Surprise! Out-of-Network Billing for Emergency Care in the United States

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In the United States, hospitals and physicians independently negotiate contracts with insurers. Therefore, a privately insured individual can be treated at an in-network hospital's emergency department but receive a large unexpected bill from an out-of-network emergency physician working at that facility. Because patients do not choose their emergency physician, emergency physicians can remain out of network and charge high prices without losing patient volume. We illustrate that this strong outside option improves physicians' bargaining power with insurers. We conclude by analyzing New York's efforts to address out-of-network billing through binding arbitration between physicians and insurers over out-of-network payments. This intervention reduced out-of-network billing by 12.8 percentage points (88%).

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I. Introduction

Each year, there are 41.9 emergency department (ED) visits per 100 people in the United States (Centers for Disease Control and Prevention 2013). When patients access EDs, they are consuming a package of care that includes hospital and physician services. However, what most privately insured patients do not realize is that hospitals and physicians in the United States independently negotiate contracts with insurers. As a result, it is possible for a patient to choose a hospital ED that is in network with his insurer but receive care and a subsequent large bill from an unavoidable ED physician working at that hospital who is out of network with his insurer. In addition to exposing patients to financial risk, when physicians have the ability to bill out of network without being avoided, as we illustrate, it undercuts the functioning of health care labor markets.

The financial harm patients face when they are treated by an out-of-network physician can be substantial. When a physician is out of network, she bills for and attempts to collect her charges, which are not competitively determined. In many instances, when a patient is treated by an out-of-network physician, insurers will pay physicians only what they would typically reimburse for in-network care (which is generally lower than physicians' charges). This leaves the physician to attempt to collect the difference between her charges and the insurer's payment (the balance) from the patient (so-called balance or surprise billing). These balance bills can be hundreds or thousands of dollars and have been well documented in the popular press (see, e.g., Rosenthal 2014a, 2014b; Sanger-Katz and Abelson 2016). Given that nearly half of individuals in the United States do not have the liquidity to pay an unexpected $400 expense without taking on debt, these out-of-network bills can be financially devastating to a large share of the population and should be a major policy concern (Board of Governors of the Federal Reserve System 2016).

ED physicians' ability to bill out of network also has the potential to raise the costs of all in-network emergency care. The prices of health care services delivered to privately insured individuals in the United States are set via bilateral negotiations between health care providers and health insurers. Because they are not chosen and cannot be avoided by patients, the incentives facing ED physicians to join insurers' networks differ markedly from the incentives facing most other non-ED physicians.

Traditionally, physicians (e.g., orthopedic surgeons and internists) face a price-volume trade-off when deciding whether to join an insurer's network. An orthopedic surgeon can, for example, refuse to join all insurers' networks and bill her patients for her charges. However, many patients will not seek treatment from a physician who is out of network because of the additional cost they would incur. Alternatively, the orthopedic surgeon could join insurers' networks, which will increase the physician's

demand, but in exchange for that demand, the insurers will require a price concession. In this way, physicians in high demand or with few substitutes are able to command higher prices, a characteristic of functioning labor markets. By contrast, because they are part of a wider bundle of hospital care and cannot be avoided once the hospital choice is made, ED physicians (and other specialty physicians, such as radiologists, pathologists, and anesthesiologists) face fairly inelastic demand from patients in the short run. Because patients will struggle to avoid out-of-network ED doctors working from in-network hospitals (in the extreme, patients transported via ambulance have almost no choice over their provider), ED physicians will not see a significant reduction in their patient volume if they fail to negotiate contracts with insurers. Theory predicts that the availability of a lucrative outside option (e.g., the ability to bill out of network without losing significant patient volume) will give ED physicians bargaining leverage that will allow them to obtain higher in-network payment rates relative to what other physicians who cannot readily bill out of network are paid.[1] As a result, ED physicians can use the threat of out-of-network billing to raise their in-network payments. These higher payment rates, caused not by supply or demand but rather by the ability to ambush the patient, represent a transfer from consumers to physicians and—because ED care is so common—raise overall health spending.

In this paper, we analyze data from a large insurer that covers tens of millions of lives annually to study where out-of-network billing occurs and why it persists and to explore policy options to address the issue. Out-of-network billing is an immediate policy concern and provides an illuminating demonstration of the economics of insurer physician bargaining. In particular, this paper illustrates how shifting a physician's outside option and disagreement payoff changes the negotiated payments they receive from insurers. We conclude by testing whether policies pursued in New York State that limited ED physicians' ability to bill out of network (and hence lowered their disagreement payoff) reduced the frequency of out-of-network billing and lowered ED physicians' average in-network payments.

We begin by assessing the distribution of out-of-network billing for ED care across hospitals in the United States. Previous work has found that approximately one-fifth of privately insured patients treated at in-network hospital EDs were treated by out-of-network ED physicians (Cooper and Scott Morton 2016; Garmon and Chartock 2017). However, we illustrate that looking at the national or regional incidence of out-of-network billing is uninformative because out-of-network billing is concentrated in

[1] For a description of this result, see Osborne and Rubinstein (1990).

a small number of hospitals: 71% of hospitals have out-of-network billing prevalence below 20%, while 15% of hospitals have out-of-network billing prevalence above 80%. Out-of-network physicians in our data charge, on average, 637% of what the Medicare program would pay for identical services. Consistent with predictions that a strong outside option should give ED physicians stronger negotiating power over in-network rates, we find that ED physicians in our data are paid in-network rates of 266% of Medicare payments, which is higher than most other specialists (for reference, in-network orthopedic surgeons in our data are paid 178% of Medicare rates for performing hip replacements).

Approximately two-thirds of hospitals in the United States outsource the staffing of their EDs to physician staffing companies that hire and manage physicians, manage ED operations, and take care of billing (Lehrich, Kalenderian, and Nentin 2013). There is anecdotal evidence that physicians and national physician staffing companies are using out-of-network billing as a tool to generate profits. We analyze the behavior of the market-leading ED outsourcing firm in the United States—EmCare—to understand how the firm uses the strong outside option that ED physicians possess to influence their negotiations with insurers. We find that EmCare uses the power of its outside option to raise profits when it takes over new contracts with hospitals. We observe that when the firm enters into a new contract to manage a hospital's ED services, it immediately exits insurer networks, bills as an out-of-network provider, and seeks to collect charges (which it doubles relative to the charges billed by the prior physician group in that hospital).

What hospitals would allow physician groups working inside their facilities to engage in an out-of-network billing strategy, given that it both exposes patients to financial risk and exposes hospitals to reputational harm? Newhouse (1970) posited that hospitals trade off patient and community benefit with profits. Since a hospital ultimately controls which physician groups staff their EDs, hospitals that allow out-of-network billing must be receiving transfers of value from those out-of-network ED physician practices that offset the reputational costs the hospitals incur from out-of-network billing occurring. Likewise, hospitals that allow ED physician practices that bill out of network to work from inside their facilities must put more weight on profit relative to patient welfare than hospitals that do not.

Consistent with these predictions, we estimate that EmCare provides roughly $2 million or more as an average annual transfer to a hospital that allows them to bill out of network. These transfers come via lowering the fees they charge hospitals to staff their facilities, allowing hospitals to share the profits they make from physician billing and altering the clinical practice of their physicians in ways that are advantageous to the hospital (e.g., we observe that after EmCare physicians took over EDs, they

ordered more imaging studies and admitted patients to the hospital at higher rates, which both generated additional hospital revenue). Note that in 2012, average profits per hospital in the United States were $12.9 million (Becker's Hospital Review 2014). As a result, the average transfer that EmCare constitutes is a 15.5% share of hospital profits. Moreover, consistent with theory, we find that for-profit hospitals are significantly more likely to contract with EmCare than nonprofit or government facilities.

Out-of-network bills are burdensome for consumers (historically, they were the number one health insurance complaint to the New York Department of Financial Services), expose patients to financial risk, and raise the total cost of health care services (New York State Department of Financial Services 2012). In 2020, policy makers at the state and federal level are exploring a range of policy options to protect consumers and restore a competitively set price for ED physicians' payments (Lucia, Hoadley, and Williams 2017; Office of Senator Bill Cassidy 2018; Office of Senator Maggie Hassan 2018). New York was the first state to devote significant attention and resources to addressing out-of-network billing. In March 2012, the state published an extensive report highlighting the occurrence of out-of-network billing, drawing attention to bad actors and raising the need for legislative action. In 2014, the state passed a law that, once implemented a year later, introduced baseball rules arbitration to settle the out-of-network billing disputes between physicians and insurers. Under the New York law, patients who saw an out-of-network ED physician were only responsible for in-network cost sharing, and physicians were prohibited from balance billing patients. In addition, to address contested bills, the state created a binding baseball rules arbitration process where an arbitrator could select between an offer made by the insurer and the bill sent by the physician. This policy therefore weakened the outside option of ED physicians by constraining what they could receive if they billed out of network. We analyze the effect of the New York law and find that it reduced out-of-network billing by 88%. There was also a 15% reduction in in-network ED physician payments that began 6 months before the law was passed and continued after the law was fully implemented.

Ultimately, this paper makes two contributions to the literature. First, we analyze the drivers of out-of-network billing in the United States, quantify the extent the issue raises total health care costs and harms consumers, and test one state's efforts to address the issue. Second, we demonstrate how the strength of a party's outside options influences negotiations. We show three pieces of evidence that illustrate that improving physicians' outside options and disagreement payoffs in their negotiations with insurers lead to higher in-network payments. These results are therefore informative about broader physician/insurer bargaining.

Going forward, this paper is structured as follows. Section II gives background on ED care in the United States and describes the impact of surprise

out-of-network billing on patients. In section III, we outline the incentives of physicians and hospitals to engage in out-of-network billing. We describe our data and analytic approach in section IV. In section V, we identify the factors associated with out-of-network billing, analyze the impact of the entry of EmCare on out-of-network billing prevalence, and analyze the transfers EmCare makes to hospitals where they enter into contracts. In section VI, we assess the impact of a law passed in New York that was designed to protect consumers from surprise bills. We conclude in section VII.

II. Background

A. *The Evolution of Emergency Medicine in the United States*

At present, there are more than 4,500 EDs in the United States and approximately 40,000 physicians who staff them nationwide (Hsia, Kellermann, and Shen 2011; Morganti et al. 2013). The use of EDs has risen dramatically over time. From 2001 through 2008, the use of EDs increased 1.9% each year—60% faster than concurrent population growth (Hsia Kellermann, and Shen 2011).

Over the past several decades, EDs have become one of the main pathways through which patients are admitted to the hospital. At present, a majority of a hospitals' admitted patients entered the hospital via an ED (Morganti et al. 2013). Because EDs have become a major source of patients, hospitals now want to keep their EDs open at all hours and run them efficiently (Institute of Medicine 2006; Morganti et al. 2013) As a result, there has been a marked increase in the outsourcing of management of hospital EDs. ED outsourcing companies hire and manage physicians, manage ED operations, and take care of billing and collections. Today, roughly 65% of the physician market is outsourced (Lehrich, Kalenderian, and Nentin 2013). Among the hospitals that outsource their services, approximately one-third contract with a large national outsourcing chain, and the remainder are outsourced to smaller local firms (Dalavagas 2014).

The national market for physician outsourcing is dominated by two firms, EmCare and TeamHealth, which collectively account for approximately 30% of the outsourced physician market (Lehrich, Kalenderian, and Nentin 2013). Both firms were publicly traded until they were taken private by large private equity firms. EmCare was publicly traded until 2018, when it was bought by KKR & Co. It operates in 45 states, has 23,100 affiliated or employed physicians and health care professionals, and (according to their 2016 Form 10-K) delivers more than 18 million emergency episodes per year. More recently, EmCare has partnered with a large for-profit

hospital chain and formed joint ventures where the firm and its hospital partners share in profits from physician bills (Lehrich, Kalenderian, and Nentin 2013). TeamHealth is approximately the same size. It was publicly traded until 2016, when it was purchased by the Blackstone Group.

In the aggregate, ED care is profitable for hospitals. Wilson and Cutler (2014) estimated that average ED profit margins are approximately 7.8% per patient. However, the profit margins that hospitals face for ED care vary significantly depending on how a patient's care is funded and based on whether a patient is admitted to the hospital. Wilson and Cutler (2014) found that hospitals had profit margins of 39.6% for privately insured patients treated in EDs, whereas the profit margin for patients who were covered by Medicare, covered by Medicaid, and uninsured were −15.6%, −35.9%, and −54.4%, respectively. They also found that patients who were admitted to the hospital were significantly more profitable than those who were not. For Medicare patients, the profit margin on ED care for patients who were discharged from the ED was −53.6%, whereas the profit margin for patients who were admitted to the hospital was 18.4% (Wilson and Cutler 2014).

B. Out-of-Network Surprise Billing

There are broadly two types of out-of-network bills. The first form of out-of-network billing results from contracting frictions between insurers and physicians. In the United States, there are approximately 55,000 ED physicians, 6,100 hospitals, and over 1,000 insurers (Kaiser Family Foundation 2019; American Hospital Association 2020). As a result, it is unlikely that every ED physician could have a contract with every insurer that covers all the patients she treats. As an example, an ED physician in a popular vacation destination could see patients from across the country. Even if she wanted to, this ED physician would struggle to enter into contracts with insurers from across the country. While an out-of-state patient's insurer might have a contract with the hospital in the area the patient is visiting, it is possible that they might not have a contract with the patient's ED physician. In these instances, if the physician is not engaging in a deliberate out-of-network strategy, she may accept a payment rate that is of the same magnitude as her usual in-network payments.

A second form of out-of-network billing occurs when physicians deliberately do not participate in insurers' networks so that they can reap higher payments. As the New York State Department of Financial Services noted in their 2012 report, "A relatively small but significant number of out-of-network specialists appear to take advantage of the fact that emergency care must be delivered and [that] advanced disclosure is not typically demanded or even expected by consumers. The fees charged by these providers can, in some instances, be many times larger than what private or public

payers typically allow, and are another source of consumer complaints" (New York State Department of Financial Services 2012). Indeed, a recent study found that physicians who tend not to be chosen by patients (anesthesiologists, radiologists, pathologists, and ED physicians) have the highest charges measured as a percentage of their Medicare payments (Bai and Anderson 2017).

When an insured patient sees an out-of-network physician, there are three potential outcomes. First, the insurer may pay the physician's out-of-network bill in its entirety. This will protect the patient, but ultimately insurers will pass the cost of these higher payment rates on to all beneficiaries in the form of higher premiums. In addition, patients generally face higher coinsurance rates when they see an out-of-network provider. As a result, even if their insurer pays their physician her charge, the patient may still face substantial cost sharing. Second, the insurer may pay the out-of-network physician her usual and customary rate, which the insurer calculates on the basis of average charges or average in-network payments for the services provided. This payment is generally lower than the total billed amount. When this occurs, the physician may accept the usual and customary rate the insurer is offering and move on. Alternatively, the physician may pursue the patient to pay the difference between the charge and whatever the insurer paid. This is referred to as balance billing. Third, the insurer may not cover the costs of out-of-network care at all, leaving the patient to pay the entire physician bill herself. As we show later from our data, these physician bills can be extremely large. While there is no systematic evidence on the frequency that patients are balance billed by physicians, from 2012 to 2015, data from the Texas Department of Insurance showed that balance billing complaints in the state increased 1,000% (Gooch 2016).

There has been significant coverage of out-of-network billing in the popular press (Rosenthal 2014a, 2014b; Sanger-Katz and Abelson 2016). However, until recently, there has been no systematic evidence on the frequency that out-of-network billing occurs. Recent survey work suggests that it is fairly common for privately insured patients to be treated by out-of-network physicians.[2] The results of these surveys have been confirmed

[2] A Consumers Union 2015 survey found that 30% of privately insured individuals reported receiving a surprise medical bill within the previous year, and Kyanko, Curry, and Busch (2013) found that most instances in which privately insured individuals involuntarily saw out-of-network providers occurred during medical emergencies. In many instances, when patients receive a surprise bill, they simply pay the balance in full (Consumers Union 2015). Likewise, among those who had trouble paying a medical bill, 32% reported that their financial troubles stemmed from a bill from an out-of-network provider for services that were not covered or were only partially covered by their insurer (Hamel et al. 2016). In this Hamel et al. (2016) survey, the authors found that bills from ED physicians made up the largest share of medical debt that patients reported having problems paying.

by recent empirical evidence. A 2014 report found that among the three largest insurers in Texas, 45%, 56%, and 21% of their in-network hospitals had zero in-network ED physicians (Pogue and Randall 2014). Likewise, in the first national study of out-of-network billing, Cooper and Scott Morton (2016) analyzed data from a large commercial insurer and found that 22% of in-network ED hospital visits included a primary physician claim from an out-of-network doctor. Using different data, Garmon and Chartock (2017) found that 20% of ED cases in which care was delivered to privately insured patients at in-network hospitals involved care from an out-of-network physician. However, as we will show below, knowing the average probability of receiving an out-of-network bill does not help diagnose the policy problem, which lies in the tail of the distribution of out-of-network billing prevalence across hospitals.

C. EmCare and Out-of-Network Billing

There is anecdotal evidence suggesting that EmCare, the nation's largest physician staffing company, uses out-of-network billing as a tool to raise profits. For example, on March 29, 2016, an investment advising service noted, "What EmCare actually does is take over an in-network hospital Emergency Room that is aligned with most local healthcare insurance plans and staff it with physicians who are out-of-network. . . . Since EmCare is out-of-network, it refuses to sign in-network agreements with local insurance providers, it 1) can charge exorbitant out-of-network reimbursement rates from the providers and 2) since it is out-of-network, it can 'balance bill' its patients for the difference between its prices and the amount the insurer belies is 'usual and customary'. This is a license to print money!" (Chanos 2016)

A video of hospital administrators at Glen Rose Medical Center in Glen Rose, Texas, discussing out-of-network bills also suggests that EmCare uses surprise billing as a deliberate strategy (the transcript from the video is available in app. 1; apps. 1–4 are available online). As the hospital administrators state in the video, in order to get EmCare physicians to cease billing out of network and balance billing their patients, they would need to increase their subsidies to EmCare. To that end, one of the hospital staff says, "They [the ED physicians] bill out-of-network for most insurance. . . and we could expand the insurances that are covered in the ER, but it's at a cost of about $200,000 a year to us. . . . [If] we require them to be in-network . . . then our subsidy would increase significantly." Later, in response to discussion of the $200,000 in additional funds the hospital would have to pay EmCare, another hospital administrator replies, "We would have to pay EmCare an additional $200,000 to put those people in-network because right now billing out-of-network they're making more money."

Envision (the parent company of EmCare) has confirmed this strategy in their reply (posted on their website) to an earlier draft of this paper. In that reply, they state, "We dispute that 'a hospital does not benefit directly from physicians engaging in out-of-network billing' (page 19). Hospitals do benefit directly when higher out-of-network insurance payments rather than hospital subsidies to the emergency physicians, enable the hospital to recruit, retain, and expand high-quality board certified emergency physicians" (Envision Healthcare 2017).

III. Incentives for Insurers, Physicians, and Hospitals to Allow or Engage in Out-of-Network Billing

For a patient to receive a surprise bill, there are three parties that have to prefer out-of-network billing to an in-network contract: the ED physician group, the hospital, and the insurer. The physician group and insurer must be unable to come to an agreement on an in-network contract. In addition, the hospital must allow physicians to bill out of network from inside their facilities.[3] We discuss each party's incentives in turn. We more formally model these incentives in appendix 2.

A. Insurers and Out-of-Network Billing

The physician group and the insurer bargain over the price the insurer will pay the physician for care delivered to policyholders. The insurer faces a trade-off between including more and better physicians in its network and the higher in-network payments needed to retain those physicians in the network. The decision about how broad and how highly reputable a network of providers to create (and how to handle out-of-network bills) is a function of the preferences of the purchasers of health insurance. Buyers of insurance might prefer a broad network of physicians, have a distaste for out-of-network bills, and therefore be willing to accept higher premiums. On the other hand, the buyers might prefer lower premiums and be willing to accept an insurance plan with a narrower network of providers and a higher probability of a policyholder seeing an out-of-network physician. In the extreme, the buyers of insurance could be willing to accept a plan with out-of-network ED physician billing and believe it to function as a very expensive form of patient cost sharing for accessing ED services.

[3] The hospital may not have legal authority to prevent a physician (or physician group) from practicing in the ED just because that physician has failed to come to an agreement with any given insurer or insurers. However, we assume that there are so many interactions between the hospital and an ED physician group that if the hospital disapproved of the group's overall strategy, it could make the relationship sufficiently onerous such that the physicians would move in network.

When ED physicians are pursuing a deliberate strategy of billing out of network, insurers can face higher payments, higher transaction costs, and dissatisfied customers (e.g., those who received a balance bill). In general, absent specific out-of-network billing laws, the insurer's outside option in the event of disagreement over an ED physician's payment is litigation or the threat of litigation under the relevant federal and state statutes. The fees that physicians collect under disagreement in this setting will therefore not be competitively set by hospital demand and physician labor supply but instead be driven by the possibility of litigation over their bills as well as adverse publicity and social norms.[4] By contrast, as we discuss, a number of states have regulations that impact ED physicians' outside option if they bill out of network. Some states (like California, Maryland, and Connecticut) directly regulate payments to out-of-network providers. Other states (like New York and Texas) have each introduced an arbitration process between providers and insurers. Finally, there are states that do not have surprise billing protections but do have more general laws against price gouging and similar behavior. As a result, the outside option for an insurer of formally disputing an out-of-network charge will be differentially successful depending on state law. State law will impact physicians' outside option, which will affect the rates an insurer is willing to pay ED physicians to join its network.

B. Hospitals and Out-of-Network Billing

EDs serve as the front door to hospitals. The majority of admitted patients in a hospital at any given point in time came in via the ED. As a result, hospitals need to keep their EDs open at all hours in order to retain patients. To keep their EDs running, hospitals must recruit staff to run their EDs and arrange with physicians to provide care from inside their facilities. Alternatively, they can contract with an ED staffing company to manage the entirety of their ED, including recruiting, managing, and paying physicians. However, EDs deliver significant amounts of uncompensated care, and ED physicians regularly treat patients from whom they receive little or no compensation (Garthwaite, Gross, and Notowigdo 2018). Because of the Emergency Medical Treatment and Active Labor Act (EMTALA), EDs must provide care to patients in an emergency (Centers for Medicare and Medicaid Services 2012). As a result, hospitals must typically pay physicians a fee to work from their facilities to offset the physicians' costs for uncompensated care and pay for the services they provide above and beyond their clinical practice (e.g., managing the ED).

[4] See, e.g., UnitedHealthcare Servs., Inc. v. Asprinio (2015 NY Slip Op 25298) and Children's Hosp. Cent. Cal. v. Blue Cross of Cal., 172 Cal. Rptr. 3d 861, 872 (Ct. App. 2014) for examples of litigation over providers' charges. Richman et al. (2017) provides further examples of litigation over providers' charges.

Hospitals control which physicians or ED staffing firms they allow to work from inside their facilities. We assume that hospitals are aware of whether physician staffing firms engage in a deliberate out-of-network billing strategy. When ED physicians bill out of network, the ED physicians themselves (or the staffing firms for which they work) benefit from higher out-of-network payments. However, the hospitals where they work do not generally receive direct benefits from out-of-network ED physician billing. Indeed, when ED physicians remain out of network and balance bill patients, it introduces costs to hospitals, including reputational harm.[5] Therefore, for hospitals to be willing to permit physicians to bill out of network from inside their facility, they must receive a transfer from physicians or staffing firms equal or greater to the cost of the reputational harm they incur from allowing the practice to persist.

These transfers could take a myriad of forms. For example, ED staffing firms often demand subsidies from hospitals to staff their EDs. Physician staffing firms could lower these subsidies in exchange for being allowed to bill out of network. Alternatively, ED physicians could deliver medical care in a manner that raises revenue for the hospital. This could include increasing imaging and lab testing rates (which raises hospital revenue) or increasing the rate that patients from the ED are admitted to the hospital. ED staffing firms could also raise the quality of hospital EDs, such that they attract more patients and improve the hospital's reputation. At the extreme, physician staffing companies could enter into profit sharing agreements with hospitals, where the hospitals would benefit directly from the profits generated by physicians' out-of-network billing.

C. Physicians and Out-of-Network Billing

A physician or physician group faces a choice of negotiating in-network rates with insurers or going out of network, collecting higher out-of-network payments but incurring costs from engaging in the practice. In the longer term, they may see a modest reduction in the number of patients they treat if patients become aware of their out-of-network billing strategy and begin to avoid their facility. A physician or physician group must consider the incremental profit she or the group will obtain from going out of network. In a standard market with downward-sloping demand, if a physician went out of network, she would experience a significant decline in the number of patients she treats because of her higher out-of-network price that most patients would face. However, because we are examining ED physicians, we make the more realistic assumption (for this setting)

[5] Historically, most media stories of out-of-network billing have cited the hospital where the patient who received an out-of-network bill was treated (see Rosenthal 2014a).

that demand for ED physicians is inelastic in the short run.[6] Therefore, in this setting, if the ED physician does not enter into an insurance network and seeks to collect her charges, she still obtains roughly the quantity of patients equal to what she would receive were she in network. As a result, we make a simplifying modeling assumption that her increase in revenue (or revenue for the ED staffing firm) is the difference between the in-network price and out-of-network effective price multiplied by the cases she performs per year. ED staffing companies may not be able to collect the entirety of their charges from all privately insured patients that they treat. For example, some insurers may not pay out-of-network physicians the entirety of their charges, and patients may have varying abilities to cover balance bills. Under this scenario, the staffing company is engaging in a form of first-degree price discrimination and seeking to collect the entirety of their charges from the patients with the ability and willingness to pay them.

Physicians likely incur costs from engaging in an out-of-network strategy. These could include fixed costs, such as physicians' own intrinsic dislike of the practice, potential peer pressure, unpleasant meetings with stakeholders, and the cost of software necessary for billing and collection. Likewise, these could include variable costs, such as more unpleasant and time-consuming communication with patients, hospitals, and insurers; the costs of collecting on each bill; and defending against litigation.

Physicians will also have to compensate the hospital for allowing them to engage in out-of-network billing from inside their facilities. As we described, physicians can compensate the hospital from their own pockets via reducing the subsidies they require for managing a hospital's ED services or entering into joint ventures where hospitals get a portion of physicians' profits. A less expensive but more legally risky option for the physician is to deliver medical care in a style that benefits the hospital. However, changes in their clinical activity that benefit the hospital (such as overtesting) could open the physician or physician groups to legal risk (e.g., claims of fraudulent billing). As a result, the propensity to engage in these actions depend on the risk tolerance of these physicians.[7]

In our setting, we think ED management firms may have greater awareness of the intricacies of physician payment and better understand the

[6] We posit that demand is inelastic in the short run because ED physicians are not chosen by patients and cannot be avoided. Indeed, previous studies have exploited the fact that patients do not choose ED physicians as a source of plausibly exogenous variation in work assessing the impact of seeing physicians with a greater or lower likelihood of prescribing opioids and seeing physicians at the end of their shift (Barnett, Olenski, and Jena 2017; Chan 2018).

[7] See, e.g., a 2017 settlement between the US Department of Justice and TeamHealth over accusations that the firm billed for higher and more expensive levels of medical service than were actually performed (Department of Justice 2017).

benefits of setting higher charges than individual physicians operating in small group practices. In this sense, the ED management firms engage in informational arbitrage (à la Hayek). Previous work by Clemens, Gottlieb, and Molnár (2017) showed that individual physicians and physicians in small groups tend to set commercial prices that follow the Medicare payment rates. By contrast, physicians in large group practices tend to have payment rates that are less strongly correlated with Medicare payment rates. National physician management companies will likely seek a profit-maximizing price that takes advantage of ED physicians' strong outside option. One might imagine that in equilibrium, this superior fee structure would have arrived at all hospitals. This is not the case in the United States for two reasons we can identify. First, outsourcing firms with an out-of-network strategy will not be able to enter hospitals that, because of their utility function, require compensation above what the physicians gain (e.g., some nonprofit hospitals may place a high premium on protecting patients from financial harm). Second, as out-of-network billing becomes more pervasive, the risk of regulatory backlash grows.[8]

IV. Data and Descriptive Statistics on Out-of-Network Billing

A. *Data*

Our claims data come from a large commercial insurer that covers tens of millions of lives annually. The data run from January 1, 2011, through December 31, 2015. The data are structured at the service line level and include detailed patient characteristics, a provider identifier, and the ability to link to a range of third-party data sets. We limit our analysis to episodes that occurred at hospitals registered with the American Hospital Association (AHA). Therefore, we do not include, for example, treatment that was delivered at urgent care clinics.

To construct emergency episodes, we identify emergency room visits in our data as those with a physician claim for emergency care and a facility claim with a code for emergency care that occurred on the same day. We identify ED claims for physicians as those that include a current procedural terminology (CPT) code of 99281, 99282, 99283, 99284, 99285, or 99291. We match those to facility claims by identifying claims delivered to the same patient on the same date that include a hospital service line with a revenue code of 0450, 0451, 0452, 0453, 0454, 0455, 0456, 0457, 0458, or 0459. The episode runs until the patient is discharged from the hospital. We exclude episodes with a length of stay over 30 days.

[8] Indeed, this occurred after an earlier version of this paper was posted (Marso 2017).

At baseline, our data include 13,444,369 ED episodes. We introduce several sample restrictions to our data to produce an analytic data set. First, we exclude episodes that were missing an AHA hospital identification number or did not come from an AHA-identified hospital. Thus, the analysis is focused on only hospital-based ED care. This restriction eliminates 1,908,710 episodes. Second, we exclude episodes for which the same physician billed as in network and out of network on separate service lines on the same claim form. This restriction eliminates 264,636 episodes. Third, we exclude episodes with duplicative insurer payments, episodes with insurer payments that were negative, and episodes for which the insurer paid $0 because the claims were denied. This restriction removes 217,267 episodes. Fourth, we exclude episodes for which the start date of the episode occurs after the end date of the episode. This restriction excludes 79 episodes. Fifth, we limit our analysis to hospitals that delivered 10 or more episodes per year and appear in all 5 years of the data. This restriction excludes 330,312 episodes. Sixth, we limit our analysis to individuals who had 6 months of continuous enrollment before their emergency episode. Having 6 months of historical data is necessary to create our Charlson comorbidity scores. This restriction excludes 1,810,245 episodes from our analysis. Finally, we winsorize the top and bottom 1% of the prices in our data.[9] We do this to limit the influence of idiosyncratically high- and low-priced episodes.

In our data, we observe physician and hospital charges, the amount that the insurer paid, and patients' coinsurance payments, copayments, and spending under their deductibles. We define the total amount an ED physician was paid as the sum of the insurer payment, the patient coinsurance payment, the patient copayment, and the patient deductible on physician service lines that have a CPT code for emergency services. We calculate facility payments as the sum of the insurer payment, patient coinsurance, patient copayment, and patient spending under her deductible summed across all facilities claims. All prices are put in 2015 dollars using the US Bureau of Labor Statistics Consumer Price Index.

Unfortunately, we do not observe whether patients were balance billed by physicians. Therefore, it is possible that the physician collects more in total than we can measure. To our knowledge, there are no data sets with information on the balance billing of patients. However, we construct a potential balance bill measure that is the difference between what the physician charged and what would be the median in-network payment for that case.

[9] Our results are robust to not winsorizing prices, but there are extremely large hospital and physician charges and payments.

In addition, we construct an indicator for whether imaging occurred during an episode based on whether there are facility claims with revenue codes associated with imaging studies.[10] We also identify episodes as involving an admission to the hospital if the facility claim for the episode includes a revenue code for room and board fees.[11]

For each episode, we also observe the patient's sex, age (measured in 10-year age bins), and race (white, black, Hispanic, and other). We also use our claims data to measure historical patient spending for 6- and 12-month periods preceding an episode. Because we do not want the emergency episodes we are analyzing to feed into the historical spending measures, we measure spending from 2 weeks before the admission date for an episode back 6 and 12 months. In addition, we used 6 and 12 months of claims data to calculate Charlson measures of comorbidity (Charlson et al. 1987).[12]

B. Identifying Where EmCare Has Contracts

EmCare bills insurers using their contracted physicians' National Provider Identifier (NPI) numbers. As a result, our claims data do not indicate that a particular claim is being billed by a physician employed by EmCare. Moreover, the firm does not provide a list of facilities where they have contracts. To overcome this information gap, we use data from EmCare's own website and public documents to identify the hospitals where the firm has outsourcing contracts. We require two independent sources of information to classify a hospital as a facility that outsourced its ED services to EmCare.

Our first source of information on the hospitals where EmCare has contracts comes from the firm's parent company, Envision. Envision posted a map on their website that included dots marking the location of hospitals where the firm had contracts (see fig. A.1; figs. A.1–A.8 are available online). To identify hospital locations on the Envision map, we scraped the map using mapping software from ArcGIS to identify the latitude and longitude of the centroid of each point on the map.[13] We then matched

[10] We identified episodes that included imaging studies based on whether the facility claims had a service line with the revenue codes 350–352, 610–619, 400–404, or 409.

[11] We identified room and board fees based on the following revenue codes on facility claims: 100, 101, 103, 110–160, 164, 167, 169–176, 179, 190–194, 199–204, 206–214, 219, 658, or 1000–1005.

[12] We pooled individuals with a Charlson score of 6 and higher.

[13] To obtain the latitudes and longitudes of the hospital locations displayed on the map, we utilized georeferencing within ArcMap. This technique aligns a map with a known coordinate system to the map of interest (which has no identified coordinate system). After transforming and overlaying the two aligned maps, we then obtain coordinate estimates of each marked hospital within a reasonable range of accuracy. While it has since been removed, embedded in the code for the website were the latitudes and longitudes of centroids of each point on the map. We matched the latitudes and longitudes from the Envision website to the latitudes and longitudes we obtained using ArcMap to validate our analysis.

the latitudes and longitudes of these centroids to data on hospital locations from the AHA. We assumed that the AHA-registered hospital that was the shortest Euclidean distance to the centroid of each point on the Envision map was an EmCare contracted hospital.

The second source of information we use to identify hospitals that contract with EmCare is job advertisements posted by the firm. EmCare posts job advertisements on their website to recruit physicians to work at their care locations (see example in fig. A.2). The job advertisements include the name of the hospital where physicians are being recruited and the specialty of the physicians the hospital is looking to hire. We scraped the names of the hospitals and the specialty of the physicians being recruited from all EmCare's job postings and website histories. This allowed us to create a roster of hospitals where EmCare was recruiting ED physicians between 2011 and 2015.

Ultimately, we regard a hospital as having a contract with EmCare if we are able to identify the hospital on a map from their website and found a job hiring post where an ED physician was being recruited. This strategy exploits the fact that, in general, EmCare wholly takes over an ED and participates in exclusive contracts with hospitals (Lehrich, Kalenderian, and Nentin 2013). Using this strategy, we identify 212 hospitals affiliated with EmCare. As a result, of the 3,345 hospitals in our analysis that meet our sample criteria, 6.3% outsource their ED to EmCare. On the basis of investor reports on EmCare, our sample of hospitals with contracts with EmCare represents a modest undercount of the total population of hospitals that have contracts with EmCare.

We also use the entry and exit of EmCare into and from hospitals to estimate the causal effect that entry and exit of the firm have on out-of-network billing prevalence, physician pricing, and hospital behavior. We relied on three strategies to find hospitals where EmCare entered. First, we searched the firm's website for press releases announcing new contracts. Second, we used LexisNexis and Google to search the popular press for news stories that announced when EmCare entered or exited a hospital ED. Third, we called all hospitals where we observed that EmCare might have had a contract on the basis of our map analysis and scrapes of their job hiring pages, spoke to the staff at the ED, and inquired about when EmCare entered into a contract with the hospital ED.[14] All told, as we illustrate in table 1, we identified 36 hospitals where EmCare entered from 2011 to 2015 and three where EmCare exited a contract.

[14] We made three attempts to reach staff at each hospital. If we were not given the precise date of entry, we used the middle date of the time unit that we were provided. For example, if we were told that entry occurred in 2012, we assumed that entry occurred on June 1, 2012.

TABLE 1
EmCare Entry and Exit Events from 2011 to 2015

	EmCare Entries	EmCare Exits
2011	1	0
2012	7	0
2013	15	1
2014	10	0
2015	3	2
Total	36	3

Note.—From 2011 to 2015, we identified 36 hospitals that entered into outsourcing contracts with EmCare and three hospitals that ended contracts with EmCare. To identify EmCare entries and exits, we called each hospital that we believed to have a contract with EmCare, reviewed press releases from the firm, and searched for news stories that highlighted an EmCare entry or exit event.

V. Out-of-Network Billing, Physician Prices, and Hospital Outsourcing

A. *Descriptive Statistics on ED Physician Payments and Out-of-Network Billing Prevalence*

Our final data set is composed of 8,913,120 ED episodes that occurred between January 1, 2011, and December 31, 2015 (see table 2).[15] This represents approximately $28 billion in emergency spending. The mean in-network ED physician payment across our sample period was $320.62 (266% of what the Medicare fee-for-service program paid for the same services; table 2). The amount that ED physicians were paid increased as a percentage of Medicare over our time period. During this period, patient out-of-pocket costs for emergency care also steadily increased, and the mean total out-of-pocket cost for an emergency episode (combining the physician and facility component) in our data was $458.69. Over 99% of ED cases in our data occurred at an in-network hospital. Table A.1 (tables A.1–A.17 are available online) includes descriptive statistics for our analytic sample of ED episodes.

At the mean in-network hospital in our data, 25.8% of patients treated in the ED were treated by an out-of-network ED physician (table 2). The frequency that patients at in-network hospitals were treated by out-of-network ED physicians has declined over time from 28.6% in 2011 to 21.9% in 2015. However, this average masks significant heterogeneity in out-of-network billing prevalence across hospitals and is somewhat misleading. Figure 1 shows the distribution of out-of-network billing prevalence across hospitals in our data in 2015 and summary statistics for that year. It illustrates that out-of-network billing is highly concentrated in a small group of hospitals. As we

[15] Seventy-seven percent of individuals with an ED episode had insurance from an administrative services only (ASO) insurance product and the balance had coverage from fully insured plans.

TABLE 2
ED Episodes per Year

	Emergency Episodes	Total Facility Spending (Million $)	Total Physician Spending (Million $)	Mean Physician In-Network Payment ($ [% Medicare])	Patient Cost Sharing on Physicians ($)	Patient Cost Sharing on Hospitals ($)	Hospital Out-of-Network Prevalence (%)
2011	1,699,231	4,522	603	274.47 (228)	42.93	342.16	28.6
2012	1,899,458	5,013	718	288.65 (245)	49.01	361.95	28.0
2013	1,820,171	5,097	754	317.79 (269)	57.87	407.44	26.1
2014	1,745,103	5,043	752	342.57 (281)	66.36	443.50	24.2
2015	1,749,157	5,263	779	375.82 (303)	69.02	455.05	21.9
Total	8,913,120	24,938	3,605	320.62 (266)	56.98	401.71	25.8

Note.—The table shows episodes per year, facility spending per year, physician spending per year, mean payment to an in-network ED physician (and mean expressed as a percentage of Medicare payments), patient payments for physician fees, patient payments for hospital fees, and yearly out-of-network prevalence. The physician payment is the sum of the insurer and patient contribution. All dollar amounts are in 2015 dollars. We observe that over 99% of ED care occurred at in-network hospitals.

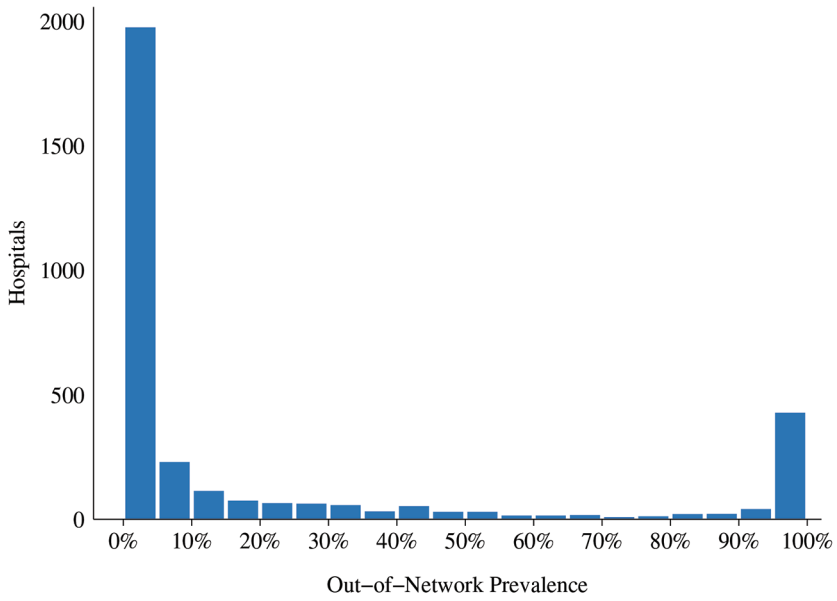

FIG. 1.—Prevalence of out-of-network ED physician billing across hospitals in 2015.

illustrate, 50% of hospitals have out-of-network billing prevalence of approximately 1%. By contrast, the out-of-network billing prevalence for hospitals in the 75th percentile of the distribution of out-of-network billing prevalence was 28%, and 15% of hospitals have out-of-network prevalence of higher than 80%. This skewed distribution is evident in 2011, 2013, and 2015 (see fig. A.3).

B. *Cross-Sectional Analysis of Hospitals' Out-of-Network Billing Prevalence*

To assess the factors associated with the variation in hospitals' out-of-network billing prevalence, we follow the approach of Finkelstein, Gentzkow, and Williams (2016) and run a least absolute shrinkage and selection operator (Lasso) regression on a range of hospital, local area, physician market, and hospital market characteristics (a complete list and descriptions of the variables that we include in our first-stage Lasso are available in app. 3). We also include an indicator variable for whether EmCare had a contract with the hospital. The Lasso method applies a penalizing parameter to the coefficient of the explanatory variables included in the regression. We use 10-fold cross validation to choose the penalizing parameter that minimizes the mean squared error. We use this Lasso procedure to select a set of variables that we include in a second stage where we

determine their conditional correlations with hospitals' out-of-network billing prevalence.

Figure 2 presents our conditional correlations between the variables selected using the Lasso regression and the share of patients per hospital who saw out-of-network physicians between 2011 and 2015 during an emergency. The results should not be interpreted causally. In this figure, we have scaled the continuous variables so that they have a mean of 0 and a standard deviation of 1. As a result, the point estimates on our continuous variables should be interpreted as the influence of a 1 standard deviation change in the dependent variable. As figure 2 shows, the presence of EmCare at a hospital is positively correlated with the hospital's out-of-network billing prevalence. We also observe that areas with more physicians per capita have lower prevalence of out-of-network billing. Out-of-network

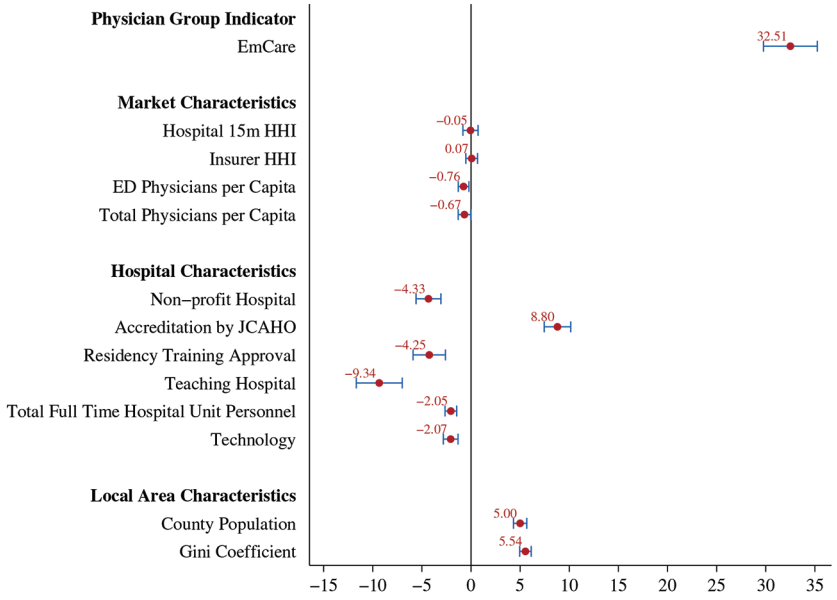

FIG. 2.—Conditional correlates of hospitals' out-of-network billing prevalence. The figure shows the point estimates from a least squares regression of hospitals' out-of-network prevalence on variables chosen from our Lasso. We used data from 2011 through 2015. Each observation is a hospital-year prevalence of out-of-network billing. The regression includes year fixed effects. For continuous variables, we scale the variables so that they have a mean of 0 and a standard deviation of 1. As a result, the point estimates can be interpreted as the percentage point change in out-of-network prevalence for a 1 standard deviation increase in the explanatory variable. For binary variables, the point estimate illustrates the impact of having the variable take a value of 1. To obtain these results, we run a Lasso with all possible variables (89 in total). We then run an ordinary least squares regression of hospital out-of-network prevalence on variables chosen from Lasso. We also include measures of hospital and insurer market concentration and physician group indicator.

billing is also less common at nonprofit hospitals, teaching hospitals, and hospitals with higher amounts of technology. There is more out-of-network billing in high-population counties and regions with more economic inequality.

C. *Causal Estimates of the Effect of EmCare Entry on Hospitals' Out-of-Network Prevalence*

Our cross-sectional results suggest that out-of-network billing is significantly higher at hospitals that outsource their ED to EmCare. In this section, we estimate the causal effect that the entry of EmCare had on the likelihood that patients were treated by out-of-network physicians working from in-network hospitals. To do so, we exploit evidence we collected from press releases, news stories on the firm's website, articles in the popular press announcing the timing of EmCare contracts, and our phone calls to hospitals to identify the dates and locations where EmCare entered into and exited hospital ED staffing contracts. We then compare outcomes before and after EmCare entered and exited hospitals. In total, we analyze the entry of EmCare into 36 hospitals between 2011 and 2015 and their exit from three hospitals during the same period. We estimate entries and exits separately. We begin by showing trends in the raw data of hospitals where EmCare entered or exited a management contract. We follow up with a regression-based analysis. Crucially, we observe no difference in the pretrends of key outcome variables before EmCare entered or exited a hospital.

In our main analysis, we estimate a hospital fixed effects model with an indicator variable, $EmCare_{i,t}$, which takes a value of 1 on and after the date that EmCare entered a hospital and returns to 0 on the dates that the firm exited hospitals if the firm lost a contract. We also run a separate estimate for the three hospitals where EmCare loses a contract. Our estimation takes the form

$$Y_{i,j,t} = \beta_0 + \beta_1 EmCare_{i,t} + \delta_j + \theta_t + \varepsilon_{i,j,t}, \tag{1}$$

where we estimate the outcomes for episode i that occurred at hospital j in month t. We also include a vector of hospital fixed effects δ_j and a unique month dummy, θ_t, for each month in the data. Our standard errors are clustered around hospitals. Our EmCare indicator is used to designate either an entry or an exit event as we denote in table 1. For exit events, the event indicator takes a value of 1 on and after the exit event, and we exclude hospitals where EmCare entered from these regressions.

We compare outcomes at hospitals where EmCare entered or exited to outcomes at three sets of control hospitals: (1) all hospitals nationally that did not have EDs managed by EmCare, (2) hospitals drawn from

the same states where the hospitals that experienced entry were located but did not outsource their ED services to EmCare, and (3) hospitals that were not managed by EmCare that we matched to entry hospitals using propensity scores.[16] One obvious concern with our identification strategy is that treated and untreated hospitals may have differences in their trends in out-of-network billing prevalence, physician pricing, or hospital behavior prior to the entry of EmCare. However, as we illustrate, when we plot the raw data from our treated hospitals, there do not appear to be any changes in behavior prior to the entry of those firms. Moreover, that we observe significant changes in hospital behavior when EmCare ends a contract with a hospital is also suggestive that we are estimating the effects of EmCare entry and not a hospital-specific phenomenon.

EmCare enters two types of hospitals (fig. A.4). The first group (27 hospitals) has out-of-network prevalence below 90% prior to EmCare entry (the mean out-of-network prevalence in these hospitals prior to entry was 11%). The second group (nine hospitals) has out-of-network prevalence of over 90% before EmCare enters (the average out-of-network prevalence in this group is 99%).

In figure 3, we present a smoothed average using a local polynomial regression of the monthly hospital-level out-of-network ED physician billing prevalence from 1 year before EmCare entered hospitals until 1 year after their entrance (panel A) and 1 year before EmCare exited hospitals until 1 year after their exit (panel B). We measure the date of entry with 6 months of noise on either side of the entry event (gray shading). In panel A of figure 3, the raw data show a clear increase in out-of-network billing prevalence at hospitals with previously low out-of-network prevalence after EmCare entered. Looking from 6 months prior to EmCare entry to 6 months after, the out-of-network billing prevalence at these hospitals that previously had low out-of-network prevalence increases discontinuously to nearly 100%. By contrast, panel B of figure 3 shows that there is a marked decrease in out-of-network billing at the three hospitals in our sample where EmCare exited a contract almost immediately after exit occurred.[17]

[16] To calculate propensity scores, we ran a logistic regression where the dependent variable was an indicator variable that took a value of 1 if EmCare took over management of the hospital's ED. We regressed that against hospital beds; technology; the square, cubic, and quadratic forms of beds and technology; and nonprofit/for-profit status. The predicted values from this regression produce a propensity score for a hospital. We then use a propensity score match to determine hospitals most similar to those with entry, with the condition that matching hospitals must be in the same state.

[17] For interested readers, we present the raw, quarterly average out-of-network prevalence by hospital at each of the 36 hospitals that EmCare entered and show the three hospitals that EmCare exited in fig. A.5. For nearly all hospitals that had previously high out-of-network billing prevalence (panels BB–JJ of fig. A.5), when EmCare entered, out-of-network billing prevalence remained high. By contrast, after EmCare entered hospitals that previously had low out-of-network billing prevalence, in nearly all cases, the likelihood that a patient was treated by an out-of-network physician increased to nearly 100% immediately

In table 3, we show estimates of equation (1) and identify the impact of EmCare entry and exit on hospitals' out-of-network billing prevalence. In column 1 of table 3, we estimate the impact of the entry of EmCare into hospitals with previously low out-of-network prevalence (those with out-of-network prevalence below 90% prior to EmCare entry). These results mirror what we observe in the raw data. We observe that the entry of EmCare into these hospitals raised out-of-network prevalence by 82.8 percentage points. In column 2, we focus on changes in out-of-network billing prevalence at hospitals that EmCare entered that previously had high out-of-network billing prevalence. After EmCare entered, there is no statistically significant change in the likelihood that a patient was treated by an out-of-network physician. This is a mechanical effect, since there was no scope for out-of-network billing to increase at these facilities. In column 3, we estimate the effect of the exit of EmCare on hospitals' out-of-network billing prevalence. It is important to note that hospitals may have made a decision to end their contract with EmCare in order to eliminate out-of-network billing from their facility. Nevertheless, we observe that after EmCare exited a hospital, the prevalence of out-of-network billing decreased by 76.5 percentage points.[18] In table A.2, we show that these results are robust to using alternative control groups.

D. The Impact of Out-of-Network Strategies on Payment Rates

These results suggest that EmCare does not negotiate with insurers and instead utilizes its outside option and seeks to collect its charges. In panel A of figure 4, we show that after entry, EmCare raised its charges significantly. In column 1 of panel A in table 4, we quantify these changes and show that after EmCare entered, they more than doubled physician charges, raising them by $480.13 on average. Our data contributor paid most of physicians' out-of-network bills. As a result, after EmCare entered, we observe that the insurer payments to ED physicians increased by $391.89 (117%).

These changes also exposed patients to increased cost sharing and financial risk. Because patients typically have out-of-pocket costs that are set via coinsurance that pays a fixed percentage of the total cost of care, patient payments (e.g., cost-sharing payments) to ED physicians increased by $46.32 (92%). Collectively, we observe that the total payments to ED physicians increased by $438.20 per case after EmCare entered a hospital.

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after EmCare entered the hospital (panels A–V, X–Z, and AA of fig. A.5). We show EmCare exits in panels KK–MM. None of these graphs show marked changes in out-of-network billing prevalence before EmCare entered or exited a hospital; nearly all show that out-of-network billing prevalence increases dramatically in the months after EmCare takes over a staffing contract and decreases immediately after they exited.

[18] This result is robust to estimating eq. (1) using logistic regression.

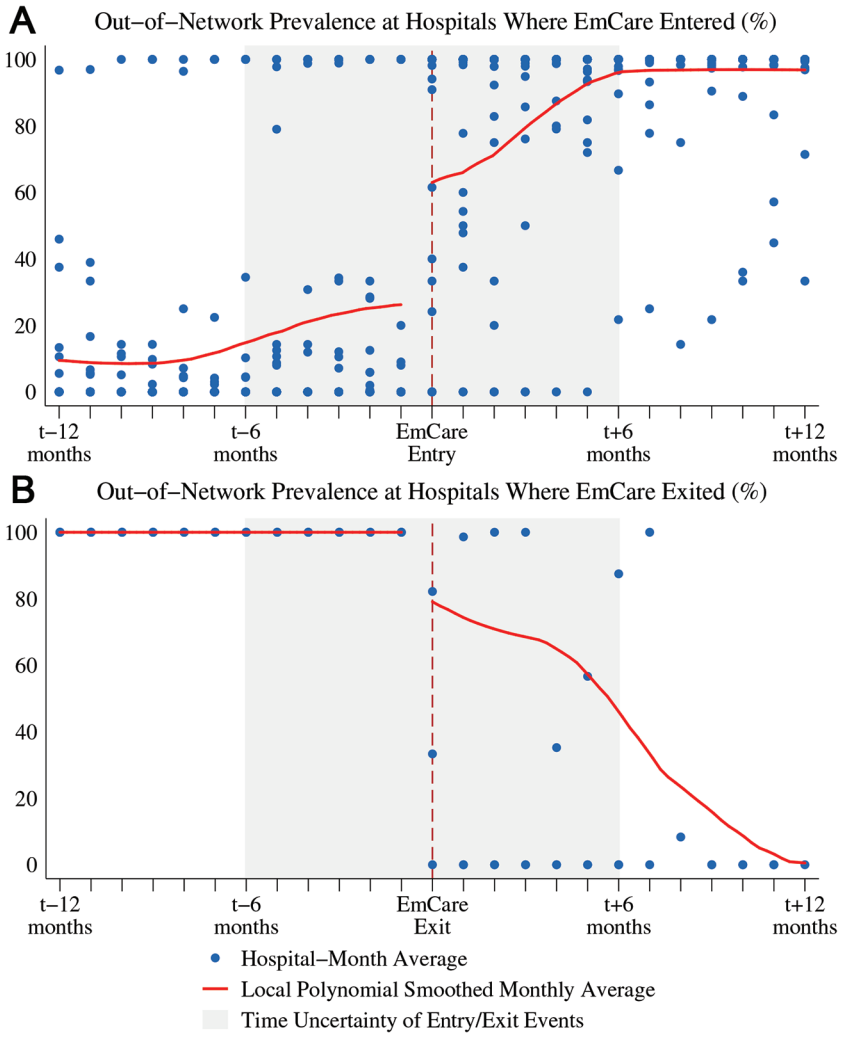

FIG. 3.—Impact of EmCare entry and exit on hospitals' prevalence of out-of-network ED physician billing. The panels plot the monthly average out-of-network prevalence by hospital from 12 months before to 12 months after EmCare entered (panel A) or exited (panel B) a hospital. In panel A, we limit our analysis to hospitals with preentry out-of-network prevalence below 90%. There is a 6-month period of uncertainty on either side of entry and exit dates (gray shading).

This is a 114% increase in ED physician payments, and these changes occurred after EmCare entered a hospital (fig. 4). Notably, as we show in column 7, we do not observe a decrease in patient volume after EmCare enters a hospital.

TABLE 3
IMPACT OF EMCARE ENTRY AND EXIT ON HOSPITALS' PREVALENCE OF OUT-OF-NETWORK ED PHYSICIAN BILLING

	OUT-OF-NETWORK INDICATOR		
	EmCare Entry		
	Hospitals with Out-of-Network Prevalence Below 90% prior to Entry (1)	Hospitals with Out-of-Network Prevalence Above 90% prior to Entry (2)	EmCare Exit
			All Hospitals (3)
EmCare entry/exit	.828***	−.027	−.765***
	(.060)	(.043)	(.077)
Hospital fixed effects	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes
Mean EmCare	.060	.995	1.000
Mean non-EmCare	.229	.229	.229
Observations	8,362,441	8,386,032	8,323,064
Control	All non-EmCare hospitals	All non-EmCare hospitals	All non-EmCare hospitals

NOTE.—The table presents least squares estimates of eq. (1). In col. 1, we focus on hospitals that EmCare entered that had out-of-network prevalence prior to entry that was below 90% (the mean out-of-network prevalence in these hospitals prior to entry was 11.6%). In col. 2, we focus on hospitals that had out-of-network prevalence prior to entry above 90% (the mean out-of-network prevalence prior to entry was 99%). In col. 3, we focus on the three hospitals where EmCare ended a contract with a hospital. The dependent variable in all regressions is a binary indicator for whether a patient at an in-network hospital was treated by an out-of-network physician. Our analysis is run at the patient level. The control groups are all hospitals in the United States that did not outsource their ED management to EmCare. Each regression includes controls for patient age, gender, race, and Charlson score. Standard errors are clustered around hospitals. Means are drawn from the analytic sample population underlying the regression. Means at entry locations are averages in 2011. Means at exit locations are averages in the quarter prior to the exit event. In table A.2, we show these estimates using alternative control groups.

*** $p < .01$.

While our data contributor covered most of physicians' out-of-network charges, many insurers simply pay out-of-network providers at median in-network rates. When this occurs, physicians can bill patients for the difference between their charges and that payment (so-called balance billing). To calculate patients' potential balance bills, we create a potential balance billing measure, which is the difference between the physician charge for the case and what would be the providers' median in-network payment for the case (219% of Medicare rates in our data). In column 5 of table 4, we show that the entry of EmCare raised patients' potential balance bills (if insurers paid only median in-network rates) by $457.21 to a total of $681.54. Bills of this magnitude would be financially devastating to a large share of the population (Board of Governors of the Federal Reserve

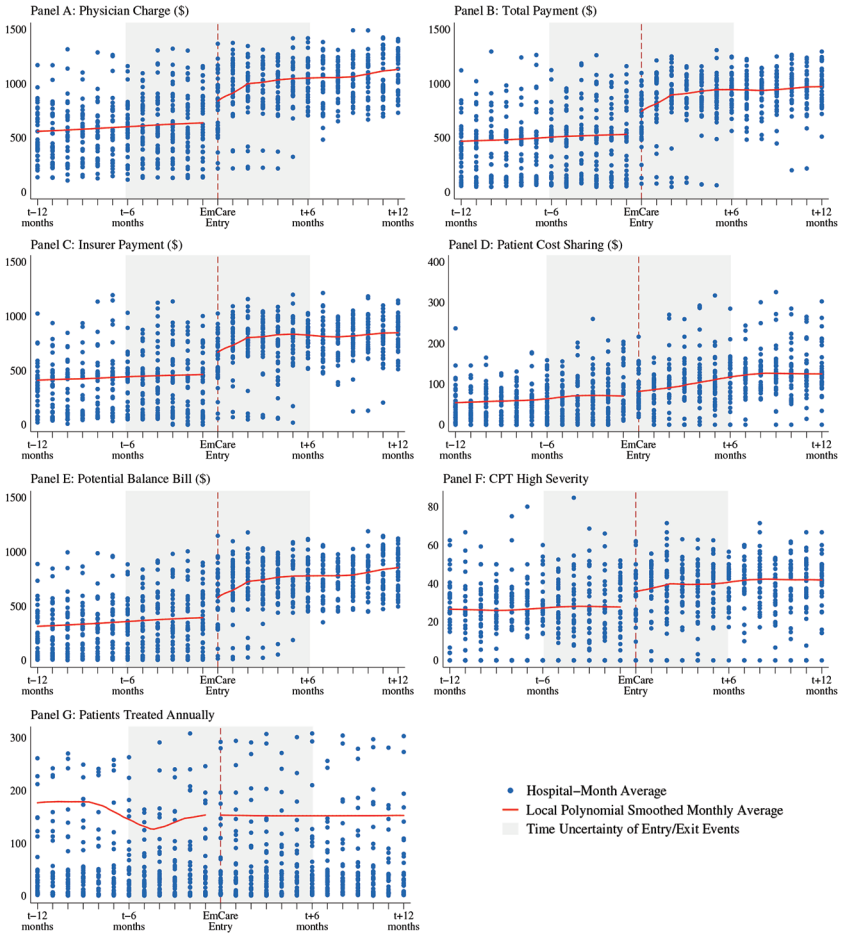

FIG. 4.—Impact of EmCare entry on physicians' payments, coding, and volume. The panels plot the monthly average by hospital from 12 months before to 12 months after EmCare entered the hospital. We exclude the top 1% of observations in each panel. The local polynomial is weighted by the number of episodes in each month. There is a 6-month period of uncertainty on either side of entry and exit dates (gray shading).

System 2016). As we illustrate in panel E of figure 4, this change also occurred immediately after EmCare entered hospitals.

The increase in physician payments was generated by price increases and substitution to higher acuity (and more generously reimbursed) CPT codes. In table A.3, we show that EmCare physicians increased their charges and total payments for all but the lowest acuity emergency CPT code. In addition to increasing their charges, EmCare physicians also increased the rate they coded ED physician services using the highest-intensity CPT code by 11.4 percentage points (47%; col. 6 in table 4)

TABLE 4
IMPACT OF EMCARE ENTRY AND EXIT ON PHYSICIANS' PAYMENTS, CODING, AND VOLUME

	Physician Charge (1)	Total Payment (2)	Insurer Payment (3)	Patient Cost Sharing (4)	Potential Balance Bill (5)	CPT High Severity (6)	Patients Treated Annually (7)
	A. Impact of EmCare Entry						
EmCare entry	480.13***	438.20***	391.89***	46.32***	457.21***	.114***	−69
	(58.02)	(44.13)	(43.31)	(3.83)	(51.43)	(.026)	(163)
Mean at entry locations	470.39	383.79	333.55	50.24	224.33	.242	1,616
Observations	8,430,842	8,430,842	8,430,842	8,430,842	8,430,842	8,430,842	8,430,842
	B. Impact of EmCare Exit						
EmCare exit	−645.76***	−701.68***	−633.00***	−68.68***	−632.37***	−.103*	46**
	(185.42)	(148.34)	(125.71)	(22.63)	(169.52)	(.057)	(19)
Mean at exit locations	1,284.05	1,123.75	1,014.64	109.11	1,031.57	.304	616
Observations	8,323,064	8,323,064	8,323,064	8,323,064	8,323,064	8,323,064	8,323,064
Hospital fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control	All non-EmCare hospitals	All non-EmCare hospitals	All non-EmCare hospitals	All non-EmCare hospitals	All non-EmCare hospitals	All non-EmCare hospitals	All non-EmCare hospitals

NOTE.—The table presents least squares estimates of eq. (1) where the EmCare event is the entry of EmCare into a hospital (panel A) and the exit of EmCare from a hospital (panel B). Each observation is a patient episode. The control group in all regressions is all hospitals in the United States exclusive of those that outsourced their ED services to EmCare. We winsorized the top and bottom percentile of hospital and physician payments. Each regression includes controls for patient age, gender, race, and Charlson score. Standard errors are clustered around hospitals. Means are drawn from the analytic sample population underlying the regression. Means at entry locations are averages in 2011. Means at exit locations are averages in the quarter prior to the exit event. All dollar amounts are inflation adjusted to 2015 dollars. In tables A.4 and A.5, we show these estimates using alternative control groups.

* $p < .10$.

** $p < .05$.

*** $p < .01$.

and increased the relative value units of physician care they provided by 9% (col. 1 in table A.3). This increase in the use of high-severity coding (and the increase in physician charges) occurred after the firm entered (panel F of fig. 4).[19] Moreover, as we discuss and illustrate later, these changes in coding occurred for patients with both high and low historical medical spending and high and low medical risk. We further discuss the impact of the entry of physician management companies on hospitals' case mix in section V.F.

It is striking that at the three hospitals where we observe EmCare exit, there is a reversal in all these key outcomes after the firm's staffing contracts ended, including a reduction in the frequency of the use of CPT code 99285. As we illustrate graphically in figure 5, immediately after EmCare exits, there is a discontinuous drop in physician charges, total payments, insurer payments, patient cost sharing, and high-severity coding. Estimates of equation (1) in panel B of table 4 show that these changes are quite large and statistically significant. They show that relative to the quarter before exit occurred, total ED physician charges decreased by $645.76 (50%), total payments decreased by $701.68 (62%), patient cost sharing decreased by $68.68 (63%), and use of the highest severity CPT code decreased by 10.3 percentage points. We also observe a modest increase in the number of patients treated per year.

In section III.C, we argued that having the ability to go out of network without seeing a sizeable reduction in the number of patients that they treat gave ED physicians a stronger outside option in negotiations with insurers. We argued that this stronger outside option would allow them to negotiate higher in-network payments. In table 5, we show the average in-network payments in our data made to internists for performing standard office visits and to orthopedists for performing hip replacements. We observe that, on average, internists are paid 158% of Medicare rates (col. 1) and orthopedists are paid 178% of Medicare rates (col. 2). By contrast, the average in-network ED physician in our data is paid 266% of Medicare rates (col. 3). We posited that firms that could credibly threaten to go out of network could negotiate higher payments. Indeed, we observe that in the cross section, the mean payment in our data to EmCare ED physicians (who, for the most part, do not participate in networks) is 542% of Medicare rates (col. 5).[20]

E. Transfers to Hospitals to Permit Out-of-Network Billing

When physicians bill out of network, it creates costs for the hospitals where they work. We hypothesized that physician management firms that use

[19] As we illustrate in tables A.4 and A.5, these results are robust when we use alternative control groups.

[20] Table A.6 provides detailed summary statistics of ED physicians' prices and charges.

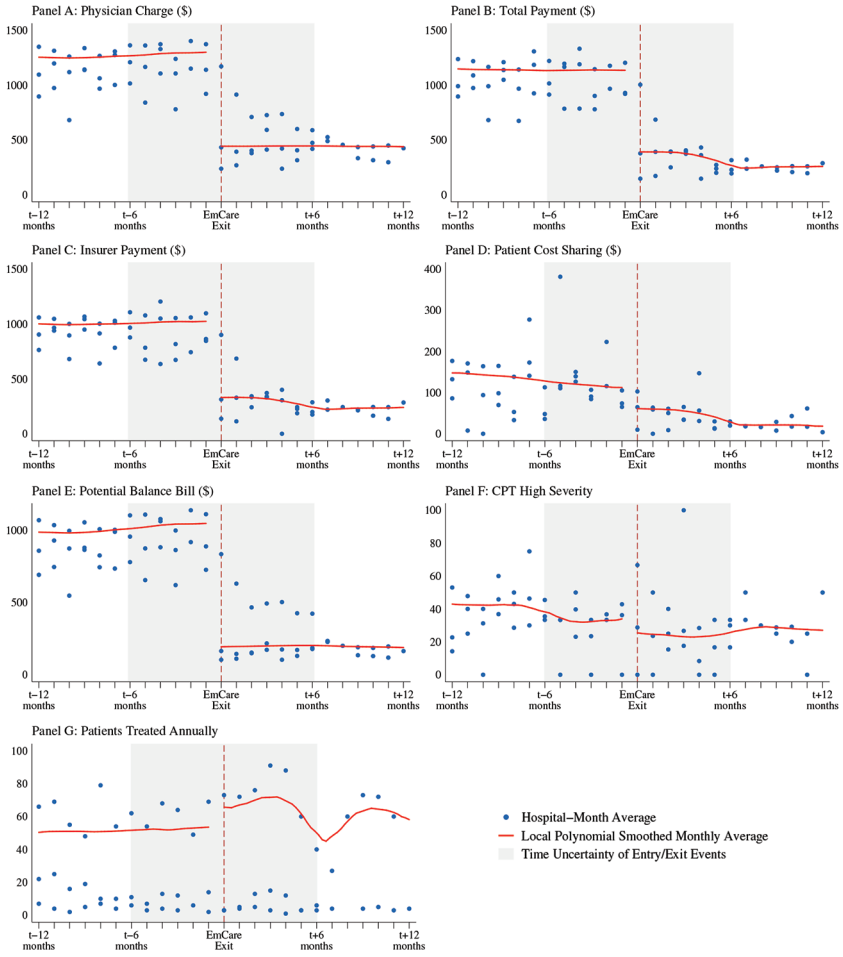

FIG. 5.—Impact of EmCare exit on physicians' payments, coding, and volume. The panels plot the monthly average by hospital from 12 months before to 12 months after EmCare exited the hospital. The local polynomial is weighted by the number of episodes in each month. There is a 6-month period of uncertainty on either side of entry and exit dates (gray shading).

out-of-network billing as a strategy would have to offer transfers to hospitals to offset these costs. There are four categories of benefits that hospitals could receive from allowing ED physicians to bill out of network from inside their facilities. First, by allowing physicians to bill out of network, hospitals could receive a discount in the fees that they must pay a physician staffing company to manage their ED. As we described in section II.C, the transcript from administrators at Glen Rose Medical Center discussing out-of-network billing (presented in app. 1) revealed that EmCare was

TABLE 5
PHYSICIANS' PAYMENTS FROM PRIVATE INSURER EXPRESSED AS PERCENTAGE OF MEDICARE PHYSICIAN PART B PAYMENTS BY SPECIALTY

	Internist Office Visit Payment Rate (1)	Orthopedist Hip Replacement Payment Rate (2)	ED Physician Standard Visit Rate (In Network) (3)	EmCare ED Physician Standard Visit Rate (4)
Percentage of Medicare	158	178	266	542

NOTE.—The table shows physicians' payments for commercially insured patients (including cost sharing) expressed as a percentage of Medicare Part B payments. Columns 3 and 4 are derived from our analytic sample of ED episodes. Column 4 includes physician payments to providers working in hospitals that contract with EmCare. Columns 1 and 2 are drawn from 2011–15 claims from the same payer supplying the ED data.

willing to offer a $200,000 per year concession in staffing fees to the facility in exchange for allowing them to bill out of network.

Second, hospitals, per our findings, can get additional revenue when out-of-network physicians alter their practice styles in ways that increase hospital activity (e.g., raising hospital imaging rates or admitting patients from the ED to the hospital at higher frequency). Our results presented in panel A of table 6 are consistent with our predictions. We estimate equation (1) and find that after EmCare entered a hospital and began billing out of network for ED services, facility charges at the hospitals where they worked increased by $1,270.15 (17%), and facilities' total payments increased by $220.11 (8%). As we illustrate in table 6, this increase in facility payments was driven in part by a 1.1 percentage point (4%) increase in the probability that a patient received an imaging procedure (col. 5) and a 1.7 percentage point (22%) increase in the likelihood that a patient was admitted to the hospital.[21] As we illustrate in panel F of figure A.6, this increase in admissions is visible in the raw data and occurred after EmCare entered a hospital. As we illustrate in panel B of table 6 and figure A.7, it is striking that almost all these changes in facility activity reverse in the three cases where we observe EmCare exit from a hospital.

The modal ED treats approximately 20,000 privately insured patients per year, so the $220.11 increase in hospital payments per case estimated in table 6 would generate an annual increase in revenue of approximately $4.4 million per hospital (20,000 × $220.21; HealthLeaders Media 2016). Wilson and Cutler (2014) estimated that privately insured patients have a profit margin for hospitals of 39.6%. Taken together, this suggests that each hospital that outsourced its ED to EmCare should make at least an additional $1.7 million per year ($4.4 million × 0.396) in profit from

[21] As we illustrate in tables A.7 and A.8, these results are robust to using other control groups. Our results are also qualitatively similar when we restrict our analysis to episodes that did not involve an inpatient admission.

TABLE 6
IMPACT OF EMCARE ENTRY AND EXIT ON HOSPITALS' PAYMENTS AND BEHAVIOR

	Facility Charge (1)	Total Payment (2)	Insurer Payment (3)	Patient Cost Sharing (4)	Imaging (5)	Admission to Hospital (6)
	A. Impact of EmCare Entry					
EmCare entry	1,270.15***	220.11**	173.42**	46.70***	.011***	.017***
	(329.40)	(91.49)	(81.17)	(14.02)	(.004)	(.005)
Mean at entry locations	7,566.25	2,719.70	2,308.49	411.21	.283	.079
Observations	8,430,842	8,430,842	8,430,842	8,430,842	8,430,842	8,430,842
	B. Impact of EmCare Exit					
EmCare exit	−395.46**	−173.43***	−161.01***	−12.42	−.006	−.020***
	(173.08)	(35.95)	(29.35)	(7.97)	(.011)	(.001)
Mean at exit locations	3,101.79	2,126.10	1,894.28	231.82	.192	.031
Observations	8,323,064	8,323,064	8,323,064	8,323,064	8,323,064	8,323,064
Hospital fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Control	All non-EmCare hospitals	All non-EmCare hospitals	All non-EmCare hospitals	All non-EmCare hospitals	All non-EmCare hospitals	All non-EmCare hospitals

NOTE.—The table presents least squares estimates of eq. (1) where the EmCare event is the entry of EmCare into a hospital (panel A) and the exit of EmCare from a hospital (panel B). Each observation is a patient episode. The control group in all regressions is all hospitals in the United States exclusive of those that outsourced their ED services to EmCare. We winsorized the top and bottom percentile of hospital and physician payments. Imaging is an indicator variable capturing whether a patient had an imaging study performed during an ED visit. Admission to hospital is an indicator variable that captures whether a patient was admitted to the hospital after an ED visit. Each regression includes controls for patient age, gender, race, and Charlson score. We also include the number of ED cases delivered per county divided by the population per county to capture changes in our data contributor's presence in each county. Standard errors are clustered around hospitals. Means are drawn from the analytic sample population underlying the regression. Means at entry locations are averages in 2011. Means at exit locations are averages in the quarter prior to the exit event. All dollar amounts are inflation adjusted to 2015 dollars. In tables A.7 and A.8, we show these estimates using alternative control groups.

** $p < .05$.

*** $p < .01$.

the changes in the way out-of-network physicians practice. Note that since this estimate does not capture profits from changes in medical care for Medicare or Medicaid beneficiaries, our estimate represents a lower bound on the returns a hospital could receive from clinical practice changes made by EmCare physicians.

Third, EmCare is increasingly entering into joint ventures with hospitals where hospitals can share in the profits of EmCare physicians (Luthi 2019). For example, according to a 2013 Deutsche Bank report, the EmCare joint venture with the Hospital Corporation of America "offers 50/50 profit sharing above a certain margin threshold, which we believe is in the 13% range" (Lehrich, Kalenderian, and Nentin 2013, 15). We found that, on average, EmCare physicians generated an additional $438.20 in physician payments per case. If EmCare were to treat 20,000 privately insured patients per year in a hospital, this would generate $8.8 million in revenue annually across all privately insured patients ($438.20 × 20,000). If we made a conservative assumption that hospitals in a joint venture with EmCare made a 1% profit on this physician revenue, this would generate an additional $87,640 for the hospital each year ($8.8 million × 0.01). Again, this estimate is a lower bound, since it does not reflect profits on Medicare beneficiaries.

Finally, EmCare could potentially bring efficiency gains to the hospitals where they gain contracts via lowering the costs of running EDs. EmCare touts that they manage the staffing, physician recruiting, and billing (https://www.emcare.com/). These could result in additional savings to hospitals.

These estimates suggest that outsourcing emergency services to EmCare conservatively brings each hospital approximately $2 million per year in additional annual profits ($200,000 + $1.7 million + $87,640). For reference, the average hospital in the United States in 2012 had a revenue of $164.3 million per year and made a profit of $12.9 million (Becker's Hospital Review 2014). As a result, ED outsourcing would increase the average hospital's profits by 15.5% ($2 million/$12.9 million). These gains must be offset against the costs of allowing a firm like EmCare to work from inside their facility. As we discussed in section III.B, these costs would include any reputational harm that the hospital would incur if it were discovered that they were allowing out-of-network billing at their facility and their inherent dislike of exposing their patients to financial risk.

Ultimately, a hospital would outsource their ED services to EmCare if the additional $2 million in profit that they received each year from outsourcing exceeded the sum of the reputational costs that they incurred from contracting with the firm and the cost of their inherent distaste for exposing their patients to risk. As a result, we would expect for-profit hospitals—which likely put a higher weight on profits than would government or nonprofit facilities—to be more likely to contract with EmCare.

TABLE 7
Characteristics of Hospitals That Contract with EmCare

Hospital Characteristics	All Hospitals (3,345)	EmCare Hospitals (212)	*p*
For-profit	.19	.45	.00
Nonprofit	.61	.33	.00
Government	.20	.22	.49
Teaching	.06	.03	.03
Hospital beds	182.69	156.36	.04
Technologies	49.04	40.19	.00
Hospital Herfindahl-Hirschman index	.55	.57	.35
Proportion Medicare	49.53	49.39	.89
Proportion Medicaid	18.65	18.28	.62
ED physicians per capita (per 10,000)	.77	.67	.00
Physicians per capita (per 10,000)	22.06	21.27	.02
Physician Herfindahl-Hirschman index	.42	.42	.61
Insurer Herfindahl-Hirschman index	.37	.36	.21
Household income ($)	36,899	37,147	.59
Gini coefficient	.32	.33	.00

Note.—The table compares characteristics of hospitals that contract with EmCare with the characteristics of hospitals in the universe of hospitals registered with the AHA. The number of hospitals is shown in parentheses. The *p*-values are reported from a two-sided *t*-test comparing the difference in means between all hospitals and EmCare hospitals.

In table 7, we present the characteristics of hospitals in our sample that did and did not contract with EmCare. We find that across all hospitals that meet our sample restrictions, 61% are nonprofit, 19% are for-profit, and 20% are government owned. Consistent with our predictions, 45% of hospitals where EmCare has a contract are for-profit facilities. Hospitals in areas with lower numbers of physicians per capita are also more likely to contract with EmCare.[22]

F. Robustness Checks

It is possible that the entry of EmCare led to subsequent changes in the case mix of patients that the hospitals treat. Indeed, EmCare advertises that a benefit of their service is that they shorten ED waiting times (Cantlupe 2013). With shorter waiting times, hospitals could potentially attract healthier patients who would have otherwise received treatment at urgent care centers. Likewise, on EmCare's website, EmCare has also highlighted its excellence in improving the treatment of complex cases, such as stroke care (EmCare 2014). To the extent that this improves a hospital's reputation, advertising and improvements in quality could allow that hospital to attract more complex patients. Any changes in the case mix of hospitals that EmCare entered could explain why, after the firm

[22] As we show in table A.9, hospitals that contract with EmCare before 2011 have characteristics similar to hospitals where we observe the entry of EmCare between 2011 and 2015.

entered hospitals, the rates of hospital admissions, the rates of imaging tests, and the rates at which physicians coded for the most intensive services increased. Finally, EmCare could face an incentive to attract or make its patients appear riskier in order to increase the chances of the hospital where they are working becoming a trauma center. Extolling the financial benefits of being designated a trauma center, an EmCare executive wrote, "Medicare offers disproportionate funding to hospitals with trauma centers. Additionally, the Patient Protection and Affordable Care Act re-institute the trauma stabilization act, which will unlock some government funding for the development of trauma programs. On top of that, as a designated trauma center, hospitals can actually bill and collect for certain activation fees that are paid by both Medicare and private insurance companies. Those fees can be very meaningful, sometimes more than funding the trauma program itself" (Josephs 2013). As the Trauma Center Association of America (2019) notes, one criterion to becoming a trauma center is having minimum numbers of high-severity patients.

In table A.10, we analyze the impact that the entry of EmCare had on the case mix of patients that hospitals treat. We find evidence that after EmCare entered a hospital, the hospital attracted a sicker mix of patients. In columns 1 and 2, we show that after EmCare entered a hospital, the 6-month historical spending of the hospital's patients increased by $820.39 (14%), and the 12-month historical spending increased by $1,232.60 (11%). We also find that after the entry of EmCare into a hospital, the 6-month Charlson score of patients who attend the ED increased by 7%, and the 12-month Charlson scores increased by 7.5%. In figure A.8, we show the average Charlson comorbidity score and 6-month historical spending levels of patients by month at hospitals where EmCare entered. There is no evidence of immediate changes in these outcomes after a change in management.

Crucially, however, we find the same changes in physician behavior and hospital activity at EmCare facilities appearing across patients irrespective of their health status. Thus, even holding patient severity constant, we still see an increase in quantity of care delivered after EmCare enters a hospital. In table A.11, we estimate equation (1) using several different sample restrictions and sets of controls for the health of the patients. We focus on the impact that the entry of EmCare had on the frequency that physicians coded using the CPT code for the most intensive emergency. We find that even among patients with low historical spending and no comorbidities, there was a substantial increase in the rate at which they had episodes that included physician claims coded using the highest-intensity CPT code. In column 1, we estimate equation (1) with no patient controls; in column 2, we reestimate equation (1) controlling for patients' age, sex, and race; and in column 3, we control for patients' age, sex, race, and their Charlson comorbidity score. Across all three estimates, the

point estimate on the impact of entry on the rate of using the highest-intensity CPT code for emergency physician visits is consistent and ranges from 0.114 to 0.116. In column 4, we estimate equation (1) and limit our analysis to patients throughout our sample who have a Charlson comorbidity score of 0 (e.g., patients who have no comorbidities). In column 5, we estimate equation (1) and limit our analysis to patients throughout our data who have a nonzero Charlson score. The point estimates in columns 4 and 5 illustrate that whether or not they had comorbidities, patients were almost equally more likely to have physician visits coded using the CPT code for the most intensive emergency after EmCare entered a hospital. Likewise, in columns 6–8, we estimate equation (1) on the samples of patients in the lower third ($0–$279.60), the middle third ($279.61–$2,033.86), and the top third ($2,033.87–$115,499.30) of the distribution of historical 6-month patient health spending. Across all three subsamples, the entry of EmCare led to an increase in the rate at which patients had physician claims coded using the CPT code for the most severe emergency.

In table A.12, we repeat this analysis and examine the impact of the entry of EmCare on facility spending across different samples of the data (the sum of the allowed amounts on the physician claims). We see that there was increased facility spending across patients with and without comorbidities and with high and low historical spending. Likewise, controlling for patients' comorbidities does little to alter the impact of the entry of EmCare on facility spending. In table A.13, we see broadly robust findings for imaging studies. After the entry of EmCare into a hospital, patients with no comorbidities are 4% more likely to receive an imaging study.

Finally, in table A.14, we analyze whether we observe higher hospital admission rates for patients with low historical spending and no comorbidities following the entry of EmCare. In column 4, we find that after EmCare entered a hospital, patients with no comorbidities were 20% more likely to be admitted to the hospital. In column 6, we find that patients with low historical spending (e.g., less than $279.60 in the previous 6 months) were 16% more likely to be admitted to the hospital after EmCare took over management of the hospital ED.

G. Generalizability of Our Data

Our data come from a single insurer that operates across all 50 states. Our data capture nearly $28 billion in economic activity; thus, the sample is interesting to study regardless of generalizability. However, to gauge the generalizability of our results, we compare the out-of-network prevalence we observe to out-of-network prevalence presented in Garmon and Chartock (2017), the only other study that examines the out-of-network

prevalence nationally.[23] Garmon and Chartock used 2007–14 data from the Truven Health MarketScan database. They focus on whether patients at in-network hospitals saw any out-of-network physicians. This measure is slightly different from our measure; we focus on the network participation of the primary physician in ED cases at in-network hospitals. Garmon and Chartock (2017) found that emergency cases that had an admission had out-of-network bills in one in five cases; outpatient emergency cases had out-of-network bills in 14% of cases. These results are similar to our results. Garmon and Chartock (2017) found out-of-network prevalence for admitted patients in Florida, Texas, and New York of 37%, 34%, and 35%, respectively. For those same states, when we focus on patients with an admission, we observe out-of-network prevalence during the 2011–15 period of 24.8%, 46.3%, and 16.1%, respectively. They also found, as we do, that out-of-network prevalence decreases over time.

VI. Policies to Address Out-of-Network Billing

A. Policy Goals and Scaling the Effect of Policies to Address Out-of-Network Billing

A successful out-of-network policy should achieve two aims. First, a policy should protect consumers from large unexpected bills from out-of-network ED physicians whom the consumers could not reasonably avoid. Second, a successful policy should establish an environment in which the price that out-of-network ED physicians are paid for their services is either competitively determined or as close to the competitively determined price as possible. Addressing this currently missing price will protect consumers from unavoidable out-of-network fees, settle disputes between physicians and insurers over their bills, and influence in-network payments by determining ED physicians' outside option in negotiations with private insurers.

Constraining ED physicians' outside option could have a significant effect on total health spending via reducing their in-network payments. To produce a back-of-the-envelope estimate of the potential savings from addressing out-of-network ED billing, consider the nationwide average in-network payment rates that orthopedic surgeons negotiate with the insurer that supplied our data. Orthopedic surgeons form an interesting comparison group because, according to a recent survey, they have the highest salaries among physicians in the United States (Grisham 2017). However, whereas the average in-network ED physician payment in our data was

[23] Cooper and Scott Morton (2016) is a national study, but it uses the same data used in this analysis.

266% of the Medicare payment rates (and the average out-of-network payment was 637% of the Medicare payment rates), the average in-network payments to orthopedic surgeons for performing hip replacements during our sample period was 178% of the Medicare payment rates. If we assumed that our policy proposal would generate competition that lowered ED physicians' in-network payment levels to approximate the in-network payment rate of orthopedic surgeons in our data (178% of the Medicare payment rates), this would lower total ED physician spending by 46%. If we assume that private spending is one-third of total health spending in the United States and that ED physicians account for approximately 1% of total private spending, a reasonable back-of-the-envelope calculation would suggest that addressing this issue would produce savings in the range of $5 billion annually.[24] While these estimates ignore general equilibrium effects, they give a scale of the savings possible via addressing out-of-network billing by ED physicians.

B. *Existing State and Federal Policies to Address Out-of-Network Billing*

At present, 21 states have some laws focused on out-of-network billing, and six of those 21 have comprehensive policies that both protect consumers and include a process to determine payments from insurers to out-of-network providers (Lucia, Hoadley, and Williams 2017). New York was the first state to systematically study the issue and introduce comprehensive legislation to address out-of-network billing (New York State Department of Financial Services 2012). In a 2012 report, the state's Department of Financial Services stated that they were receiving a growing number of complaints about out-of-network bills submitted by ED physicians and other hospital-based specialists. The report drew attention to bad actors that used out-of-network billing as a deliberate profit-seeking strategy. The New York report also highlighted key areas where policy and regulation could protect consumers and raised the need for future legislation.[25] In 2014, as we describe below, New York State passed a law that included patient protections and an arbitration mechanism to settle disputes between insurers and providers.

Most states' (including New York's) surprise billing laws include a hold harmless provision to protect patients from financial risks (Lucia, Hoadley, and Williams 2017). These hold harmless provisions stipulate that

[24] These numbers are from Morganti et al. (2013) and Hartman et al. (2018).

[25] The 2012 New York report on out-of-network bills states, "In emergency situations, consumers typically do not demand or even expect advance disclosure by out-of-network providers. A relatively small but significant number of out-of-network specialists, however, appear to take advantage of the fact that emergency care most be delivered. These providers charge excessive fees, some that are many times larger than what private or public payors typically allow."

patients cannot be charged more than their usual in-network cost sharing during emergencies if they see an out-of-network provider who is working at an in-network facility. However, only nine of the 21 states with hold harmless provisions restrict providers from balance billing patients. Thus, while patients who saw an out-of-network provider would not be subject to higher cost-sharing rates, they could still be exposed to significant financial risk if physicians acted to collect the balance of their bill from them directly.

The harder policy problem for the states is choosing the missing price when there is no contract between physicians and insurers. By 2017, only California, Connecticut, Florida, Illinois, Maryland, and New York introduced state-specific methods for determining how insurers should pay out-of-network ED physicians who treat patients at in-network hospitals. In California, Connecticut, and Maryland, the missing price is determined via regulation. For example, in California, out-of-network providers are paid the greater of 125% of Medicare rates or average commercial rates in their area (California Legislative Information 2016). However, it is unlikely that a regulated price of this sort will match the true competitive price for any given transaction. As soon as the regulated price set by states differs from the market price, either the insurer or the physician will take advantage of a regulated price that favors them. If the regulated payment for providers' out-of-network bills is greater than the expected in-network price, ED physicians will be reluctant to join networks. Likewise, if the regulated payment is below expected in-network rates, insurers will not want to form networks (see, e.g., recent experience in California described in Duffy 2019).

In Florida, Illinois, and New York, in addition to prohibiting patients from being balance billed, the states introduced an arbitration process to determine insurer payments in the event that an insurer and provider cannot reach a resolution on a payment amount in cases when an ED physician is out of network. Under the New York law, when a patient is seen out of network, the insurer makes its payment to the provider. If the out-of-network provider does not accept the payer's offer, the provider can initiate an independent dispute resolution process. The independent dispute resolution process is judged by practicing physicians who use baseball rules arbitration. Each party submits a bid, and an arbitrator determines whether the provider will be paid either the amount requested by the provider or the amount offered by the insurer. Ultimately, this policy disadvantages providers that seek unreasonably high charges and punishes insurers that seek to make unreasonably low payments. The law also encourages physicians and payers to negotiate independently and avoid arbitration. Technically, the law applies only to fully insured insurance products, as states cannot regulate ASO plans (which account for the majority of privately insured products in the United States; Kaiser Family

Foundation 2017). However, because most providers are unaware of a patient's plan funding, their billed amount is likely chosen to reflect the possibility of arbitration.

This type of arbitration process shifts the outside option for physicians when they negotiate their in-network payments. Under the New York law, physicians cannot balance bill patients or hope to collect 100% of their charges from insurers. As a result, the 2014 New York law should both reduce the prevalence of out-of-network billing (since it is no longer as profitable a strategy) and impact in-network payments (via lowering ED physicians disagreement payoff).

Unfortunately, states' policies (including New York's) can apply only to the 40% of commercially insured individuals in the United States who are enrolled in fully insured employer-sponsored health plans (Kaiser Family Foundation 2017). Sixty percent of individuals in the United States with commercial insurance are enrolled in plans offered by firms that self-insure. Because of the Employee Retirement Income Security Act of 1974, state-based protections for out-of-network policies do not apply to these enrollees. At the federal level, protections for consumers are limited. The Affordable Care Act amended Section 2719A of the Public Health Service Act and required health plans to cover emergency services without prior authorization and irrespective of network status.[26] Unfortunately, the provision still allows providers to balance bill patients for the difference between their charges and the insurer payment.

C. Analyzing the Impact of New York State's Law

We use our claims data to test the impact of New York State's efforts to reduce surprise billing on ED physicians' out-of-network billing prevalence, ED physicians' in-network payment levels, physician charges, and facility payments. As table A.15 shows, our data include 323,936 ED episodes delivered at New York hospitals between 2011 and 2015, which captures approximately $1 billion in emergency health care spending. Our data capture changes before and after their report on March 7, 2012; the passage of their law on March 31, 2014; and implementation of the law on the March 31, 2015.[27]

To identify the impact of New York State's efforts to address out-of-network billing, we compare key outcomes in New York before and after their policy push with outcomes in 32 control states that do not regulate

[26] The law requires that health plans pay providers a reasonable amount, which is defined as the greatest of (1) the median in-network rates, (2) Medicare rates for emergency services, or (3) usual and customary payments (Keith 2018; Office of the Legislative Counsel 2020).

[27] Ninety percent of the patients in our data in New York are in ASO products. Unfortunately, we do not have hospitals with EDs managed by EmCare in our data for New York.

the missing price when there is no contract between physicians and insurers and that have over 5,000 ED visits per year in our data.[28] We show how key outcomes in New York State changed during the period from March 7, 2012, when the Department of Financial Services report was published, and after March 31, 2015, when the surprise billing protections took force in the state.

We begin by producing event study–style difference-in-difference estimates that take the form

$$Y_{i,h,t} = \beta_0 + \beta_1 NY_h + \beta_t NY_h \times \mu_t + \gamma_h + \mu_t + \varepsilon_{i,h,t}, \quad (2)$$

where the dependent variable is our outcome of interest for patient i treated at hospital h in quarter t. We include an indicator, NY_h, that denotes whether a hospital is located in New York. This is our treatment variable, and it takes a value of 1 for all time periods if a hospital is located in New York (e.g., is in our treated group). We interact this treatment indicator with a vector of quarter fixed effects. This allows us to visualize changes in outcomes by quarter in New York State versus changes in outcomes in control states from January 1, 2011, to December 31, 2015. We also include a vector of hospital fixed effects γ_h and quarter fixed effects μ_t (this forces our New York indicator to drop out of our estimator, since hospital locations do not change over time).

In addition, we estimate a more traditional difference-in-difference estimator that takes the form

$$Y_{i,h,t} = \beta_0 + \beta_1 NY_h + \beta_2 Post_t + \beta_3 NY_h \times Post_t + \gamma_h + \mu_t + \varepsilon_{i,h,t}, \quad (3)$$

where our treatment indicator NY_h is interacted with a post implementation indicator $Post_t$ that takes a value of 1 for all periods from April 1, 2015, onward, after New York State implemented its out-of-network billing laws in full. Our β_3 coefficient is the coefficient of interest and captures the interaction between our treatment variable (that a hospital is located in New York) and our post variable, which is turned on after the out-of-network billing law was implemented. In order to estimate the treatment effect of the New York State intervention, in our main specification, we exclude the period between when the initial New York State report

[28] Our control group contains 32 states: Alabama, Arizona, Arkansas, Colorado, Georgia, Iowa, Indiana, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Mississippi, North Carolina, Nebraska, New Hampshire, New Jersey, New Mexico, Nevada, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, Washington, Wisconsin, and West Virginia. This is based on analysis by Lucia, Hoadley, and Williams (2017). We also exclude 11 states from our control group that had fewer than 5,000 episodes of ED care annually. Our results, however, are robust to including these states.

on surprise billing was published on March 7, 2012, and when it was implemented on March 31, 2015. We also include a difference-in-difference estimator where we do not drop this period, include a difference-in-difference indicator where we drop the period between when the vote on the New York law occurred and when the law was implemented, and create versions where we introduce an interaction between our treatment indicator NY_h and a linear time trend to control for differences in trends between New York and control states prior to the implementation of the law.

We take two approaches to calculating the precision of our estimates of both equations (2) and (3). First, we present standard errors that are clustered around hospitals. However, because we are comparing treatment effects in one state (New York) to outcomes in 32 control states, there are potential concerns that traditional clustering methods would be inappropriate for estimating precision with so few degrees of freedom and only a single treated group (Donald and Lang 2007). As a result, in our second approach, we follow Buchmueller, DiNardo, and Valletta (2011) and implement a permutation test in the spirit of Fisher (1935). To do so, we compare the treatment effects we observe in New York State to 32 placebo treatment effects we observe when we estimate equation (2) independently, and we sequentially use each of those 32 control states as the placebo treated state instead of New York. We then present how our treatment effects for New York State compare with the distribution of placebo treatment effects that we observe when the control states are used as the treatment group.

D. The Impact of New York State's Out-of-Network Billing Laws

Figure 6 presents estimates of equation (2) and shows quarter by quarter changes in the prevalence of out-of-network physicians, in-network ED payments, ED physician charges, and facility payments in New York and in the 32 control states from 2011–15. As we illustrate in panel A of figure 6, the prevalence of out-of-network ED physicians in New York and control states followed similar trends before the 2014 passage of New York's out-of-network protection law (although there was a modest reduction in out-of-network prevalence in New York following the release of the Department of Financial Services report on March 7, 2012). However, almost immediately after the law was passed (and before the law's implementation date), there was a marked reduction in the prevalence of out-of-network ED physicians in New York. We show the point estimates underlying figure 6 in table A.16. They imply that the prevalence of out-of-network ED physicians in New York in the fourth quarter of 2015 was 11.7 percentage points lower than it was in the first quarter of 2011.

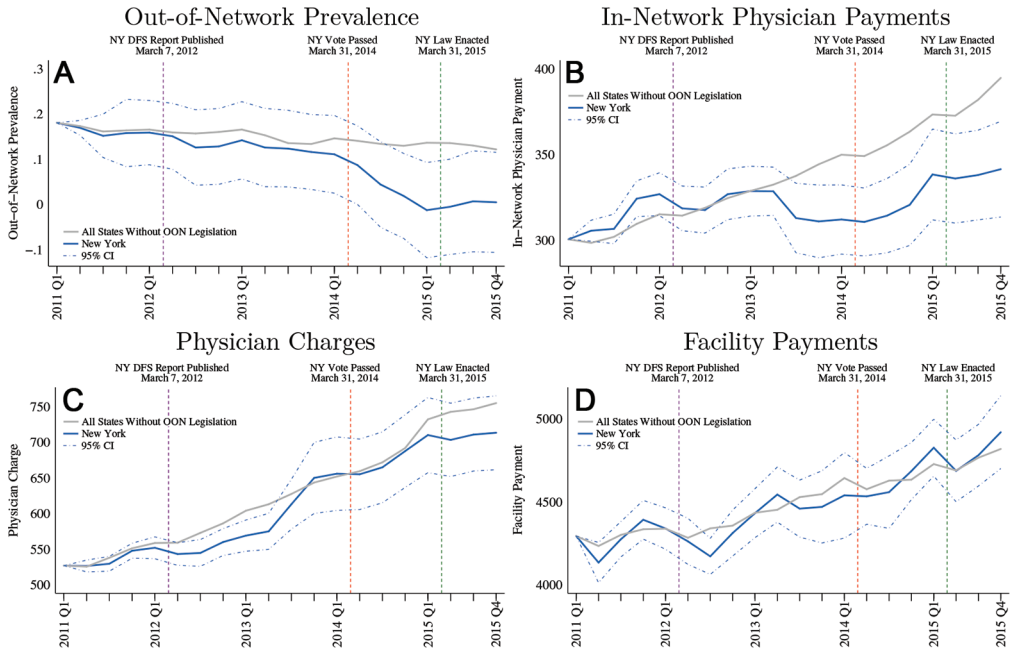

FIG. 6.—Out-of-network prevalence, in-network physician payment, physician charge, and facility payment in New York and states without surprise billing laws.

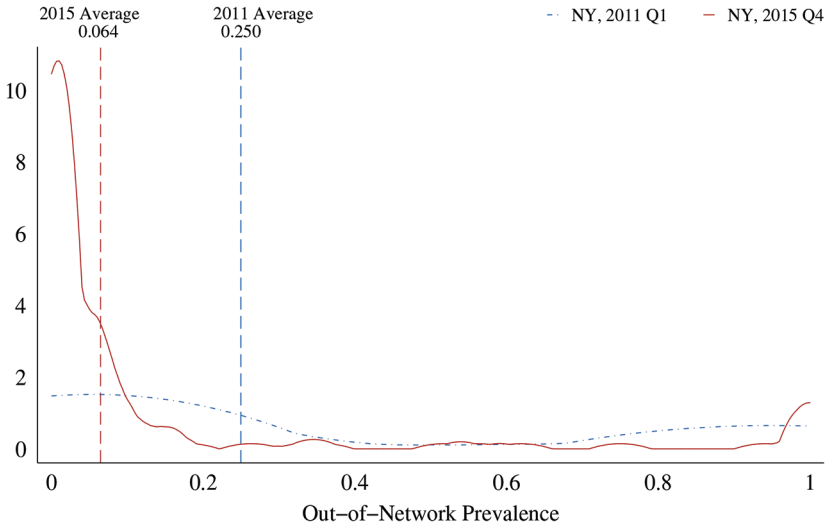

FIG. 7.—Distribution of out-of-network billing in New York in 2011 and 2015. The figure shows the kernel density distribution of hospital out-of-network prevalence in New York in 2011 and 2015.

Figure 7 shows the distribution of out-of-network prevalence across hospitals in 2011 and 2015. The out-of-network prevalence in New York in 2011 was 25.0%. Four years later, the rate was 6.4%. As the figure illustrates, the reduction in out-of-network providers was driven by reductions in out-of-network prevalence across nearly all hospitals, including those that previously had high prevalence of out-of-network billing.

Column 1 in table 8 presents our long-difference estimates of equation (3). The point estimates imply that the introduction of the package of reforms in New York State reduced the out-of-network prevalence from 2011 to 2015 by 12.8 percentage points off a base out-of-network prevalence in New York of 14.5% (implying a 88% reduction in out-of-network prevalence). These estimates are precisely estimated using both of our approaches to infer statistical significance. We present estimates from alternative functional forms of our difference-in-difference estimator in table A.17. Our main result is robust across alternative specifications.[29]

[29] In panel A of table A.17, we show estimates of eq. (3) where we exclude the period between March 31, 2014, when the vote to pass the New York surprise law occurred, and April 1, 2015, when the law was fully implemented. Point estimates in col. 1 of panel A imply that the law reduced out-of-network prevalence by 11.7 percentage points. In panel B, we introduce a linear time trend interacted with our New York indicator variable. In this specification, presented in panel B of table A.17, we observe that the New York law reduced out-of-network prevalence by 10.1 percentage points. In panel C, we estimate eq. (3) without dropping any time periods. In this specification, we observe that the New York law reduced out-of-network prevalence by 10.2 percentage points. This decrease in the size of

TABLE 8
ESTIMATING IMPACT OF NEW YORK STATE SURPRISE BILLING LAW

	Out-of-Network Prevalence (1)	In-Network Physician Payment (2)	Physician Charge (3)	Facility Payment (4)
New York × post dummy	−.128***	−44.97***	−31.13	75.89
	(.046)	(13.26)	(25.60)	(84.01)
Placebo treatment effects (drawn from distribution of 32 states):				
5th percentile	−.148	−52.62	−130.67	−264.80
10th percentile	−.124	−44.66	−111.79	−203.80
90th percentile	.147	73.42	101.21	371.31
95th percentile	.186	132.41	176.39	492.70
Hospital fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
New York mean	.145	304.04	514.41	2,797.58
Control mean	.175	305.42	572.26	2,653.34
Observations	2,141,506	1,768,651	2,141,506	2,141,506
R^2	.595	.54	.46	.10

NOTE.—The table presents least squares estimates of eq. (3). All regressions are run at the patient level. Each regression includes an indicator variable for whether the episode occurred in New York. The post dummy turns on in 2015 Q1 (when the New York vote was implemented). Hospital and physician payments are winsorized at the top and bottom one percentile. The control group includes 32 states where states do not regulate the missing price when there is no contract between physicians and insurers (Alabama, Arizona, Arkansas, Colorado, Georgia, Iowa, Indiana, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Mississippi, North Carolina, Nebraska, New Hampshire, New Jersey, New Mexico, Nevada, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, Washington, Wisconsin, and West Virginia). Each regression includes controls for patient age, gender, race, and Charlson score. We also include the number of ED cases delivered per county divided by the population per county to capture changes in our data contributor's presence in each county. Standard errors are clustered around hospitals. Means are drawn from the analytic sample population underlying the regression. All dollar amounts are inflation adjusted to 2015 dollars.

*** $p < .01$.

As we illustrate in panel B of figure 6, in-network ED physician payments in New York and control states were similar until the second quarter of 2013, when there was a large and statistically significant reduction in payments in New York. This reduction occurred two quarters before the state's arbitration law was passed and a year after the Department of Financial Services' report. It is likely that the 2012 report, in highlighting bad actors and foreshadowing future policy action, gave insurers stronger bargaining leverage with providers. By the fourth quarter of 2015,

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our point estimate occurs because the reduction in out-of-network prevalence occurred primarily during the period between when the New York law was passed in 2014 and when it was implemented in 2015. Finally, in panel D, we estimate eq. (3) without dropping any periods and include a linear time trend interacted with our New York indicator variable. While we observe that the New York law reduced out-of-network prevalence in this specification, our point estimate is no longer precisely estimated.

per estimates presented in table A.16, in-network ED physician payments in New York were $52.93 lower than they were in the first quarter of 2011, when they were 260.22 (a 20% reduction).

Our long-difference estimates of equation (3) on ED physicians' in-network payments are presented in column 2 of table 8. They suggest that the New York reforms lowered in-network physician payments by $44.97 (15%). These estimates are precisely estimated using both of our approaches for identifying standard errors. This reduction in payments is consistent with predictions that the law would lower ED physicians' disagreement payoff in negotiations with insurers over in-network payments, which should lower the prices reached in the negotiations. It is also notable that this effect was observable in New York, where—in addition to engaging in arbitration—insurers have to identify how their proposed out-of-network payments are scaled relative to usual and customary payments (the 80th percentile of physician charges).[30]

We also analyze the impact of the New York reforms on ED physicians' charges and facility payments in our sample. Our results are presented in panels C and D of figure 6 and columns 3 and 4 of table 8. We do not observe any statistically significant increases in these outcomes throughout our sample period.

Evidence from New York State suggests that introducing a hold harmless provision and arbitration over insurers' payments to out-of-network physicians can lower the frequency of out-of-network billing and the level of physicians' in-network payments. This result shows how changing physicians' outside option in negotiations alters their ultimate negotiated payment. Nevertheless, the New York State law is administratively complex, costly to administer, and has the potential to be gamed. If patients receive a surprise out-of-network bill and are charged out-of-network rates, they must be aware that the protections exist and fill out the form included in appendix 4. Likewise, the state has to fund and administer the arbitration process in perpetuity. Moreover, because states cannot regulate ASO products, the New York protections offer formal protection only to individuals covered by fully insured insurance products. And perhaps the biggest challenge with this policy is that, because parties must show how their bids relate to usual and customary payments (e.g., charges, which physicians set themselves), there is scope in the long-run that physicians could

[30] We present estimates of eq. (3) where we drop observations from March 31, 2014, to March 31, 2015, in panel A of table A.17. The point estimate in this specification is −38.73 and remains precisely estimated using both our approaches to calculating standard errors. In panel C, we estimate eq. (3) without dropping any time periods. The point estimate in this specification is −28.64 and remains precisely estimates. In panels B and D, we add interactions between a linear time trend and an indicator for New York to these specifications. This attenuates our treatment effects because the reduction in providers' in-network prices occurred in mid-2013, two quarters before the vote over New York's out-of-network law took place.

game the system and increase their charges over time, which would improve their outcome in arbitration. As a result, the long-run impact of arbitration may differ from what we found in the short run.[31]

VII. Conclusion

Out-of-network billing by ED physicians working from in-network hospitals is a function of an idiosyncrasy in the US health system: physicians may not participate in the same insurance networks as the hospital where they practice medicine. For bundled services where patients consume physician and facility care together (and cannot select their physician or observe physicians' networks ex ante), doctors face inelastic demand in the short run. When a physician is out of network, depending on a patient's insurance plan, the patient can be hit with a large and unexpected bill that is not competitively determined. These out-of-network bills can expose patients to significant financial risk. Moreover, when physicians and physician groups can bill out of network without seeing a sizeable reduction in the number of patients they treat, it undercuts the functioning of health care markets by insulating physicians from competition and changing the outside option physicians face when negotiating with insurers over their prices. This strong outside option allows physicians to negotiate high in-network payments.

Consistent with their strong outside option, we observe that ED physicians are paid more as a percentage of Medicare payments than other physician specialties. Moreover, we find that out-of-network billing is concentrated in a minority of hospitals. We find that 75% of hospitals have out-of-network prevalence of less than 20%. By contrast, 10% of hospitals have out-of-network prevalence of over 99%. This suggests that out-of-network billing is a deliberate practice by groups of physicians and hospitals.

We identify that one of the nation's leading physician staffing companies—EmCare—is using out-of-network billing as a tool to raise profits.

[31] An alternative (and potentially superior) approach for addressing out-of-network billing detailed in our working paper (Cooper, Scott Morton, and Shekita 2017) is for the state to regulate the form of the contract between hospitals, physicians, and insurers, so that the resulting physician payment is generated by market forces. Under this policy, states or the federal government would require hospitals to sell and insurers to contract for an ED service package that includes physician and facility services. Hospitals would purchase the inputs for ED services the way they purchase other labor inputs, such as nursing care and nonlabor inputs, such as bandages and needles. All care provided in the ED would be included when the hospital contracted to be in network with an insurer. This type of policy would require the hospital to buy ED physician services in a local labor market, which would expose hospitals and physicians to competitive forces and produce a market price for ED physician services. Hospitals would then submit a single bill to insurers. Patients choosing in-network facilities would have no surprise bills. Furthermore, states are permitted to regulate hospitals and in this way could protect all consumers, including those covered through ASO insurance. This policy is also likely to lower the equilibrium prices for in-network ED physicians.

We find that after EmCare takes over the management of ED services at a hospital, it raises out-of-network billing prevalence by over 80 percentage points. This allows the firm to collect higher payments from insurers and from patients. We calculate that the payments they received from insurers increased by 117% and patient cost sharing increased by 92%. Hospitals with ED services that are outsourced to EmCare form a significant percentage of the 15% of hospitals in the United States with extremely high out-of-network billing levels. However, EmCare is not the only physician staffing company to use out-of-network billing to raise revenue. In a previous analysis, we have shown that TeamHealth—another large physician staffing company backed by private equity—exits networks as soon as it enters hospitals but eventually reenters networks after negotiating significantly higher in-network payments (Cooper, Scott Morton, and Shekita 2017).

When ED physicians bill out of network, it likely creates reputational harm for the in-network hospitals where they work and some disutility if hospitals value patient welfare. To offset this harm, we find evidence that EmCare offers $2 million or more in economic transfers annually to hospitals where they have contracts to offset any costs the hospitals incur. This represents a 15.5% increase in the profit margin at the average hospital in the United States. The transfers we observe include EmCare-affiliated physicians ordering treatments that lead to increased hospital billing, such as ordering more imaging studies and increasing rates at which patients are admitted to the hospital. We also find evidence that EmCare offers reductions in staffing fees for hospitals in exchange for being allowed to remain out of network.

Policies to address surprise billing should both protect consumers and restore a competitively set price for emergency care. Ultimately, the strength of physicians' outside option (e.g., the extent to which they can go out of network and collect their charges) influences their in-network payments. We studied a New York State law that prohibited balance billing and introduced an arbitration process to settling billing disputes between physicians and insurers. This policy lowered out-of-network prevalence in the state by 88%. Moreover, we show that the policy also led to a 15% reduction in ED physicians' in-network payments. Going forward, we hope policy makers focus on addressing the underlying source of this market failure (that hospitals and hospital-based physicians independently negotiate with insurers and may not participate in the same networks) and not simply focus on the subsequent problems that the market failure creates (high patient bills and disputes between insurers and physicians).

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