]$	$[5, 8]$	$[0, 4]$	$[5, 8]$	$[0, 4]$	$[5, 8]$	$[0, 4]$	$[5, 8]$
PE Target	−0.0628***	−0.0734*	−0.0761***	−0.0946*	−0.1874***	−0.0983	−0.1799***	−0.1767**
	(−3.87)	(−1.79)	(−3.48)	(−1.96)	(−4.95)	(−1.24)	(−5.35)	(−2.53)
NonPE Target	−0.0226	−0.0980**	−0.0538	−0.1085*	−0.3012***	−0.4776**	−0.0238	−0.1148
	(−0.71)	(−2.23)	(−1.64)	(−1.91)	(−3.83)	(−2.22)	(−0.40)	(−0.73)
Controls and Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
H_0: PE=NonPE	0.22	0.61	0.51	0.82	0.15	0.10	0.01	0.70
Obs	3,006	1,773	3,006	1,773	3,006	1,773	3,006	1,773
Adj. R^2	0.98	0.98	0.98	0.98	0.92	0.91	0.91	0.90

(B) Dropping Pairs with Control Located in HRRs Where Over 25% of Hospitals Are PE-Acquired

Dep. Var.:	*Log(Employment)*		*Log(Total Wages)*		*Log(Core Workers)*		*Log(Admin Workers)*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-Event Window	[0, 4]	[5, 8]	[0, 4]	[5, 8]	[0, 4]	[5, 8]	[0, 4]	[5, 8]
PE Target	−0.0657***	−0.0522	−0.0778***	−0.0752*	−0.1746***	−0.0032	−0.1712***	−0.1923***
	(−4.16)	(−1.46)	(−3.74)	(−1.70)	(−4.82)	(−0.04)	(−5.35)	(−2.99)
NonPE Target	−0.0269	−0.0248	−0.0603*	−0.0436	−0.2936***	−0.3753**	−0.0329	−0.0195
	(−0.94)	(−0.47)	(−1.91)	(−0.73)	(−4.55)	(−2.26)	(−0.62)	(−0.14)
Controls and Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
H_0: PE=NonPE	0.18	0.62	0.58	0.60	0.07	0.04	0.01	0.22
Obs	3,411	2,075	3,411	2,075	3,411	2,075	3,411	2,075
Adj. R^2	0.98	0.98	0.98	0.98	0.91	0.90	0.90	0.89