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Abstract

Hospitals and physicians independently negotiate contracts with insurers. As a result, a privately insured individual can be treated at an in-network hospital's emergency department, but receive care and potentially 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 significant patient volume in the short-run. We illustrate that this strong outside option improves emergency physicians' bargaining power with insurers. We observe that a leading, national physician staffing company uses out-of-network billing as tool to generate profits. The firm offers substantial compensation to hospitals for allowing them to bill out-of-network from their facilities. Finally, we analyze a New York State law that introduced binding arbitration between emergency physicians and insurers and therefore weakened physicians' outside option in negotiations. We observe that the New York law reduced out-of-network billing by 56 percent and lowered in-network emergency physician payments by 14 percent.

JEL codes: I11, I13, I18, L14

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1 Introduction

Each year, there are 41.9 emergency department (ED) visits per 100 people in the United States (US) (Rui, Kang, and M 2013). When patients access EDs, they are consuming an indivisible 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 US 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 the hospital who is out-of-network with his insurer. This exposes patients to significant financial risk.

The pricing of ED physician services is problematic because patients have little scope for knowing the network status of ED physicians before entering the hospital, and once patients make a decision over which hospital to attend, have no choice over which ED physician treats them once care has been initiated. As a result, ED physicians need not set their prices in response to patient demand. Ultimately, the practice of out-of-network billing from inside in-network hospitals undercuts the functioning of health care labor markets and reduces social welfare. In this paper, we describe where out-of-network billing occurs, why it persists, and explore policy options to address the issue. Out-of-network billing is both 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.

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 only pay physicians a portion of their out-of-network 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, for example, Rosenthal 2014a; Rosenthal 2014b; Sanger-Katz and Abelson 2016). Moreover, even in instances when an insurer pays the entirety of a physician's out-of-network charges, those higher payments will be passed onto consumers through higher premiums and cost sharing. Given that nearly half of individuals in the US 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 the 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 US are set via bilateral negotiations between health care providers and health insurers. 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 tradeoff 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 like 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, a patient transported via ambulance has 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.

The ability to stay out-of-network and charge high prices with little impact on quantity might suggest that we should observe zero in-network ED physicians. However, as we discuss, physicians can incur significant costs when they bill out-of-network, such as an intrinsic dislike of the practice and the costs of collecting bills. 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, physicians can use the threat of out-of-network billing to raise their

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

in-network payments and avoid the added costs of being out-of-network. 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 and why out-of-network ED billing occurs. We also use our analysis of ED billing in the US to illustrate how a strong outside option improves a party's negotiating power. Finally, we test empirically whether a policy pursued in New York State that limited ED physicians' ability to bill out-of-network (and hence lowers their disagreement payoff) reduces the frequency of out-of-network billing and lowers ED physicians' average in-network payments.

We begin by assessing the distribution of out-of-network billing for ED care across hospitals in the US. Previous work has found that approximately a 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 2016). However, we illustrate that looking at national or regional averages of out-of-network is uninformative because out-of-network billing is concentrated in a small number of hospitals: 71 percent of hospitals have out-of-network billing prevalence below 20 percent while 15 percent of hospitals have out-of-network billing prevalence above 80 percent. Out-of-network physicians in our data charge, on average, 637 percent 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 percent of Medicare payments, which is higher than most other specialists (for reference, in our data, in-network orthopedic surgeons are paid 178 percent of Medicare rates for performing hip replacements).

Approximately two-thirds of hospitals in the US outsource the staffing of their EDs to physician management firms that hire and manage physicians, manage ED operations, and take care of billing (Deutsche Bank 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 largest ED outsourcing firm in the US – EmCare – to understand how the firm uses the strong outside option ED physicians possess to influence their negotiations with insurers. We find that EmCare uses the power of their outside option to raise revenues when they take over new contracts with hospitals. We observe that when the firm enters into a new contract to manage a hospital's ED services, they immediately exit insurer networks, bill as out-of-network providers, and seek to collect their charges (which they double 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 offers hospitals that allow them to bill out-of-network $2 million or more in transfers annually. 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 the clinical practice of their physicians in ways that are advantageous to the hospital (for example, 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 US were $12.9 million (Becker's Hospital Review 2014). As a result, the transfers that EmCare make constitute a 15.5 percent increase in hospital profits. Moreover, consistent with theory, we find that for-profit hospitals are significantly more likely to contract with EmCare than non-profit or government facility.

Out-of-network bills are irksome 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). Policy-makers at the state and federal level are now exploring a range of policy options to protect consumers and restore a competitively set price for ED physicians' payments (Lucia, Hoadley, and Williams 2017; Cassidy 2018; Hassan 2018). We finish by testing the impact of a 2014 law in New York that introduced baseball rules arbitration to settle the out-of-network billing disputes between physicians and insurers. Under the New York law, patients were only exposed to in-network cost sharing if they saw an out-of-network ED physician and physicians were prohibited from balance billing patients. In addition, to address contested bills, the state created a binding process where an arbitrator could select between the original offer made by the insurer and the original 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 find that the New York State policy reduced out-of-network billing by 56 percent and lowered in-network ED physician payments in the state by 14 percent.

Ultimately, this paper makes two contributions to the literature. First, we analyze the drivers of out-of-network billing in the US, 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 which 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 2 gives background on ED care in the US and describes the impact of surprise out-of-network billing on patients. In Section 3, we outline the incentives of physicians and hospitals to engage in out-of-network billing. We describe our data and analytic approach in Section 4. In Section 5, 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 6, we assess the impact of a law passed in New York that was designed to to protect consumers from surprise bills. We conclude in Section 7.

2 Background

2.1 The Evolution of Emergency Medicine in the United States

From the 1970s through the 1990s, care in hospital-based EDs shifted from being provided on an ad hoc basis by community physicians to being delivered, round-the-clock, by doctors who often completed emergency medicine residencies and obtained board-certification in the specialty (Institute of Medicine 2006).[2] At present, there

[2]Many EDs are not staffed by board-certified ED physicians. Approximately a third of emergency care is provided by family physicians. In rural states, the share of family physicians delivering

are more than 4,500 EDs in the US 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 1993 to 2003, the US population grew by 12 percent, hospitalizations increased by 12 percent, and ED visits increased by 26 percent (Institute of Medicine 2006). From 2001 through 2008, the use of EDs increased 1.9 percent each year—60 percent faster than concurrent population growth (Hsia, Kellermann, and Shen 2011).

Over the last several decades, EDs have become one of the main pathways through which patients are admitted to the hospital (Morganti et al. 2013). From 1993 to 2006, the share of all inpatient stays in which patients were admitted to the hospital via an ED increased from 33.5 percent to 48.3 percent (Schuur and Venkatesh 2012). Over time, as the use of EDs has gone up, waiting times to be treated in EDs also increased (Hing and Bhuiya 2012). In response to rising waiting times, EDs are now increasingly are competing on the length of time patients have to wait before they are treated (Esposito 2015; Rice 2016). 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. At present, roughly 65 percent of the physician market is outsourced (Deutsche Bank 2013). Among the hospitals that outsource their services, approximately a 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, that collectively account for approximately 30 percent of the outsourced physician market (Deutsche Bank 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. Inc. 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 (Deutsche Bank 2013). TeamHealth is approximately the same size. It was publicly traded until 2016, when it was purchased by the Blackstone Group.

emergency care is higher than 50% (Wadman et al. 2005; Groth et al. 2013; McGirr, Williams, and Prescott 1998).

In the aggregate, ED care is profitable for hospitals. Wilson and Cutler (2014) estimated that average ED profit margins are approximately 7.8 percent 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 percent for privately insured patients treated in EDs, whereas the profit margin for patients covered by Medicare, covered by Medicaid, and those uninsured were −15.6 percent, −35.9 percent, and −54.4 percent, 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 percent whereas the profit margin for patients who were admitted to the hospital was 18.4 percent (Wilson and Cutler 2014).

2.2 Out-of-Network Surprise Billing

There has been significant coverage of out-of-network billing in the popular press (Rosenthal 2014a; Rosenthal 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. A Consumers Union 2015 survey found that 30 percent 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 percent 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.

The results of these surveys have been confirmed by recent empirical evidence. A 2014 report found that among the three largest insurers in Texas, 45 percent, 56 percent, and 21 percent 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 percent of in-network ED hospital visits included a primary physician claim from an out-of-network doctor. Using different data, Garmon and Chartock (2016) found that 20 percent 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.

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 US, there are approximately 54,000 ED physicians, 5,500 hospitals, and over 1,000 insurers (Kaiser Family Foundation 2018; American Hospital Association 2018). As a result, it is unlikely that every ED physician could have a contract with every insurer that covers all the patients they treated. 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 they might not have a contract with the patient's ED physician. In these instances, if the physician were not engaging in a deliberate out-of-network strategy, the physician might 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, "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 2016).

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 co-insurance rates when they see an out-of-network provider. As a result, even if their insurer pays their physician his charge, the patient may still face substantial cost-sharing. Second, the insurer may pay the out-of-network physician his usual and customary rate, which the insurer calculates based on 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).

2.3 EmCare and Out-of-Network Billing

There is anecdotal evidence suggesting 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 that, "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 EmCare uses surprise billing as a deliberate strategy (the transcript from the video is available in Appendix 1). 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 physician] 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 to an earlier draft of this paper posted on their webpage. 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)

3 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.

3.1 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 policy holders. The insurer faces a tradeoff between including more and better physicians in its network and the higher in-network payments needed to make to retain those physicians in the network. The decision

[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 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.

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 policy-holder 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.

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 physicians collect under disagreement in this setting will therefore not be competitively set by hospital demand and physician labor supply, but 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.

3.2 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 were came in via the ED. As a result, hospitals

[4] See, for example, 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.

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 & Active Labor Act (EMTALA), EDs must provide care to patients in an emergency (Centers for Medicare and Medicaid Services 2018). 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).

Hospitals control which physicians or ED staffing firms they allow to work from inside their facilities. We assume that hospitals are aware of whether or not 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 whom 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

[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).

by physicians' out-of-network billing.

3.3 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 due to 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) 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 modelling assumption that her increase in revenue (or revenue for the ED staffing firm) is the difference between the in-network prices and out-of-network payments she collects 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 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

[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 2015).

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 over-testing) 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 benefits of setting higher charges than individual physicians operating in small group practices. In this sense, the ED management firms engage in informational arbitrage (a 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 US 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 non-profit hospitals may place a high premium on protecting patients from financial harm). Second, if out-of-network billing were pervasive, there would be an extremely high risk of regulatory backlash.[8]

[7]See, for example, a 2017 settlement between the US Department of Justice and TeamHealth over accusations the firm billed for higher and more expensive levels of medical service than were actually performed (Department of Justice 2017). https://www.justice.gov/opa/pr/healthcare-service-provider-pay-60-million-settle-medicare-and-medicaid-false-claims-act.

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

4 Data and Descriptive Statistics on Out-of-Network Billing

4.1 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 datasets. 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 an emergency care that occurred on the same day. We identify ED claims for physicians as those that include a 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.

At baseline, our data include 13,444,445 ED episodes. We introduce several sample restrictions to our data to produce an analytic dataset. First, we exclude episodes that were missing an AHA hospital ID or did not come from an AHA-identified hospital. Thus, the analysis is focused only on 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 five years of the data. This restriction excludes 330,312 episodes. Sixth, we limit our analysis to individuals who had six months of continuous enrollment before their emergency episode. Having six-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 percent 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' co-insurance payments, co-payments, and spending under their deductibles. We define the total amount an ED physician was paid as the sum of the insurer payment, the patient co-insurance payment, the patient co-payment, 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 co-insurance, patient co-payment, and patient spending under her deductible summed across all facilities claims. All prices are put in 2015 dollars using the U.S. 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 datasets 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 as a percentage of Medicare payments.

In addition, we construct an indicator for whether or not imaging occurred during an episode based on whether or not 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 six- 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 two weeks before the admission date for an episode back six and 12 months. In addition, we used six and 12 months of claims data to calculate Charlson measures of comorbidity

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

[10] We identified episodes that included imaging studies based on whether or not 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.

(Charlson et al. 1987).[12]

4.2 Identifying Where EmCare Have 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 webpage 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 webpage that included dots marking the location of hospitals where the firm had contracts (see Appendix Figure A.1). 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 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 webpage to recruit physicians to work at their care locations (see an example in Appendix Figure 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 webpage histories. This allowed us to create a roster of hospitals where EmCare was recruiting ED

[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 webpage were the latitudes and longitudes of centroids of each point on the map. We matched the latitudes and longitudes from the Envision webpage to the latitudes and longitudes we obtained using ArcMap to validate our analysis.

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 webpage 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 (Deutsche Bank 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 percent outsource their ED to EmCare. Based on investor reports on EmCare, our sample of hospitals with contracts with EmCare represents a modest under-count 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 webpage for press releases announcing new contracts. Second, we used LexusNexus 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 EmCare might have had a contract based on 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 3 where EmCare exited a contract.

5 Out-of-Network Billing, Physician Prices, and Hospital Outsourcing

5.1 Descriptive Statistics on ED Physician Payments and Out-of-Network Billing Prevalence

Our final dataset 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

[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 we were provided. For example, if we were told entry occurred in 2012, we assumed entry occurred on June 1, 2012.

[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.

$28 billion in emergency spending. The mean in-network ED physician payment across our sample period was $320.62 (266 percent of what the Medicare fee-for-service program paid for the same services) (Table 2). The amount 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 percent of ED cases in our data occurred at an in-network hospital. Appendix Table A.1 includes descriptive statistics for our analytic sample of ED episodes.

At the mean in-network hospital in our data, 25.8 percent 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 percent in 2011 to 21.9 percent 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 illustrate, 50 percent of hospitals have out-of-network billing prevalence of approximately one percent. 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 percent and 15 percent of hospitals have out-of-network prevalence of higher than 80 percent. This skewed distribution is evident in 2011, 2013, and 2015 (see Appendix Figure A.3).

5.2 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 Appendix 3). We also include an indicator variable for whether or not 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 that 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 they have a mean of zero and a standard deviation of one. As a result, the point estimates on our continuous variables should be interpreted as the influence of a one 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 obseve that areas with more physicians per capita have lower prevalence of out-of-network billing. Out-of-network billing is also less common at non-profit hospitals, government 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.

5.3 Causal Estimates of the Effect of EmCare Entry on Hospitals' OON 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 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 webpage, 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 and exited into 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 that up with a regression-based analysis. Crucially, we observe no difference in the pre-trends of key outcomes variables before EmCare entered or exited a hospital.

In our main analysis, we estimate a hospital fixed effects model with an indicator variable, $EmCare_{i,t}$ that takes a value of 1 on and after the date that EmCare entered a hospital and returns to zero 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 exit event as we denote in the table. 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 also is suggestive that we are estimating the effects of EmCare entry and not a hospital-specific phenomenon.

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 one year before EmCare entered hospitals until one year after their entrance (Panel A) and one year before EmCare exited hospitals until one year after their exit (Panel B). Because we measure the date of entry with six months of noise on either side of the entry event, we have put this time window in gray.

[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 non-profit/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.

EmCare enters two types of hospitals (Appendix Figure A.4). The first group (27 hospitals) has out-of-network prevalence below 90 percent prior to EmCare entry (the mean out-of-network prevalence in these hospitals prior to entry was 11 percent). The second group (9 hospitals) has out-of-network prevalence of over 90 percent before EmCare enters (the average out-of-network prevalence in this group is 99 percent).

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 six months prior to EmCare entry to six months after, the out-of-network billing prevalence at these hospitals that previously had low out-of-network prevalence increases discontinuously to nearly 100 percent. 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.

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 EmCare exited in Appendix Figure A.5.[17] None of these graphs shows marked changes in out-of-network billing prevalence before EmCare entered or exited a hospital; nearly all show that out-of-network billing prevalence increase dramatically in the months after EmCare takes over a staffing contract and decrease immediately after they exited.

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 percent 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 a patient was treated by an out-of-network

[17] For nearly all hospitals that had previously high out-of-network billing prevalence (Panels BB, CC, DD, EE, FF, GG, HH, II, and JJ of Appendix Figure 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 a patient was treated by an out-of-network physician increased to nearly 100 percent immediately after EmCare entered the hospital (Panels A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, X, Y, Z, and AA of Appendix Figure A.5). We show EmCare exits in Panels KK, LL, and MM.

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 Appendix Table A.2, we show that these results are robust to using alternative control groups.

5.4 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. This increase in out-of-network billing and physician charges generated large increases in revenue for EmCare physicians. In Panel A of Figure 4, we show that after entry, EmCare raised its charges significantly. In Column (1) of Table 4, we quantify these changes and show that after EmCare entered, they more than doubled physician charges, raising them by, on average, \$480.13. 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 percent).

These changes also exposed patients to increased cost sharing and financial risk. Because patients typically have out-of-pocket costs that are set via co-insurance 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 percent). Collectively, we observe that the total payments to ED physicians increased by \$438.20 per case after EmCare entered a hospital. This is a 114 percent increase in ED physician payments. These changes occurred after EmCare entered a hospital (Figure 4). Notably, as we observe in Column (7), we do not observe a decrease in patient volume after EmCare enters a hospital, begins billing out-of-network, and increases their charges.

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

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

in-network payment for the case (219 percent 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 only paid median in-network rates) by $457.21. Bills of this magnitude would be financially devastating to a large share of the population (Board of the Governors of the Federal Reserve 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 Appendix 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 percent) (Columns (6) in Table 4) and increased the relative value units (RVUs) of physician care they provided by 9 percent (Columns (1) in Appendix 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 Figure 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 have further discussion of the impact of the entry of physician management companies on hospitals' case mix in Section 5.6.

It is striking that at the three hospitals where we observe EmCare exit, there is a reversal in all of 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 Table 5 show that these changes are quite large and statistically significant. They show that relative to the quarter before exit occurred, total ED physician charges decrease by $645.76 (50 percent), total payments decrease by $701.68 (62 percent), patient cost sharing goes down by $68.68 (63 percent), and the the 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 3.3, we argued that having the ability to go out-of-network without

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

seeing a sizeable reduction in the number of patients 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 6, we show the average in-network payments in our data made to internists for performing standard office visits and orthopedists for performing hip replacement. We observe that, on average, internists are paid 158 percent of Medicare rates (Column (1)) and orthopedists are paid 178 percent of Medicare rates (Column (2)). By contrast, the average in-network ED physician in our data is paid 266 percent of Medicare rates (Column (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 percent of Medicare rates (Column (5)).[20]

5.5 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 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 network from inside their facilities. First, by allowing physicians to bill out-of-network, hospitals could receive a discount in the fees they must pay a physician staffing company to manage their ED. As we described in Section 2.3, the transcript from administrators at Glen Rose Medical Center discussing out-of-network billing (presented in Appendix 1) revealed EmCare was 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 Table 7 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 percent) and facilities' total payments increased by $220.11 (8 percent). As we illustrate in Table 7, this increase in facility

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

payments was driven, in part, by a 1.1 percentage point (4 percent) increase in the probability that a patient received an imaging procedure (Column (5)) and a 1.7 percentage point (22 percent) increase in the likelihood that a patient was admitted to the hospital.[21] As we illustrate in Panel F of Figure 6, this increase in admissions is visible in the raw data and occurred after EmCare entered a hospital. As we illustrate in Table 8 and Figure 7, it is striking that almost all of 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 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 percent. 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 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 percent range." (Deutsche Bank 2013). We found that, on average, EmCare physicians generated $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 percent 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

[21] As we illustrate in Appendix 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.

they manage the staffing, physician recruiting and billing.[22] 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 US 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 percent (= \$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 3.2, these costs would include any reputational harm the hospital would incur if it was 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 \$2m in profit they received from each year from outsourcing exceeded the sum of the reputational costs 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 that for-profit hospitals, which likely put a higher weight on profits than would government or non-profit facilities, to be more likely to contract with EmCare. In Table 9, 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 percent are non-profit, 19 percent are for-profit, and 20 percent are government owned. Consistent with our predictions, 45 percent 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.[23]

5.6 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 webpage, EmCare

[22] See EmCare webpage, https://www.emcare.com/.

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

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 EmCare entered could explain why, after the firm 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" (XXX). As the Trauma Center Association of America notes, one criteria to becoming a trauma center is having minimum numbers of high severity patients.

In Appendix 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 six-month historical spending of the hospital's patients increased by $820.39 (14 percent) and the 12-month historical spending increased by $1,232.60 (11 percent). We also find that after the entry of EmCare into a hospital, the six-month Charlson score of patients who attend the ED increased by 7 percent and the 12-month Charlson scores increased by 7.5 percent. In Appendix Figure A.6, we show the average Charlson co-morbidity score and six-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 Appendix 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 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 re-estimate 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 non-zero 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, 7, and 8, we estimate Equation (1) on the samples of patients in the lower third ($0 to $279.60), the middle-third ($279.61 to $2,033.86), and the top-third ($2,033.87 to $115,499.30) of the distribution of historical six-month patient health spending. Across all three sub-samples, the entry of EmCare led to an increase in the rate patients had physician claims coded using the CPT code for the most severe emergency.

In Appendix 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 Appendix 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 percent more likely to receive an imaging study.

Finally, in Appendix 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 percent more likely to be admitted to the hospital. In Column 6, we find patients with low historical spending (e.g., less than $279.60 in the previous six months) were 16 percent more likely to be admitted to the hospital after EmCare took over the management of the hospital ED.

5.7 Generalizability of Our Data

Our data come from a single insurer that operates across all fifty 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 (2016), the only other study that examines the out-of-network prevalence nationally.[24] Garmon and Chartock used 2007 to 2014 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 (2016) 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 percent of cases. These results are similar to our results. Garmon and Chartock found out-of-network prevalence for admitted patients in Florida, Texas, and New York of 37 percent, 34 percent, and 35 percent, respectively. For those same states, when we focus on patients with an admission, we observe out-of-network prevalence during the 2011 to 2015 period of 24.8 percent, 46.3 percent, and 16.1 percent, respectively. They also found, as we do, that out-of-network prevalence decrease over time.

6 Policies to Address Out-of-Network Billing

6.1 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

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

are paid for their services is either competitively determined or is as close to the competitively determined price as possible. Addressing this currently "missing" price will both 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 nation-wide average in-network payment rates 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 US (Grisham 2017). However, whereas the average in-network ED physician payment in our data was 266 percent of the Medicare payment rates (and the average out-of-network payment was 637 percent of the Medicare payment rates), the average in-network payments to orthopedic surgeons for performing hip replacements during our sample period was 178 percent of the Medicare payment rates. If we assumed 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 percent of the Medicare payment rates), this would lower total ED physician spending by 46 percent. If we assume that private spending is one-third of total health spending in the US and that ED physicians account for approximately 1 percent 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.[25] While these estimates ignore general equilibrium effects, they give a scale of the savings possible via addressing out-of-network billing.

6.2 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 6 of those 21 have comprehensive policies that both protect consumers and include a process determine payments from insurers to out-of-network providers (Lucia, Hoadley, and Williams 2017). Unfortunately, state policies only apply to the 40 percent of commercially insured individuals in the US that are enrolled in fully-insured, employer-sponsored health plans (Kaiser Family Foundation 2017). Sixty percent of

[25] These numbers are from Morganti et al. (2013) and Hartman et al. (2017).

the individuals in the US 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. Notably, however, two recent bi-partisan policy proposals from the Senate, if passed, would offer federal protections that applied to individuals enrolled in fully- and self-insured insurance plans and prohibit balance billing.

Most states' surprise billing laws include a hold harmless provision to protect patients from financial risks (Lucia, Hoadley, and Williams 2017). These laws stipulate that patients cannot be charged more than their usual in-network cost sharing during emergencies if they see an out-of-network provider that is working at an in-network facility. However, only 9 of the 21 states with hold-harmless provisions restrict providers from balance-billing patients. So, while patients that 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 6 states (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. A recent Senate proposal has proposed similar regulated payments where the insurer is required to pay providers the average in-network prices in the region (Cassidy 2018). However, it is extremely unlikely that a regulated price of this sort will match the 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

[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 (*Public Health Service Act* 2018; Keith 2018).

rates, insurers will not want to form networks (see, for example, 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 insurers and providers cannot reach a resolution on payments in cases when an ED physician is out-of-network. Likewise, a recent bill sponsored by Senator Maggie Hassan of New Hampshire also introduces an arbitration process (Hassan 2018). New York's law, passed on April 1, 2014, is the most ambitious in the nation to date. The law has two components. The first is a hold harmless provision that prohibits balance billing and requires patients who are treated by an out-of-network physician to pay no more than what they would have paid in cost sharing should the physician have been in-network. The second component is an arbitration process to determine what providers are paid when they treat a patient and do not participate in the patient's insurer's network. The law also stipulates that insurers must develop reasonable payment rates for out-of-network care, illustrate how their out-of-network payments were calculated, and show how they compare to usual and customary rates (Hoadley, Ahn, and Lucia 2015).[27]

In practice, under this law in New York, 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. The arbitrator can stipulate that the provider will be paid the insurer's original payment or alternatively select the provider's original charge. Ultimately, this policy disadvantages providers that bill for unreasonably high charges and punishes insurers that offer unreasonably low initial 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 US) (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 collect their inflated charges from insurers. As a result, the

[27]Usual and customary rates are defined in the New York State law as the 80th percentile of charges based on the Fair Health database, which captures physician charges in the states for most medical procedures.

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). We take these propositions to the data by testing the impact of New York State's 2014 surprise billing on out-of-network billing rates and the level of physicians' in-network payments.

6.3 Analyzing the Impact of New York State's Law

As Appendix 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. In addition, 90.2 percent of the patients in our data in New York are in ASO products. To test the impact of the New York State laws, we run a difference-in-difference regression and compare New York hospitals' out-of-network prevalence, physician in-network payment rates, and facility payment rates before and after the passage of the out-of-network legislation to outcomes in hospitals in 21 control states that had no out-of-network protections and did not introduce out-of-network protections from 2011 to 2015.[28] To do so, we estimate:

$$Y_{i,h,t} = \beta_0 + \beta_1 NY_h + \beta_2 Post_t + \beta_3 NY_h * Post_t + \gamma_h + \mu_t + \varepsilon_{i,h,t}, \qquad (2)$$

where the dependent variable is our outcome of interest for patient i, treated at hospital h, in quarter t. We include an indicator for 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). $Post_t$ takes value of 1 for all periods from April 1, 2014, onward, after New York State passed its out-of-network billing laws. 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 passed.

We take two approaches to calculating our standard errors. 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 21 control

[28] Our control group contains 21 states: Alabama, Arizona, Arkansas, District of Columbia, Georgia, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Missouri, Nebraska, Nevada, Ohio, Oklahoma, Oregon, South Carolina, Tennessee, Virginia, Washington, Wisconsin. This based on analysis by Lucia, Hoadley, and Williams (2017). We also exclude nine states from our control group that had fewer than 5000 episodes of ED care annually. Our results, however, are robust to including these states.

states, there are 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 21 placebo treatment effects we observe when we estimate Equation (2) independently and sequentially use of each of those 21 control states as the 'placebo' treated state instead of New York. We then present how our treatment effects for New York state compares to the distribution of 'placebo' treatment effects we observe when the control states are used as the treatment group.

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

Table 10 presents least-squares estimates of Equation (2) and shows the impact of the New York State law on hospitals' out-of-network prevalence, physician charges and payments, and hospital charges and payments. As Column 1 illustrates, the New York State law reduced the frequency of out-of-network billing by 9 percentage points (56 percent) relative to changes observed in the 21 control states off a base rate of out-of-network prevalence in New York of 16 percent. These results are precisely estimated using our clustered standard errors and our point estimate falls outside of the 5th and 95th percentiles of the distribution of placebo treatment effects.

Figure 8 presents non-parametric estimates of Equation (2) graphically. The out-of-network prevalence in New York and control states followed similar trends before the introduction of the New York State out-of-network protection law in 2014. However, almost immediately after the law was passed (and before the required implementation date), there was a marked reduction in out-of-network billing in New York. Figure 9 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 percent. Four years later, the rate was 6.4 percent, and the reduction in out-of-network prevalence 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.

Perhaps more notably, as we illustrate in Column (3), the New York state law lowered in-network payments to physicians by $41.39 (14 percent). These results are also 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).

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 only offer formal protection to individuals covered by fully insured insurance products. And perhaps the biggest challenge with this policy is that, because the outcome of arbitration is linked to physician charges (which physicians set themselves), there is scope that physicians could 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.[29]

[29] 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 non-labor 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.

7 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 physician 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 were 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 at 75 percent of hospitals have out-of-network prevalence of less than 20 percent. By contrast, ten percent of hospitals have out-of-network prevalence of over 99 percent. 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. 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 percent and patient cost sharing increased by 92 percent. Hospitals with ED services that are outsourced to EmCare form a significant percentage of the 15 percent of hospitals in the US 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 previous analysis, we have shown that TeamHealth, another private-equity backed, large physician staffing company exits networks as soon as it enters hospitals, but eventually re-enters 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 the have contracts to offset any costs the hospitals incur. This represents a 15.5 percent increase in the profit margin at the average hospital in the US. 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 that 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 must both protect consumers and restore a competitively set price for emergency care. Ultimately, the strength physicians' outside option (e.g. the extent 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 14 percent. Moreover, we show that the policy also led to a significant reduction in ED physicians' in-network payments.

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Table 1: EmCare Entry and Exit Events from 2011 to 2015

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

Notes: 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 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.

Table 2: ED Episodes Per Year

	Emergency Episodes	Total Facility Spending (millions)	Total Physician Spending (millions)	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%

Notes: The table shows episodes per year, facility spending per year, physician spending per year, the mean payment to an in-network ED physician (and the 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.

Table 3: The Impact of EmCare Entry and Exit on Hospitals' Prevalence of Out-of-Network ED Physician Billing

	(1)	(2)	(3)
	Hospitals with OON Prevalence Below 90% Prior to Entry	Hospitals with OON Prevalence Above 90% Prior to Entry	All Hospitals
	EmCare Entry		EmCare Exit
	OON Indicator		OON Indicator
EmCare Entry/Exit	0.828***	-0.027	-0.765***
	(0.060)	(0.043)	(0.077)
Hospital FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes
Mean EmCare	0.060	0.995	1.000
Mean Non-EmCare	0.229	0.229	0.229
Observations	8,362,441	8,386,032	8,323,064
Control	All Non-EmCare Hospitals	All Non-EmCare Hospitals	All Non-EmCare Hospitals

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1). In Column (1), we focus on hospitals that EmCare entered that had out-of-network prevalence prior to entry that were below 90 percent (the mean out-of-network prevalence in these hospitals prior to entry was 11.6 percent). In Column (2), we focus on hospitals that had out-of-network prevalence prior to entry above 90 percent (the mean out-of-network prevalence prior to entry was 99 percent). In Column (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 US 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. In Appendix Table A.2 we show these estimates using alternative control groups.

Table 4: The Impact of EmCare Entry on Physicians' Payments, Coding and Volume

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Physician Charge	Total Payment	Insurer Payment	Patient Cost Sharing	Potential Balance Bill	CPT High Severity	Patients Treated Annually
EmCare Entry	480.13***	438.20***	391.89***	46.32***	457.21***	0.114***	-69
	(58.02)	(44.13)	(43.31)	(3.83)	(51.43)	(0.026)	(163)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	470.39	383.79	333.55	50.24	224.33	0.242	1,616
Mean Non-EmCare	504.24	346.88	304.74	42.15	239.23	0.323	1,677
Observations	8,430,842	8,430,842	8,430,842	8,430,842	8,430,842	8,430,842	8,430,842
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

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1) where the EmCare event is the entry of EmCare into a hospital. Each observation is a patient episode. The control group in all regressions is all hospitals in the US 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. All dollar amounts are inflation adjusted into 2015 dollars. In Appendix Table A.4 and Appendix Table A.5, we show these estimates using alternative control groups.

Table 5: The Impact of EmCare Exit on Physicians' Payments, Coding and Volume

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Physician Charge	Total Payment	Insurer Payment	Patient Cost Sharing	Potential Balance Bill	CPT High Severity	Patients Treated Annually
EmCare Exit	-645.76***	-701.68***	-633.00***	-68.68***	-632.37***	-0.103*	46**
	(185.42)	(148.34)	(125.71)	(22.63)	(169.52)	(0.057)	(19)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	1,284.05	1,123.75	1,014.64	109.11	1,031.57	0.304	616
Mean Non-EmCare	504.24	346.88	304.74	42.15	239.23	0.323	1,677
Observations	8,323,064	8,323,064	8,323,064	8,323,064	8,323,064	8,323,064	8,323,064
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

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1) where the EmCare event is the exit of EmCare from a hospital. Each observation is a patient episode. The control group in all regressions is all hospitals in the US 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. All dollar amounts are inflation adjusted into 2015 dollars.

Table 6: Physicians' Payments from a Private Insurer Expressed as a Percentage of Medicare Physician Part B Payments By Specialty

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

Notes: This 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 to 2015 claims from the same payer supplying the ED data.

Table 7: The Impact of EmCare Entry on Hospitals' Payments, and Behavior

	(1)	(2)	(3)	(4)	(5)	(6)
	Facility Charge	Total Payment	Insurer Payment	Patient Cost Sharing	Imaging	Admission to Hospital
EmCare Entry	1,270.15***	220.11**	173.42**	46.70***	0.011***	0.017***
	(329.40)	(91.49)	(81.17)	(14.02)	(0.004)	(0.005)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	7,566.25	2,719.70	2,308.49	411.21	0.283	0.079
Mean Non-EmCare	6,100.01	2,660.51	2,320.13	340.38	0.273	0.098
Observations	8,430,842	8,430,842	8,430,842	8,430,842	8,430,842	8,430,842
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

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1) where the EmCare event is the entry of EmCare into a hospital. Each observation is a patient episode. The control group in all regressions is all hospitals in the US 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. Standard errors are clustered around hospitals. Means are drawn from the analytic sample population underlying the regression. All dollar amounts are inflation adjusted into 2015 dollars. In Appendix Table A.7 and Appendix Table A.8, we show these estimates using alternative control groups.

Table 8: The Impact of EmCare Exit on Hospitals' Payments, and Behavior

	(1)	(2)	(3)	(4)	(5)	(6)
	Facility Charge	Total Payment	Insurer Payment	Patient Cost Sharing	Imaging	Admission to Hospital
EmCare Exit	-395.46**	-173.43***	-161.01***	-12.42	-0.006	-0.020***
	(173.08)	(35.95)	(29.35)	(7.97)	(0.011)	(0.001)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	3,101.79	2,126.10	1,894.28	231.82	0.192	0.031
Mean Non-EmCare	6,100.01	2,660.51	2,320.13	340.38	0.273	0.098
Observations	8,323,064	8,323,064	8,323,064	8,323,064	8,323,064	8,323,064
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

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1) where the EmCare event is the exit of EmCare from a hospital. Each observation is a patient episode. The control group in all regressions is all hospitals in the US 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. Standard errors are clustered around hospitals. Means are drawn from the analytic sample population underlying the regression. All dollar amounts are inflation adjusted into 2015 dollars.

Table 9: The Characteristics of Hospitals that Contract with EmCare

Hospital Characteristics	All Hospitals (3,345)	EmCare Hospitals (212)	P-value from two-sided t-test
For-profit	0.19	0.45	0.00
Non-profit	0.61	0.33	0.00
Government	0.20	0.22	0.49
Teaching	0.06	0.03	0.03
Hospital Beds	182.69	156.36	0.04
Technologies	49.04	40.19	0.00
Hospital HHI	0.55	0.57	0.35
Proportion Medicare	49.53	49.39	0.89
Proportion Medicaid	18.65	18.28	0.62
ED Physicians per Capita (per 10,000)	0.77	0.67	0.00
Physicians per Capita (per 10,000)	22.06	21.27	0.02
Physician HHI	0.42	0.42	0.61
Insurer HHI	0.37	0.36	0.21
Household Income ($)	36,899	37,147	0.59
Gini Coefficient	0.32	0.33	0.00

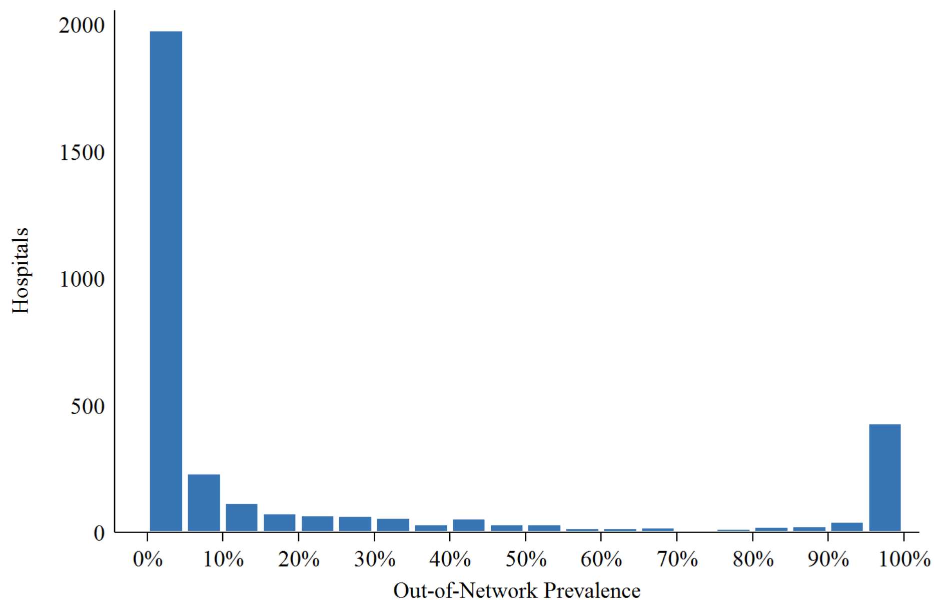
Notes: The table compares characteristics of hospitals that contract with EmCare to the characteristics of hospitals in the universe of hospitals registered with the American Hospital Association. The number of hospitals in each column is shown in parenthesis. The p-value is reported from a two-sided t-test comparing the difference in means between all hospitals and EmCare hospitals.

Table 10: Estimating the Impact of the New York State Surprise Billing Law

	(1) Out-of-Network Prevalence	(2) Physician Charge	(3) In-Network Physician Payment	(4) Facility Charge	(5) Facility Payment
NY*Post dummy	-0.09***	-14.24	-41.39***	-75.73	39.66
	(0.03)	(19.76)	(8.89)	(135.45)	(70.95)
Placebo treatment effects (drawn from distribution of 21 states)					
5th percentile	-0.08	-102.53	-32.35	-338.17	-127.19
95th percentile	0.11	109.91	56.17	380.02	151.16
Hospital FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Mean NY	0.16	501.47	293.99	6,083.08	2,745.82
Mean Non-NY	0.17	581.68	315.02	5,750.11	2,577.81
Observations	4,100,767	4,100,767	3,419,554	4,100,767	4,100,767
R-Square	0.61	0.47	0.54	0.10	0.10

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (2). 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 2014 Q1 (when the NY vote was passed). Hospital and physician payments are winsorized at the top and bottom one percentile. The control group includes 21 states that have not introduced surprise billing protections (Alabama, Arizona, Arkansas, District of Columbia, Georgia, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Missouri, Nebraska, Nevada, Ohio, Oklahoma, Oregon, South Carolina, Tennessee, Virginia, Washington, Wisconsin). 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. All dollar amounts are inflation adjusted into 2015 dollars.

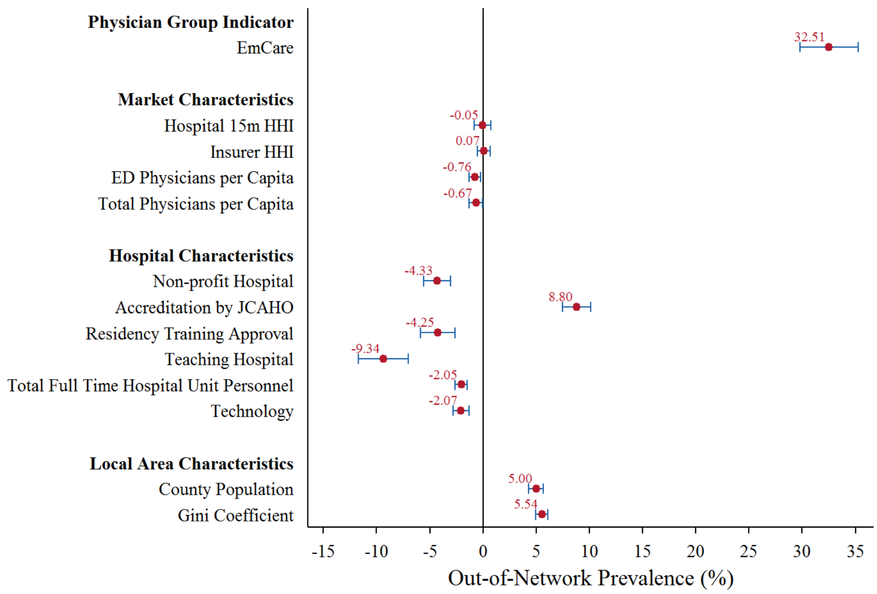
Figure 1: The Prevalence of Out-of-Network ED Physician Billing Across Hospitals in 2015



	Observations	10^{th}	25^{th}	50^{th}	75^{th}	90^{th}
Out-of-Network Prevalence	3,345	0	0	0.011	0.278	0.990

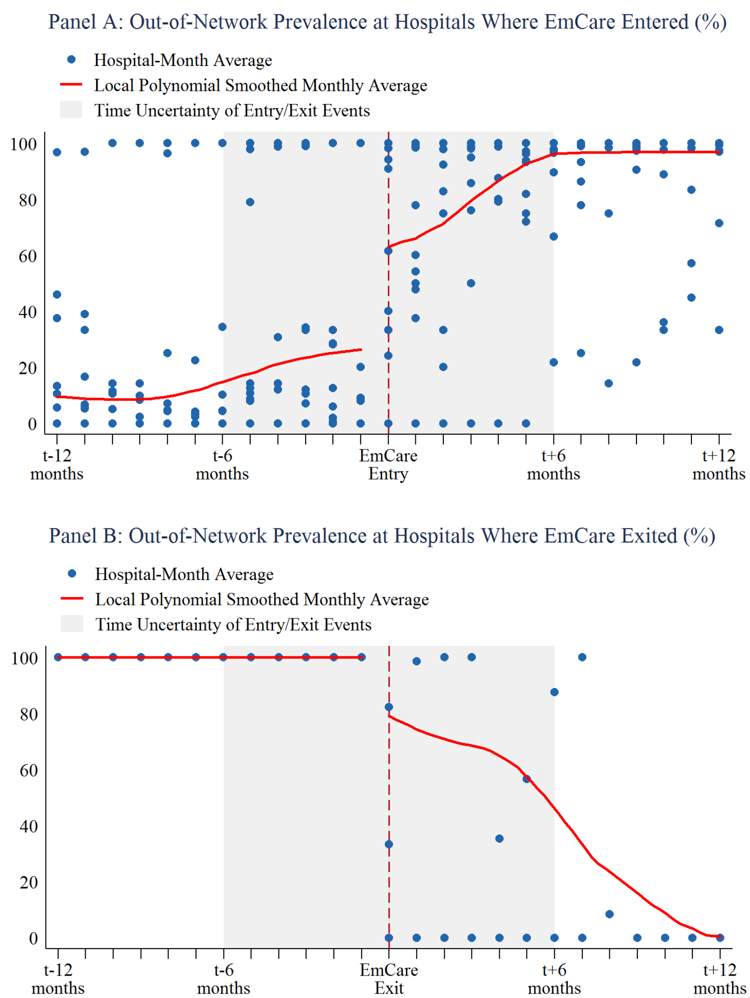
Notes: The figure shows the prevalence of out-of-network ED physician across US hospitals in 2015.

Figure 2: Conditional Correlates of Hospitals' Out-of-Network Billing Prevalence



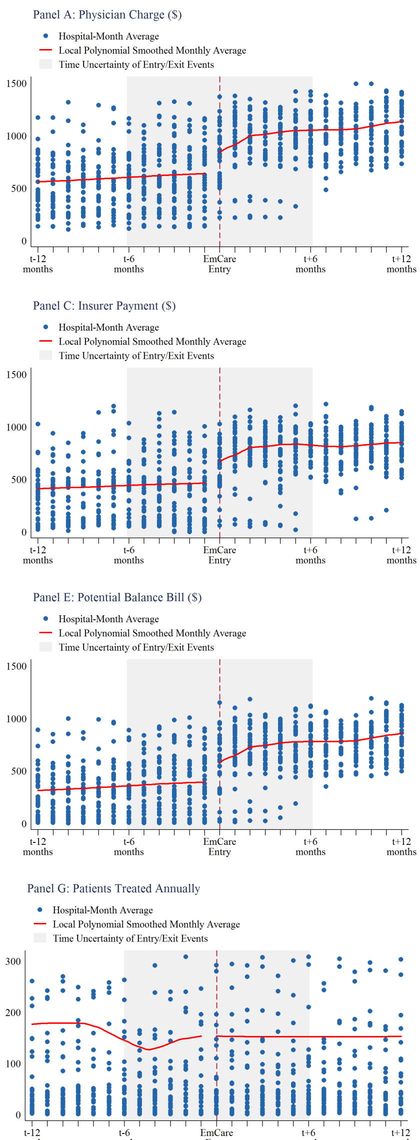
Notes: The figure shows the point estimates from a least-squared regression of hospitals' out-of-network prevalence on variables chosen from our Lasso. We used data from 2011 through 2015. Each observation is a hospital-year prevalence of out-of-network billing. The regression includes year fixed-effects. For continuous variables, we scale the variables so that they have a mean of zero and a standard deviation of one. As a result, the point estimates can be interpreted as the percentage point change in out-of-network prevalence for a one standard deviation increase in the explanatory variable. For binary variables, the point estimate illustrates the impact of having the variable take a value of one. To obtain these results, we run a Lasso with all possible variables (89 in total). We then run an OLS 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.

Figure 3: The Impact of EmCare Entry and Exit on Hospitals' Prevalence of Out-of-Network ED Physician Billing



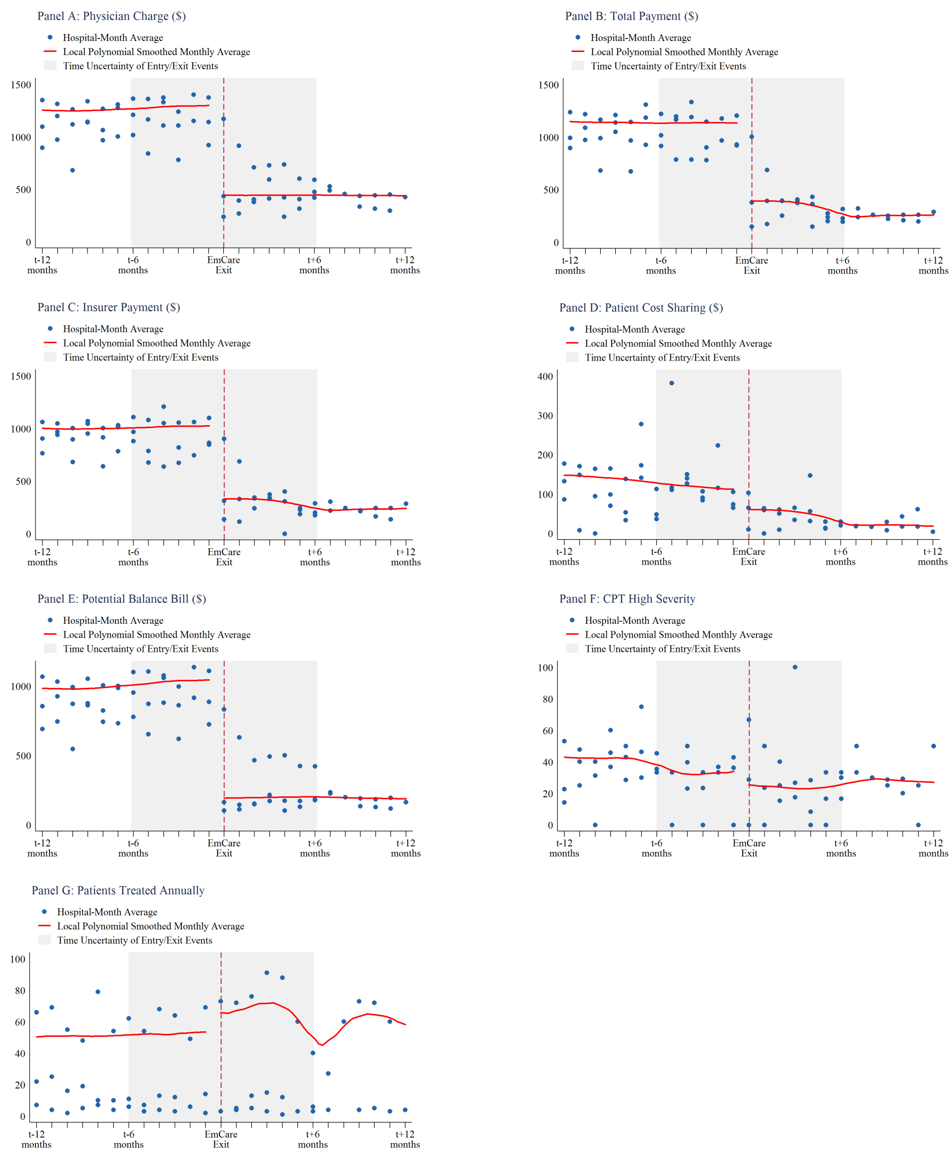
Notes: The panels plot the monthly average out-of-network prevalence by hospital from 12 months before to 12 months after EmCare entered (Panel A) or exited (Panel B) a hospital. In Panel A, we limit our analysis to hospitals with pre-entry out-of-network prevalence below 90 percent. There is six month period of uncertainty on either side of entry and exit dates, which we denote by shading the area gray.

Figure 4: The Impact of EmCare Entry on Physicians' Payments, Coding, and Volume



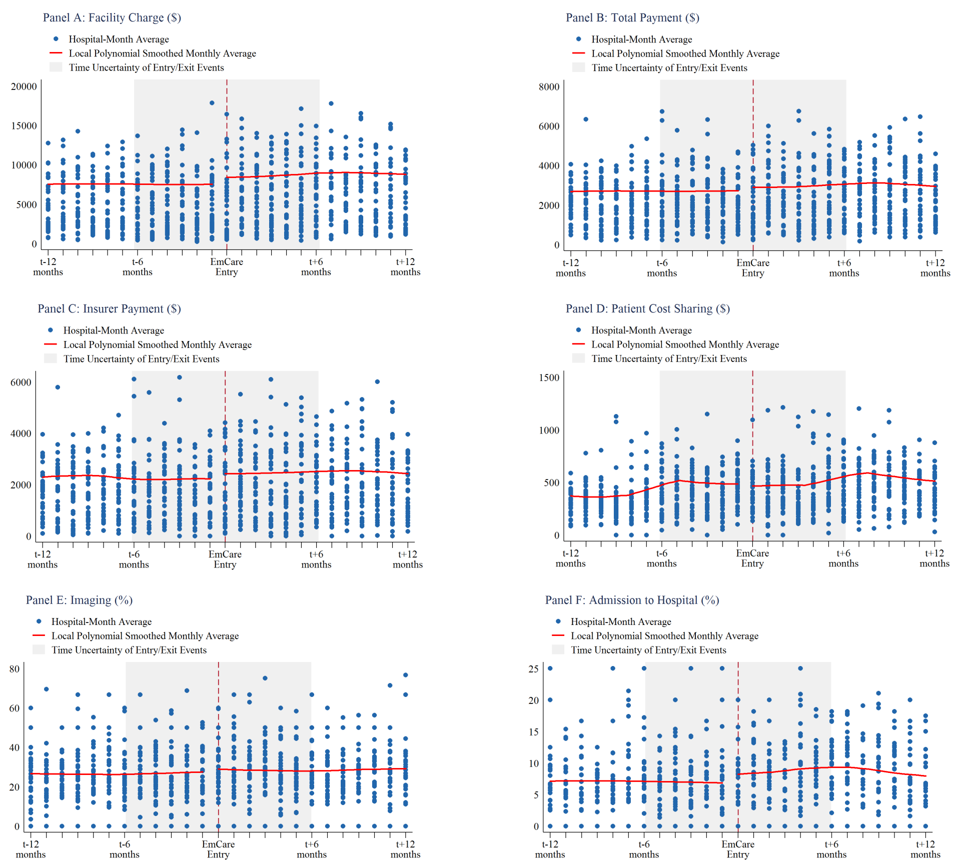
Notes: The panels plot the monthly average by hospital from 12 months before to 12 months after EmCare entered the hospital. We exclude the top 1% observations in each panel. The local polynomial is weighted by the number of episodes in each month. There is six month period of uncertainty on either side of entry and exit dates, which we denote by shading the area gray.

Figure 5: The Impact of EmCare Exit on Physicians' Payments, Coding, and Volume



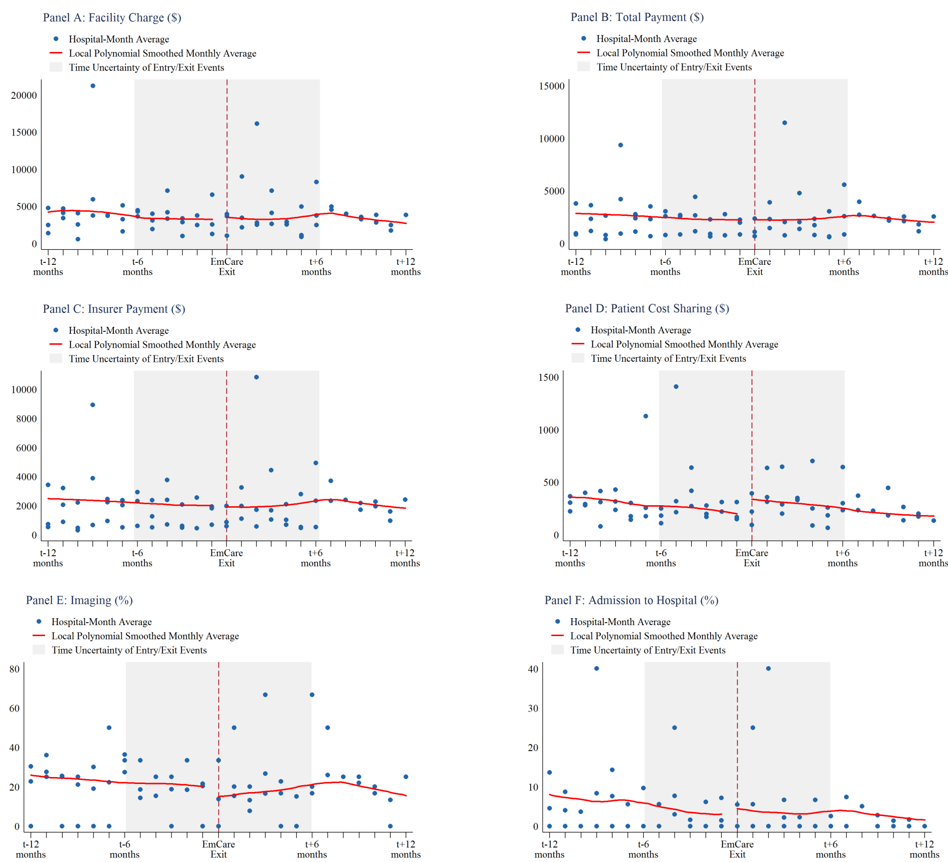
Notes: The panels plot the monthly average by hospital from 12 months before to 12 months after EmCare exited the hospital. The local polynomial is weighted by the number of episodes in each month. There is six month period of uncertainty on either side of entry and exit dates, which we denote by shading the area gray.

Figure 6: The Impact of EmCare Entry on Hospitals' Payments, and Behavior



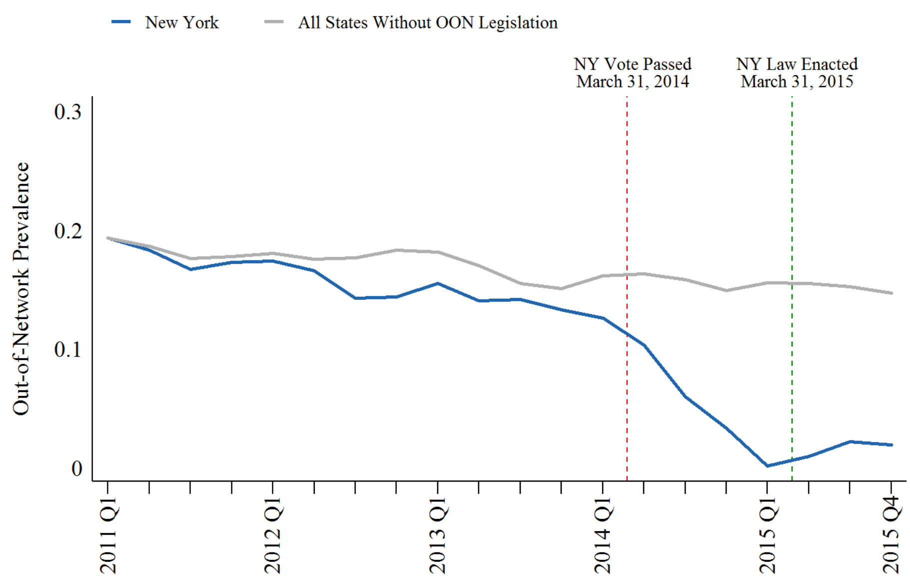
Notes: The panels plot the monthly average by hospital from 12 months before to 12 months after EmCare entered the hospital. We exclude the top 1% observations in each panel. The local polynomial is weighted by the number of episodes in each month. There is six month period of uncertainty on either side of entry and exit dates, which we denote by shading the area gray.

Figure 7: The Impact of EmCare Exit on Hospitals' Payments, and Behavior



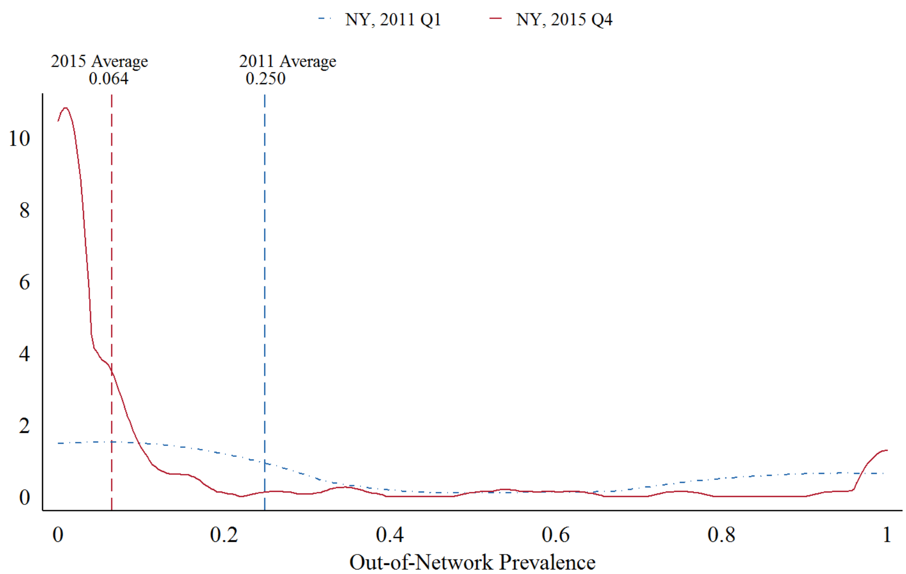
Notes: The panels plot the monthly average by hospital from 12 months before to 12 months after EmCare exited the hospital. The local polynomial is weighted by the number of episodes in each month. There is six month period of uncertainty on either side of entry and exit dates, which we denote by shading the area gray.

Figure 8: Out-of-Network Prevalence in New York and States Without Surprise Billing Laws



Notes: The figure presents least-squares estimates of Equation (2) - an episode-level regression where the dependent variable is whether or not a patient at an in-network ED received a bill from an out-of-network physician. We regress that against an indicator for whether the episode occurred in the state of New York, a vector of quarterly fixed effects, and the interaction of the New York indicator and the quarterly fixed effects. Patient age, gender, race, and Charlson scores are included as controls. The omitted category is Q1 2013. We include a vector of hospital fixed effects. The control group is composed of observations from 21 states that did not have surprise billing laws. The red dotted line denotes when the NY vote passed, and the green dotted line denotes when the NY law was enacted.

Figure 9: The Distribution of Out-of-Network Billing in New York in 2011 and 2015



Notes: The figure shows the kernel density distribution of hospital out-of-network prevalence in New York in 2011 and 2015

Appendix – For Online Publication

Appendix 1 Transcript of Discussions about EmCare and Out-of-Network Billing at Glen Rose Medical Center

Video from Glen Rose Medical Center in Glen Rose, Texas.
Accessible at: https://www.youtube.com/watch?v=6kvM5fKPqCE.
Recorded on 4/28/15.

Speaker 1: The question has been brought up in the past, and y'all might get it as well so, but on the insurance or ER physicians and bills under Fossil Rim, so if anybody gets a bill under Fossil Rim, Fossil Rim Physicians Group is who the billing group is there. But they bill out-of-network for most insurance, and we did contact them a while back, and we could expand the insurances covered in the ER but it's at a cost of about two hundred thousand dollars a year, to us to expand that for the patients so.

Speaker 2: If we require them to be in-network with all the providers, then our subsidy would increase significantly.

Speaker 3: That would cover all the providers, are there some that are cheap, and some that aren't?

Speaker 2: No, they all pay about the same, it's that we do have some that are in-network, they are in-network, well they're in-network with Medicare. They're in-network with some of the providers, but most of the providers they're not in-network. Which means that if you're in-network you have to accept what insurance pays, if you're in-network with a provider, what an insurance pays, that's what you have to accept. You're out-of-network, even if insurance pays you can bill the patient for the additional amount. That's our retail store.

Speaker 4: So the power plant and the school are they considered in-network or out-of-network?

Speaker 2: I don't know, it depends on who their insurance is with, like the power plants got several different insurances. Insurance by insurance not employer by employer. Yea.

Speaker 2: Oh so, [crosstalk 00:01:48] Luminen has different insurance.

Speaker 3: Some of them can be in-network, some of them can be out.

Speaker 3: In the two hundred thousand that it will take to be in-network with everybody that's not necessarily equally distributed between a thousand different insurance companies? Or some of them might cost five thousand a year? [crosstalk 00:02:08]

Speaker 1: That's what 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. So basically we're supplementing them. It would be cheaper on the patients but we're actually absorbing that patient cost that they're [EmCare] getting for billing out-of-network for the patient, so it would actually come back to us.

Speaker 3: Okay, and if we get enough people in it then we're getting it at a discounted rate?

Speaker 1: If we can build our buy-up to about 750 or 800 visits a month, it'll be a wash for us. Yeah it wouldn't cost us any to have them down there.

Speaker 3: Well we're gonna start having emails sent out about the 20th of the month to all the board members looking to come in to check a runny nose.

Speaker 2: It is, it's just from that perspective only it doesn't make any difference if they pay or not pay, it's visits. Of course there's another side to it, that's our billing side of the ER visit.

Speaker 5: Summer's coming there's always [crosstalk 00:03:03]

Speaker 2: Oh I know, it's true.

Speaker 1: One ER visit can, I mean looking at the bill it is a fairy significant amount of money for that one visit depending on where you're at.

Speaker 2: Tell them to use my office. Tell them, they probably already settled [inaudible 00:03:27] So they can get out of the hall.

Speaker 2: Yeah the questions on the ER billing hope you, hope I clarified a little bit. Probably the complaint that we get the most on is an insurance being out-of-network for.

Speaker 4: Government

Speaker 2: It's the most significant one.

Speaker 4: That's how we [inaudible 00:03:39]

Speaker 3: The administrative fee is paid to the Emcare.

Speaker 1: The administrative fee is paid to EmCare, yes.

Speaker 3: EmCare administers Fossil Rim Emergency Physicians and our Emergency Room, or just the Fossil Rim?

Speaker 2: Just for billing for the physician for the Emergency Room.

Speaker 3: That's all EmCare does?

Speaker 2: Yes

Speaker 3: Just billing for the physicians?

Speaker 2: Yes

Speaker 3: Billing for everything else is us?

Speaker 1: Right. Right. If you come to the ER you're gonna get 2 bills, you're gonna get a bill from the doctor and a bill from us.

Appendix 2 Modelling Surprise Out-of-Network Billing

For it to occur, there are three parties that have to prefer out-of-network billing to an in-network contract: the 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 effectively allow physicians to bill out-of-network from inside their facilities.[30] We discuss each party's incentives in turn.

Out-of-Network Prices

The physician group and the insurer bargain over the price the insurer will pay the physicians. If there is no agreement between them and yet the physician is able to obtain access to the hospital ED (discussed below), patients do not create elastic demand because they are unaware of the out-of-network status of the doctor, uninformed about any increased price they will have to pay, and not in a position to change hospitals. A physician optimizing against this short-run demand curve could potentially set a very high price. The constraints that will limit such price-setting are legal (e.g. state laws that restrict price gouging), and publicity and reputational costs. Thus, the revenue component of the disagreement payoff of the physician group, should it end up out-of-network, will vary by state, and we could think of the price as being a function of that state's institutional environment, e.g. $p = f(law_s)$.[31] However, the model below will focus on agents operating in one state and describe the average out-of-network price the group can collect, p^L, as coming from the legal environment, not the market environment in that state. A crucial feature of emergency medicine is that the quantity of patients seen by the emergency physician group is almost invariant to its network status as long as it retains the ability to staff the hospital ED and the negative publicity from any surprise billing does not drive away ED patients from the hospital.[32]

[30] 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 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.

[31] In Maryland and California, for example, out-of-network physicians cannot bill more than the greatest of either their in-network payments, a fixed percentage of Medicare payments, or physicians' usual and customary charges.

[32] When patients attend a hospital ED, they have no choice over the physician that treats them. As a result, once a patient decides to attend a hospital ED, the patient cannot avoid out-of-network physicians working in that ED. Previous researchers have used this feature of emergency medicine

Insurers

We denote the equilibrium negotiated price as p^*. We abstract from all other revenue and costs of the insurer and simply define r to be the insurer's net revenue per patient without any ED physician cost. Thus, the net benefit of a representative enrollee to the plan is r less the cost of the ED physician. If the physician group and the insurer agree to a contract at p^*, the insurer gets:

$$U_{i,IN} = r - p^*. \tag{3}$$

If the two parties do not agree, then the physician group begins billing its charges, which are higher than negotiated network rates. The insurer may take advantage of any state law to reduce those physician charges, but the laws result in an effective price received by the physicians of p^L. We assume that the insurer ends up paying some fraction γ, less than one of the new out-of-network price p^L. We will treat γ as exogenous in our model.[33] The net insurer payoff under disagreement is thus:

$$U_{i,OUT} = r - \gamma p^L. \tag{4}$$

A second difference under disagreement is that now the physicians also collect the balance of the payment from the patient, who earns a disutility payoff $W((1-\gamma)p^L) < 0$. The patient blames the hospital for the balance bill so the hospital suffers harm to its reputation of k_h. Throughout the model, when we use the term "out-of-network billing" we are referring to physicians using the deliberate strategy of raising charges by a significant amount in order to earn higher payments. It is perfectly possible for an ED physician group to not have a contract with a patient's insurer (perhaps due to transaction costs) and to charge that patient a typical in-network price. We assume, as is the case in our data, that in this situation the patient and the insurer will share costs in the usual way and there are no disputes. We further assume that in that case there is no reputational cost to the hospital. While this setting is technically also "out-of-network billing," we exclude it from the definition in our discussion below in order to focus on the deliberate strategy of raising prices.

as a source of random variation in physician assignment (see Barnett, Olenski, and Jena 2017).

[33] It could be that γ is determined by state laws and norms as well as by competition in the insurer market. We assume that frictions in the physician ED market are too small to create any feedback to insurance competition.

Hospitals

We assume that hospitals understand when their outsourcing firm will be taking advantage of patients and insurers with an out-of-network billing strategy. Hospitals appreciate that the management company cannot carry out its strategy without access to the ED, and therefore the hospital will be able to bargain to keep a share of the increased profits generated by the outsourcing firm. These profits could take the form of physicians allowing the hospital to share in the physicians' profits (e.g., with a joint venture) or through a reduction in any management fees that a hospital would have to pay a firm to staff their ED. The payment could alternatively be generated by increases in facility fees that result from increased testing rates, imaging rates, or admissions to the hospital. By ordering these services, ED physicians have significant influence over hospitals' revenue. However, increased ordering of services that are not medically necessary exposes physicians to legal liability.

Because the hospital can block an out-of-network billing strategy, it must be compensated for the reputational loss it incurs from having this practice occur inside its facility. We assume that an outsourcing firm can pay a fixed amount $c > k_h$ to satisfy the hospital.[34] Physicians also have the ability to generate payment c to the hospital without it coming from the physician's own pocket. This could occur via potentially unnecessary activities A such as ordering additional lab testing, imaging studies, or raising the rates that patients are admitted to the hospital. Increasing these activities does not generate revenue for the physician, but it does generate revenues to the hospital. Engaging in activity A carries with it some legal risk indicated by $R(A)$, (with $R'(A) > 0$, $R(0) = 0$), since it may involve giving medically unnecessary care which could be found to violate laws or regulations. A more complex model could make c endogenous and allow outsourcing firms to compete by increasing it, but we do not take on that topic in this paper.

We also assume the hospital does not face any cost of higher-priced in-network billing. We think this is a reasonable assumption because it is hard for patients to observe counterfactual prices and patients perceive they are 'covered' in these circumstances. That is, the level of p^* paid to ED physicians when they participate in an insurer's network does not affect the hospital's payoff. Hospitals value consumer

[34] We recognize a possible role for asymmetric information. A hospital may not realize the strategy of the outsourcing firm *ex ante*. An uniformed hospital may sign a contract that is later terminated when the hospital realizes its patients are receiving balance bills and the reputational cost is high. For example, the Los Alamos Medical Center began contracting with EmCare in 2012 (DeRoma 2012). Several years later, the hospital ended their contract with the hospital over concerns about out-of-network billing and coding practices.

welfare with weight α_h. If a hospital hires an out-of-network group to staff its ED, hospital utility changes by:

$$\Delta U_h = (c - k_h) + \alpha_h W((1-\gamma)p^L), \tag{5}$$

which represents its incremental financial earnings less the dollar value of the disutility of patients. The hospital will only agree to out-of-network billing if its weight α_h on patients is sufficiently low. Recall that $W < 0$ and $c > k_h$, so α_h will be positive but smaller, all else equal, for hospital willing to engage in out-of-network billing:

$$\alpha_h < (c - k_h)/(-W((1-\gamma)p^L). \tag{6}$$

If a hospital experiences a very high reputational or other cost to hosting a physician group engaged in an out-of-network billing strategy, physician groups will find it expensive to locate their strategy in that hospital and will tend to locate elsewhere. In the empirical section of the paper we will identify the characteristics of hospitals that have high out-of-network prevalence and contract with firms that engage in an out-of-network billing strategy.

Physicians

A physician group faces a choice of strategy. It can end all its contracts with insurers and collect p^L for its services while compensating the hospital c (or engaging in A) and bearing the disutility from financially harming patients. Out-of-network billing from a patient's doctor results in disutility to that patient of $W((1-\gamma)p^L)$ which the physicians take into account with a weight α_p. Alternatively, the physician group can join insurer networks for p^* and avoid all hospital payments and patient disutility. (In our model consumer welfare, W, is constant at zero across in-network prices because we assume the equilibrium impact of out-of-network billing on premiums takes place slowly over time and is not perceived by consumers within our game.)

Physicians value profits, consumer welfare, and legal risk with weights as noted below. Profit is the negotiated price times a fixed quantity of patients less any financial costs due to the physician group's choice. We model patient numbers as fixed because of the almost inelastic response of patients described above. If out-of-network status is chosen, the group must either pay the hospital the financial cost c or bear risk $R(A)$, which is a decrement to the physicians' utility weighted by β_p. Physician per patient utility (the number of patients is fixed) when bargaining fails is:

$$U_{p,OUT}(\pi, W, A) = p^L + \alpha_p W((1-\gamma)p^L) - \min\{c, \beta_p R(A)\}. \tag{7}$$

We assume that everywhere physicians' gain from an additional dollar increase in p^L is larger than their utility loss from the harm to consumers. Physicians' increased utility from income can be offset by harm to consumers, but not reversed. This is particularly plausible when γ is large, which is the case in our setting.[35] We therefore assume $|\alpha_p W'| < 1$.

When bargaining succeeds and the physician group is in-network at the hospital, its utility is:

$$U_{p,IN}(\pi, W, A) = p^*. \tag{8}$$

We assume equal bargaining power for the two parties. The Nash bargaining expression is therefore the product of the gains from agreement for both parties:

$$[U_{p,OUT} - U_{p,IN}] * [U_{i,IN} - U_{i,OUT}]. \tag{9}$$

Which can equivalently be written:

$$[p^* - p^L + \alpha_p W((1-\gamma)p^L) - \min\{c, \beta_p R(A)\}] * [\gamma p^L - p^*]. \tag{10}$$

We assume bargaining strengths are equal and therefore p^* will split any difference between the two outside options. If the following holds:

$$U_{p,OUT}(\pi, W, A) = p^L + \alpha_p W((1-\gamma)p^L) - \min\{c, \beta_p R(A)\} \geq \gamma p^L, \tag{11}$$

then there are no gains from a contract and the physician group will stay out-of-network. On the other hand, if:

$$U_{p,OUT}(\pi, W, A) = p^L + \alpha_p W((1-\gamma)p^L) - \min\{c, \beta_p R(A)\} < \gamma p^L, \tag{12}$$

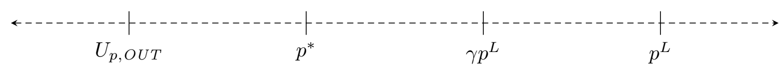
then we expect an equilibrium p^*:

$$p^* = [p^L + \alpha_p W((1-\gamma)p^L) - \min\{c, \beta_p R(A)\} - \gamma p^L]/2 \tag{13}$$

The intuition for the case where an in-network price is possible is graphed below.

[35] Few consumers have savings to pay a large medical bill and therefore the fraction of it that can be actually collected by physicians is relatively small.

The key condition that allows this outcome is that physicians' net utility for being out-of-network is low, either because of concern for patient welfare or because the hospital's reputational cost, and therefore transfer, is high. Alternatively, there is no scope for agreement if $U_{p,OUT}$ (measured in dollars) lies above γp^L on the line below, either because physicians are not concerned about putting patients in a bad situation or hospital reputation costs are low. The model does not include heterogeneity in consumers because our data do not allow us to examine that. However, the balance billing strategy may be even more profitable if it allows the physician to price discriminate by collecting a higher fraction of charges from the wealthy and well-insured.



The insurer's outside option (γp^L) is not specific to an insurer but is constant across all insurers due to state law. In particular, equilibrium p^* will fall in between the two outside options when $U_{p,OUT}$ is low enough. In this situation if the law or other forces raise the insurer's out-of-network payment, the equilibrium negotiated price will increase. We can check if an increase in p^L will raise the equilibrium negotiated rate by taking the derivative of the expression for p^* with respect to p^L and asking if it is positive.

$$1 - \gamma + (1 - \gamma)\alpha_p W' > 0 \tag{14}$$

We know W' is negative (a higher payment paid by consumers makes their utility more negative) and we also know $|\alpha_p W'| < 1$ by our assumption above. Since $(1 - \gamma)$ is positive, the derivative is therefore positive.

It is instructive to look at the case where physicians put no weight on legal risk or patient disutility. In that situation the physician payoff is p^L (they choose activity A and do not pay c) and there is nothing the insurer can offer as an in-network price that will be attractive. The physicians will stay out of the network, insurers will pay γp^L and patients will pay the balance. As physicians' disutility for risk, c, and weight on patients all rise, the outside option for the physician group becomes worse and eventually will fall below γp^L whereupon there is scope for an in-network rate that benefits both sides.

The question of whether out-of-network physician groups will choose to pay c or instead engage in activity A depends on which is less costly to the doctors. Their costs depend on their risk tolerance β_p. Physician groups with low α_p and high β_p

want to choose the out-of-network strategy but do not want the risk of activity A and therefore must pay the hospital directly. Physician groups with low α_p and low will β_p choose the out-of-network billing strategy for the additional profit, and pay the hospital through activity A which they find relatively cheap compared to giving up profit.

Appendix 3 Variables Used in Lasso in Section 5.2

	Description	Source
aha_admtot	Total facility admissions	AHA
aha_births	Total births (excluding fetal deaths)	AHA
aha_c_g	Government	AHA
aha_c_np	Non-profit	AHA
aha_fte	Full-time equivalent total personnel	AHA
aha_ftelpn	Full-time equivalent licensed practical or vocational nurses	AHA
aha_ftemd	Full-time equivalent physicians and dentists	AHA
aha_fteoth94	Full-time equivalent all other personnel	AHA
aha_fteres	Full-time equivalent medical and dental residents and interns	AHA
aha_ftern	Full-time equivalent registered nurses	AHA
aha_ftetran	Full-time equivalent other trainees	AHA
aha_ftettrn	Full-time equivalent total trainees	AHA
aha_ftlab	Full-time lab technicians	AHA
aha_ftlpntf	Full-time licensed nurses	AHA
aha_ftmdtf	Full-time physicians and dentists	AHA
aha_ftres	Full-time medical and dental residents and interns	AHA
aha_fttoth	Total full-time hospital unit personnel	AHA
aha_fttotlt	Total full-time nursing home personnel	AHA
aha_fttran84	Full-time other trainees	AHA

Continued on next page

	Description	Source
aha_hcount_15m	Hospital count 15m	AHA
aha_hmocon	Number of HMO contracts	AHA
aha_hospbd	Total hospital beds	AHA
aha_mapp1	Accreditation by JCAHO	AHA
aha_mapp10	Medicare certification	AHA
aha_mapp11	Accreditation by American Osteopathic Association	AHA
aha_mapp12	Internship approved by AOA	AHA
aha_mapp13	Residency approved by AOA	AHA
aha_mapp16	Catholic church operated	AHA
aha_mapp19	Rural referral center	AHA
aha_mapp2	Cancer program approved by ACS	AHA
aha_mapp20	Sole community provider	AHA
aha_mapp21	DNV healthcare accreditation	AHA
aha_mapp3	Residency training approval	AHA
aha_mapp5	Medical school affiliation	AHA
aha_mapp6	Hospital-controlled professional nursing school	AHA
aha_mapp7	Accreditation by CARF	AHA
aha_mapp8	Teaching hospital	AHA
aha_mapp9	Blue Cross contracting or participating	AHA
aha_mcddc	Total facility Medicaid discharges	AHA
aha_mcdipd	Total facility Medicaid days	AHA

Continued on next page

	Description	Source
aha_mcrdc	Total facility Medicare discharges	AHA
aha_npayben	Total facility employee benefits	AHA
aha_paytot	Facility payroll expenses	AHA
aha_prop_caid	Proportion Medicaid	AHA
aha_prop_care	Proportion Medicare	AHA
aha_ptlab	Part-time laboratory technicians	AHA
aha_ptlpntf	Part-time licensed practical or vocational nurses	AHA
aha_ptmdtf	Part-time physicians and dentists	AHA
aha_ptphr	Part-time pharmacists, licensed	AHA
aha_ptpht	Part-time pharmacy technicians	AHA
aha_ptrad	Part-time radiology technicians	AHA
aha_ptres	Part-time medical and dental residents and interns	AHA
aha_ptresp	Part-time respiratory therapists	AHA
aha_pttoth	Total part-time hospital unit personnel	AHA
aha_pttotlt	Total part-time nursing home personnel	AHA
aha_pttran84	Part-time other trainees	AHA
aha_sunits	Separate nursing home	AHA
aha_suropip	Inpatient surgical operations	AHA
aha_suroptot	Total surgical operations	AHA
aha_syshhi_15m	Hospital 15m HHI	AHA
aha_techtotal	Technology	AHA

Continued on next page

	Description	Source
aha_vem	Emergency room visits	AHA
aha_vtot	Total outpatient visits	AHA
eop_cs00_seg_inc	Income segregation	Equality of Opportunity Project
eop_cs_divorced	Fraction of divorced adults	Equality of Opportunity Project
eop_cs_elf_ind_man	Manufacturing employment share	Equality of Opportunity Project
eop_cs_fam_wkidsinglemom	Fraction of children with single mothers	Equality of Opportunity Project
eop_cs_labforce	Labor participation rate	Equality of Opportunity Project
eop_cs_married	Fraction of adults married	Equality of Opportunity Project
eop_cs_race_bla	Fraction black	Equality of Opportunity Project
eop_cs_race_theil_2000	Theil Index of racial segregation	Equality of Opportunity Project
eop_frac_traveltime_lt15	Fraction with commute less than 15 minutes	Equality of Opportunity Project
eop_gini	Gini (includes top 1%)	Equality of Opportunity Project
eop_hhinc00	Household Income	Equality of Opportunity Project
eop_inc_share_1perc	Top 1% income share	Equality of Opportunity Project
eop_incgrowth0010	Income growth, 2000-2006/10	Equality of Opportunity Project
eop_intersects_msa	Urban indicator	Equality of Opportunity Project
eop_mig_inflow	Migration inflow rate	Equality of Opportunity Project
eop_mig_outflow	Migration outflow rate	Equality of Opportunity Project
eop_rel_tot	Fraction religious	Equality of Opportunity Project
eop_subcty_expend	Local government expenditures per capita	Equality of Opportunity Project
eop_taxrate	Local tax rate	Equality of Opportunity Project

Continued on next page

	Description	Source
hli_hhi_all	Insurer HHI	Health Leader Interstudy
hli_share	Insurer share of market	Health Leader Interstudy
cen_countypop	County population	US Census Bureau
ska_ed_phys_per_capita	ED physicians per capita	SK&A
ska_phys_per_capita	Physicians per capita	SK&A
emcare_hosp	Indicator for EmCare hospitals	Internal

Notes: AHA: American Hospital Association Annual Survey. Equality of Opportunity Project: Selected variables from (http://www.equality-of-opportunity.org/data/). Health Leader Interstudy: Data from US Managed Market Solutions, formerly Health Leader Interstudy. SK&A: Healthcare database with list of physicians for marketing purposes. Internal: See Appendix Figure A.1. These are all variables that may be selected from the Lasso. Hospitals missing any of these variables or not appearing in all 5 years of the data are not included. A total of 3,340 unique hospitals are included.

Appendix 4 Surprise Billing Forms from New York State

New York State Out-of-Network Surprise Medical Bill

You may not be responsible for a surprise bill for out-of-network services

A "Surprise Bill" is when you have insurance coverage issued in the State of NY:

Hospital or surgical centers: You are a patient at a participating hospital or ambulatory surgical center and you receive services for which:

- A network doctor was not available
- An out-of-network doctor provided without your knowledge
- Unforeseen medical circumstances arose at the time the health care services were provided.

It will not be a surprise bill if you chose to receive services from an out-of-network doctor instead of form an available network doctor.

Referrals: Your network doctor did not ask your consent to refer you to an out-of-network doctor, lab or other health care provider, and did not tell you it would result in costs not covered by your health plan.

An independent dispute resolution entity (IDRE) can determine if you need to pay the bill. You, the plan or your doctor may request an independent dispute resolution (IDR) for surprise bills and referrals. Use the form on the next page to submit your request. You do not have to pay the bill in order to be eligible to submit the dispute for review to an IDRE.

Dispute resolution prices

1. **Submit your request for independent review:** Complete the form on the next page. You can call Customer Service if you need help completing the form. The phone number is on you ID card. You may mail the form to us at:

   Consolidated Health Plans
   2077 Roosevelt Ave.
   Springfield, MA 01104

   Or send the form electronically to:
   customerservice@consolidatedhealthplan.com

2. **An independent dispute resolution entity (IDRE) approved by the State of New York will screen your request for eligibility.**

   If the IDRE needs more information, it will contact the health plan or health care provider. If the requested information is not submitted with three business days, or if the application is not eligible, the IDRE will reject the application.

3. **The IDRE will send a letter to the person who initiated the request (you, the doctor, CHP)**

   The letter will include

   - A request for the information needed to complete the review
   - A request for any additional information that may be available to support the request
   - Where to send the information

4. **You must submit any requested information within five business days of receiving the letter**

   If IDRE receives a partial response or no response, the dispute will be decided based on the available information. You cannot ask for reconsideration by submitting additional information after the decision is made.

5. **The IDRE will make a determination within 30 days of receiving the request**

   If IDRE feels either the provider's bill or the health plan's coverage policy is extreme, it may direct them to attempt a good faith negotiation for settlement. They will have up to ten business days for this negotiation.

   A neutral and impartial reviewer with training and experience in health care billing, reimbursement, and usual and customary charges will review the dispute. The IDRE will forward copies of its decision to the health plan, the physician, superintendent, and as applicable, the nonparticipating referred health care provider and the patient, within two business days of making the decision.

New York State Out-of-Network Surprise Medical Bill Assignment of Benefits Form

Use this form if you receive a surprise bill for health care services and want the services to be treated as in network. To use this form, you must: (1) fill it out and sign it; (2) send a copy to your health care provider (include a copy of the bill or bills); and (3) send a copy to your insurer (include a copy of the bill or bills). If you don't know if it is a surprise bill, contact the Department of Financial Services at 1-800-342-3736.

A surprise bill is when:

1. You received services from a nonparticipating physician at a participating hospital or ambulatory surgical center, where a participating physician was not available; or a nonparticipating physician provided services without your knowledge; or unforeseen medical circumstances arose at the time the services were provided. You did not choose to receive services from a nonparticipating physician instead of from an available participating physician; OR
2. You were referred by a participating physician to a nonparticipating provider, but you did not sign a written consent that you knew the services would be out-of-network and would result in costs not covered by your insurer. A referral occurs: (1) during a visit with your participating physician, a nonparticipating provider treats you; or (2) your participating physician takes a specimen from you in the office and sends it to a nonparticipating laboratory pathologist; or (3) for any other health care services when referrals are required under your plan.

I assign my rights to payment to my provider and I certify to the best of my knowledge that:

I (or my dependent/s) received a surprise bill from a health care provider. I want the provider to seek payment for this bill from my insurance company (this is an "assignment"). I want my health insurer to pay the provider for any health care services I or my dependent/s received that are covered under my health insurance. With my assignment, the provider cannot seek payment from me, except for any copayment, coinsurance or deductible that would be owed if I or my dependent/s used a participating provider. If my insurer paid me for the services, I agree to send the payment to the provider.

Your name: ______________________________

Your Address: ______________________________

Insurer Name: ______________________________

Your Insurance ID No: ______________________________

Provider Name: ____________________ Provider Phone Number: ____________

Provider Address: ______________________________

Date of Service: ______________________________

Any person who knowingly and with intent to defraud any insurance company or other person files and application for insurance or statement of claim containing any materially false information, or conceals for the purpose of misleading, information concerning any fact thereto, commits a fraudulent insurance act, which is a crime, and shall also be subject to a civil penalty not to exceed five thousand dollars and the stated value of the claim for each such violation.

____________________ ____________________

(Signature of patient) (Date of signature)

Appendix Table A.1: ED Episode Descriptive Statistics

	Mean	SD	Min	P10	P25	P50	P75	P90	Max
Physician Payment	404.44	313.94	48.19	104.53	178.91	308.24	533.96	856.76	1,617.59
Physician Charge	603.49	378.27	105.00	220.28	326.51	509.60	773.05	1,116.87	2,113.93
Physician Insurer Payment	347.45	304.91	0.00	44.18	132.55	266.31	474.60	774.91	1,617.59
Physician Patient Payment	56.98	112.46	0.00	0.00	0.00	0.00	64.11	181.66	669.16
Potential Balance Bill	337.62	313.83	0.00	48.26	117.96	237.51	468.89	751.59	2,006.55
Facility Payment	2,797.89	5,121.69	116.88	392.96	677.00	1,117.80	2,373.00	6,261.15	35,736.79
Facility Charge	6,519.47	12,770.32	169.00	542.71	1,046.39	2,282.88	5,695.04	15,017.15	88,819.04
Facility Insurer Payment	2,396.18	4,970.15	0.00	0.00	361.09	846.67	1,964.17	5,525.53	35,736.79
Facility Patient Payment	401.71	570.96	0.00	0.00	101.72	197.31	436.35	1,061.74	3,301.67
Admissions	0.09	0.29	0	0	0	0	0	0	1
Imaging	0.28	0.45	0	0	0	0	1	1	1
Length of Stay	0.58	1.97	0	0	0	0	0	1	30
CPT 99281	0.05	0.21	0	0	0	0	0	0	1
CPT 99282	0.13	0.34	0	0	0	0	0	1	1
CPT 99283	0.48	0.50	0	0	0	0	1	1	1
CPT 99284	0.50	0.50	0	0	0	0	1	1	1
CPT 99285	0.35	0.48	0	0	0	0	1	1	1
Hispanic	0.08	0.28	0	0	0	0	0	0	1
Black	0.10	0.30	0	0	0	0	0	1	1
White	0.48	0.50	0	0	0	0	1	1	1
Year of Birth 1947-1954	0.09	0.28	0	0	0	0	0	0	1
Year of Birth 1955-1959	0.09	0.28	0	0	0	0	0	0	1
Year of Birth 1960-1964	0.09	0.29	0	0	0	0	0	0	1
Year of Birth 1965-1969	0.09	0.28	0	0	0	0	0	0	1

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Appendix Table A.1: ED Episode Descriptives (continued)

	Mean	SD	Min	P10	P25	P50	P75	P90	Max
Year of Birth 1970-1974	0.09	0.28	0	0	0	0	0	0	1
Year of Birth 1975-1979	0.08	0.27	0	0	0	0	0	0	1
Year of Birth 1980-1984	0.08	0.27	0	0	0	0	0	0	1
Year of Birth 1985-1989	0.08	0.27	0	0	0	0	0	0	1
Year of Birth 1990-1996	0.13	0.33	0	0	0	0	0	1	1
Year of Birth 1997-2005	0.10	0.30	0	0	0	0	0	0	1
Year of Birth 2006-2015	0.10	0.30	0	0	0	0	0	0	1
6-month Charlson Scores	0.33	0.92	0	0	0	0	0	1	6
12-month Charlson Scores	0.45	1.06	0	0	0	0	0	2	6
6-month Spending	6,248	17,195	0	0	149	757	3,547	14,253	115,499
12-month Spending	11,481	27,904	0	115	523	2,086	8,231	27,170	178,297
Episodes per Hospital	2,665	3,821	60	190	442	1,176	3,279	6,964	47,599

Notes: These are the descriptive statistics for all ED cases in our data. These are limited to cases that occurred at in-network hospitals. Payment and charges are winsorized at the top and bottom one percentiles. Payments and charges are also inflation adjusted into 2015 dollars using the BLS All Consumer Price Index.

Appendix Table A.2: The Impact of EmCare Entry and Exit on Hospitals' Prevalence of Out-of-Network ED Physician Billing Across Different Control Groups

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Hospitals with OON Prevalence Below 90% Prior to Entry			Hospitals with OON Prevalence Above 90% Prior to Entry			All Hospitals		
	EmCare Entry			EmCare Entry			EmCare Exit		
	OON Indicator			OON Indicator			OON Indicator		
EmCare Entry/Exit	0.828***	0.843***	0.781***	-0.027	-0.010	-0.025	-0.765***	-0.762***	-0.749***
	(0.060)	(0.061)	(0.061)	(0.043)	(0.044)	(0.053)	(0.077)	(0.081)	(0.085)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	0.060	0.060	0.060	0.995	0.995	0.995	1.000	1.000	1.000
Mean Non-EmCare	0.229	0.284	0.319	0.229	0.284	0.319	0.229	0.284	0.319
Observations	8,362,441	3,841,374	110,887	8,386,032	3,864,965	134,478	8,323,064	3,801,997	71,510
Control	All Non-EmCare Hospitals	Hospitals in Same State	Propensity Score Match	All Non-EmCare Hospitals	Hospitals in Same State	Propensity Score Match	All Non-EmCare Hospitals	Hospitals in Same State	Propensity Score Match

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1) separately on hospitals with out-of-network (OON) prevalence below 90 percent (Columns 1-3) and above 90% (Columns 4-6) where EmCare entered. We also estimate Equation (1) for the exit of EmCare from hospitals in Columns (7-9). 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 for Columns (1,4,7) are all hospitals in the US that did not outsource their ED management to EmCare. The control groups for Columns (2,5,8) are all hospitals in same states as the treated hospitals, excluding hospitals that outsourced their ED services to EmCare. The control groups in Columns (3,6,9) are hospitals matched to treated hospitals using propensity scores calculated using entry as predicted by a treated hospital's beds, technology, and non-profit/for-profit status. 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.

Appendix Table A.3: The Impact of EmCare Entry on Physician Payments and RVU

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Work RVUs	Physician Charges					Total Payments				
	All ED CPT	CPT 99281	CPT 99282	CPT 99283	CPT 99284	CPT 99285	CPT 99281	CPT 99282	CPT 99283	CPT 99284	CPT 99285
EmCare Entry	0.21***	-15.80	231.40***	297.00***	405.99***	521.09***	-9.88	206.66***	277.68***	385.48***	481.65***
	(0.07)	(10.05)	(18.40)	(28.74)	(39.50)	(68.13)	(11.46)	(14.90)	(29.71)	(31.19)	(67.00)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	2.35	122.92	172.49	301.30	482.30	759.64	93.32	143.62	254.11	392.63	608.40
Mean Non-EmCare	2.50	129.59	179.18	303.02	490.32	750.47	71.48	104.41	198.84	332.80	536.96
Observations	8,375,188	27,543	304,195	2,452,057	2,809,866	2,593,849	27,543	304,195	2,452,057	2,809,866	2,593,849
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	All Non-EmCare Hospitals	All Non-EmCare Hospitals	All Non-EmCare Hospitals	All Non-EmCare Hospitals

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1). We test the impact of EmCare entry on physicians' work RVU (Column (1)), physician charges per CPT (Columns (2) - (6)), and physicians' allowed amounts per CPT (Columns (7) - (11)).The control groups for all columns are all hospitals in the US that did not outsource their ED management to EmCare. Standard errors are clustered around hospitals. Means are drawn from the analytic sample population underlying the regression.

Appendix Table A.4: The Impact of EmCare Entry on Physicians' Payments, Coding, and Volume Using Control Hospitals from the Same State

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Physician Charge	Total Payment	Insurer Payment	Patient Cost Sharing	Potential Balance Bill	CPT High Severity	Patients Treated Annually
EmCare Entry	483.92***	440.76***	392.89***	47.87***	460.21***	0.117***	-66
	(58.27)	(44.37)	(43.50)	(3.85)	(51.71)	(0.026)	(164)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	470.39	383.79	333.55	50.24	224.33	0.242	1,616
Mean Non-EmCare	502.10	357.92	312.61	45.31	235.62	0.334	1,546
Observations	3,909,775	3,909,775	3,909,775	3,909,775	3,909,775	3,909,775	3,909,775
Control	Hospitals in Same State	Hospitals in Same State	Hospitals in Same State	Hospitals in Same State	Hospitals in Same State	Hospitals in Same State	Hospitals in Same State

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1) where the EmCare event is the entry of EmCare into a hospital. Each observation is a patient episode. The control group in all regressions includes hospitals from the same state as the hospitals where EmCare entry occurred. 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. All dollar amounts are inflation adjusted into 2015 dollars.

Appendix Table A.5: The Impact of EmCare Entry on Physicians' Payments, Coding, and Volume Using Control Hospitals Matched Via Propensity Score Weighting

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Physician Charge	Total Payment	Insurer Payment	Patient Cost Sharing	Potential Balance Bill	CPT High Severity	Patients Treated Annually
EmCare Entry	446.20***	398.99***	362.88***	36.10***	426.01***	0.105***	-135
	(62.66)	(52.27)	(49.27)	(5.54)	(57.24)	(0.027)	(144)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	470.39	383.79	333.55	50.24	224.33	0.242	1,616
Mean Non-EmCare	540.04	371.28	326.77	44.51	271.10	0.347	762
Observations	179,288	179,288	179,288	179,288	179,288	179,288	179,288
Control	Propensity Score Match	Propensity Score Match	Propensity Score Match	Propensity Score Match	Propensity Score Match	Propensity Score Match	Propensity Score Match

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1) where the EmCare event is the entry of EmCare into a hospital. Each observation is a patient episode. The control groups are composed of hospitals matched to treated hospitals using propensity scores calculated using entry as predicted by a treated hospital's beds, technology, and non-profit/for-profit status. 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. All dollar amounts are inflation adjusted into 2015 dollars.

Appendix Table A.6: Physician Payment Rates for ED Visits

	Mean	S.D.	P25	P50	P75	Max
In-Network ED Physician Payment	\$320.62	\$234.42	\$153.67	\$262.02	\$413.72	\$1,617.59
(Percent Medicare)	(266%)					
Out-of-Network ED Physician Charge	\$771.31	\$435.22	\$433.00	\$669.16	\$997.26	\$2,113.93
(Percent Medicare)	(637%)					

Notes: We limit our data to hospitals with more than 10 episodes per year from 2011 to 2015. Physician charges and payments are winsorized at the top and bottom percentile. Prices are inflation adjusted using the BLS All Consumer Price Index.

Appendix Table A.7: The Impact of EmCare Entry on Hospitals' Payments, and Behavior Using Control Hospitals from the Same State

	(1)	(2)	(3)	(4)	(5)	(6)
	Facility Charge	Total Payment	Insurer Payment	Patient Cost Sharing	Imaging	Admission to Hospital
EmCare Entry	1,209.14***	198.88**	156.39*	42.49***	0.010**	0.015***
	(327.56)	(91.13)	(80.98)	(13.95)	(0.004)	(0.005)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	7,566.25	2,719.70	2,308.49	411.21	0.283	0.079
Mean Non-EmCare	6,086.93	2,787.99	2,423.90	364.09	0.271	0.092
Observations	3,909,775	3,909,775	3,909,775	3,909,775	3,909,775	3,909,775
Control	Hospitals in Same State	Hospitals in Same State	Hospitals in Same State	Hospitals in Same State	Hospitals in Same State	Hospitals in Same State

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1) where the EmCare event is the entry of EmCare into a hospital. Each observation is a patient episode. The control group in all regressions includes hospitals from the same state as the hospitals where EmCare entry occurred. 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. Standard errors are clustered around hospitals. Means are drawn from the analytic sample population underlying the regression. All dollar amounts are inflation adjusted into 2015 dollars.

Appendix Table A.8: The Impact of EmCare Entry on Hospitals' Payments, and Behavior Using Control Hospitals Matched Via Propensity Score Weighting

	(1)	(2)	(3)	(4)	(5)	(6)
	Facility Charge	Total Payment	Insurer Payment	Patient Cost Sharing	Imaging	Admission to Hospital
EmCare Entry	1,054.61***	182.88*	149.99	32.89**	0.009	0.011**
	(305.89)	(98.48)	(90.02)	(15.27)	(0.006)	(0.005)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	7,566.25	2,719.70	2,308.49	411.21	0.283	0.079
Mean Non-EmCare	6,662.51	2,544.25	2,193.96	350.28	0.280	0.095
Observations	179,288	179,288	179,288	179,288	179,288	179,288
Control	Propensity Score Match	Propensity Score Match	Propensity Score Match	Propensity Score Match	Propensity Score Match	Propensity Score Match

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1) where the EmCare event is the entry of EmCare into a hospital. Each observation is a patient episode. The control groups are composed of hospitals matched to treated hospitals using propensity scores calculated using entry as predicted by a treated hospital's beds, technology, and non-profit/for-profit status. 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. Standard errors are clustered around hospitals. Means are drawn from the analytic sample population underlying the regression. All dollar amounts are inflation adjusted into 2015 dollars.

Appendix Table A.9: Comparison of Entry Hospital Characteristics and EmCare Hospitals We Observe in the Cross-section

Hospital Characteristics	EmCare Hospitals	EmCare Entry Hospitals	P-value from two-sided t-test
For-profit	0.45	0.47	0.80
Non-profit	0.32	0.33	0.91
Government	0.23	0.19	0.67
Teaching	0.03	0.00	0.26
Hospital Beds	151.31	181.06	0.31
Technologies	39.75	42.36	0.63
Hospital HHI	0.57	0.58	0.91
Proportion Medicare	49.54	48.67	0.72
Proportion Medicaid	17.92	20.04	0.22
ED Physicians per Capita (per 10,000)	0.67	0.66	0.83
Physicians per Capita (per 10,000)	21.52	20.08	0.09
Physician HHI	0.41	0.49	0.07
Insurer HHI	0.37	0.35	0.52
Household Income ($)	37,509.40	35,372.57	0.12
Gini Coefficient	0.33	0.33	0.67

Notes: The table compares the characteristics of hospitals where we observe EmCare enter to hospitals where we infer EmCare has a contract but cannot identify the entry date. The p-value is reported from a two-sided t-test comparing the difference in means between hospitals and hospitals with entry.

Appendix Table A.10: The Impact of EmCare Entry on the Historical Spending and Charlson Score of Treated ED Patients

	(1)	(2)	(3)	(4)
	6 month historical spending	12 month historical spending	6 month Charlson	12 month Charlson
EmCare Entry	820.39***	1,232.60***	0.02**	0.03***
	(225.46)	(392.17)	(0.01)	(0.01)
Hospital FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Mean EmCare	5,903.65	10,910.82	0.28	0.40
Mean Non-EmCare	6,251.32	11,483.54	0.33	0.45
Observations	8,430,842	7,066,887	8,430,842	7,066,887
Control	All Non-EmCare Hospitals	All Non-EmCare Hospitals	All Non-EmCare Hospitals	All Non-EmCare Hospitals

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1). Each observation is a patient episode. The control group in all regressions includes all hospitals in the US exclusive of those that outsourced their ED services to EmCare. We winsorized the top percentile of 6 and 12 month historical spending. Standard errors are clustered around hospitals.

Appendix Table A.11: The Impact of EmCare Entry on Coding Severity - Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Coding Severity	Coding Severity	Coding Severity	Coding Severity	Coding Severity	Coding Severity	Coding Severity	Coding Severity
EmCare Entry	0.116***	0.115***	0.114***	0.115***	0.118***	0.111***	0.116***	0.118***
	(0.026)	(0.026)	(0.026)	(0.025)	(0.029)	(0.026)	(0.026)	(0.027)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	0.242	0.242	0.242	0.224	0.341	0.206	0.232	0.299
Mean Non-EmCare	0.323	0.323	0.323	0.303	0.419	0.275	0.297	0.405
Observations	8,430,842	8,430,842	8,430,842	6,970,946	1,459,896	2,810,302	2,810,262	2,810,278
Control	No Controls	Patient Character-istics	Patient Character-istics and Charlson Score	Charlson Score of 0	Non-zero Charlson Score	Bottom Third of the Historical Spending Distribution	Middle Third of the Historical Spending Distribution	Upper Third of the Historical Spending Distribution

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1). Each observation is a patient episode. The control group in all regressions includes all hospitals in the US exclusive of those that outsourced their ED services to EmCare. We winsorized the top and bottom percentile of facility payments. Standard errors are clustered around hospitals. In columns 6,7, and 8 historical spending is split into thirds where each column contains the sample of patients from the bottom, middle, and upper third of spending.

Appendix Table A.12: The Impact of EmCare Entry on Facility Spending - Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Facility Spending	Facility Spending	Facility Spending	Facility Spending	Facility Spending	Facility Spending	Facility Spending	Facility Spending
EmCare Entry	246.01**	231.47**	220.11**	174.86**	497.51*	180.75**	189.07**	319.16**
	(98.91)	(93.93)	(91.49)	(71.45)	(282.07)	(89.91)	(89.22)	(130.52)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	2,719.70	2,719.70	2,719.70	2,487.18	4,060.67	2,430.92	2,491.94	3,344.15
Mean Non-EmCare	2,660.51	2,660.51	2,660.51	2,335.62	4,252.10	2,261.53	2,271.48	3,545.73
Observations	8,430,842	8,430,842	8,430,842	6,970,946	1,459,896	2,810,302	2,810,262	2,810,278
Control	No Controls	Patient Character-istics	Patient Character-istics and Charlson Score	Charlson Score of 0	Non-zero Charlson Score	Bottom Third of the Historical Spending Distribution	Middle Third of the Historical Spending Distribution	Upper Third of the Historical Spending Distribution

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1). Each observation is a patient episode. The control group in all regressions includes all hospitals in the US exclusive of those that outsourced their ED services to EmCare. We winsorized the top and bottom percentile of facility payments. Standard errors are clustered around hospitals. In columns 6,7, and 8 historical spending is split into thirds where each column contains the sample of patients from the bottom, middle, and upper third of spending.

Appendix Table A.13: The Impact of EmCare Entry on Hospital Imaging Performed in the ED - Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Imaging	Imaging	Imaging	Imaging	Imaging	Imaging	Imaging	Imaging
EmCare Entry	0.013***	0.011***	0.011***	0.011**	0.021**	0.013**	0.014**	0.008
	(0.004)	(0.004)	(0.004)	(0.005)	(0.009)	(0.006)	(0.007)	(0.005)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	0.283	0.283	0.283	0.278	0.314	0.261	0.276	0.321
Mean Non-EmCare	0.273	0.273	0.273	0.264	0.318	0.250	0.255	0.319
Observations	8,430,842	8,430,842	8,430,842	6,970,946	1,459,896	2,810,302	2,810,262	2,810,278
Control	No Controls	Patient Characteristics	Patient Characteristics and Charlson Score	Charlson Score of 0	Non-zero Charlson Score	Bottom Third of the Historical Spending Distribution	Middle Third of the Historical Spending Distribution	Upper Third of the Historical Spending Distribution

Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1). Each observation is a patient episode. The control group in all regressions includes all hospitals in the US exclusive of those that outsourced their ED services to EmCare. We winsorized the top and bottom percentile of facility payments. Standard errors are clustered around hospitals. In columns 6,7, and 8 historical spending is split into thirds where each column contains the sample of patients from the bottom, middle, and upper third of spending.

Appendix Table A.14: The Impact of EmCare Entry on Hospital Admissions from the ED - Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Admissions	Admissions	Admissions	Admissions	Admissions	Admissions	Admissions	Admissions
EmCare Entry	0.018***	0.018***	0.017***	0.013***	0.040***	0.010**	0.015***	0.028***
	(0.005)	(0.005)	(0.005)	(0.003)	(0.015)	(0.005)	(0.004)	(0.008)
Hospital FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean EmCare	0.079	0.079	0.079	0.064	0.165	0.062	0.067	0.115
Mean Non-EmCare	0.098	0.098	0.098	0.078	0.197	0.072	0.078	0.152
Observations	8,430,842	8,430,842	8,430,842	6,970,946	1,459,896	2,810,302	2,810,262	2,810,278
Control	No Controls	Patient Characteristics	Patient Characteristics and Charlson Score	Charlson Score of 0	Non-zero Charlson Score	Bottom Third of the Historical Spending Distribution	Middle Third of the Historical Spending Distribution	Upper Third of the Historical Spending Distribution

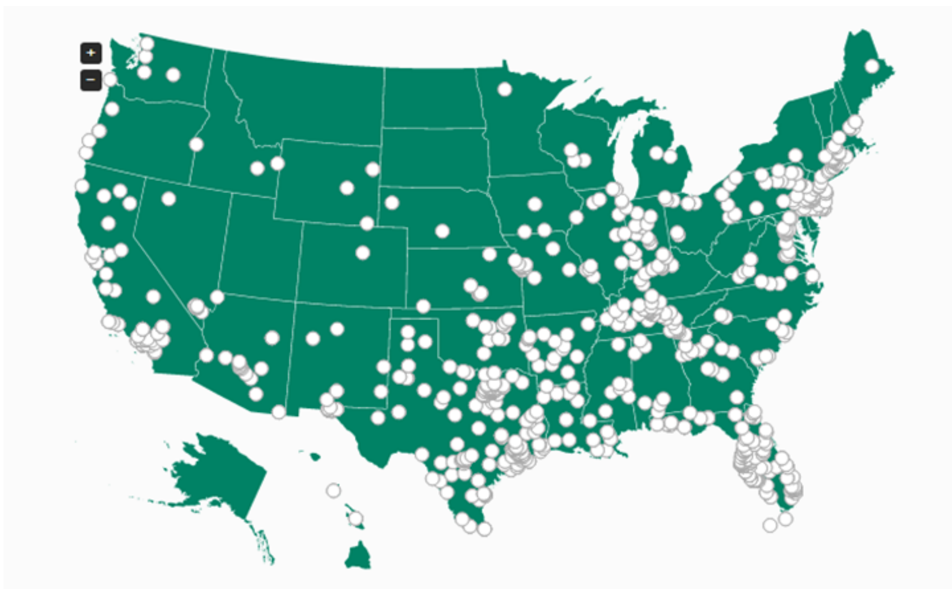
Notes: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. This table presents least-squares estimates of Equation (1). Each observation is a patient episode. The control group in all regressions includes all hospitals in the US exclusive of those that outsourced their ED services to EmCare. We winsorized the top and bottom percentile of facility payments. Standard errors are clustered around hospitals. In columns 6,7, and 8 historical spending is split into thirds where each column contains the sample of patients from the bottom, middle, and upper third of spending.

Appendix Table A.15: ED Episodes and Annual Physician and Facility Spending for Care in New York State

	Emergency Episodes	Total Facility Spending	Total Physician Spending	Percent ASO	Share of Episodes at In-Network Hospitals
2011	61,325	\$156,174,143	\$20,152,501	87.6%	99.0%
2012	69,406	\$176,099,801	\$23,549,516	89.2%	99.4%
2013	67,316	\$185,283,334	\$22,938,521	91.5%	99.6%
2014	65,388	\$187,270,755	\$21,558,206	92.1%	99.8%
2015	60,501	\$184,643,289	\$21,198,611	90.4%	99.8%
Total	323,936	\$889,471,321	\$109,397,356	90.2%	99.5%

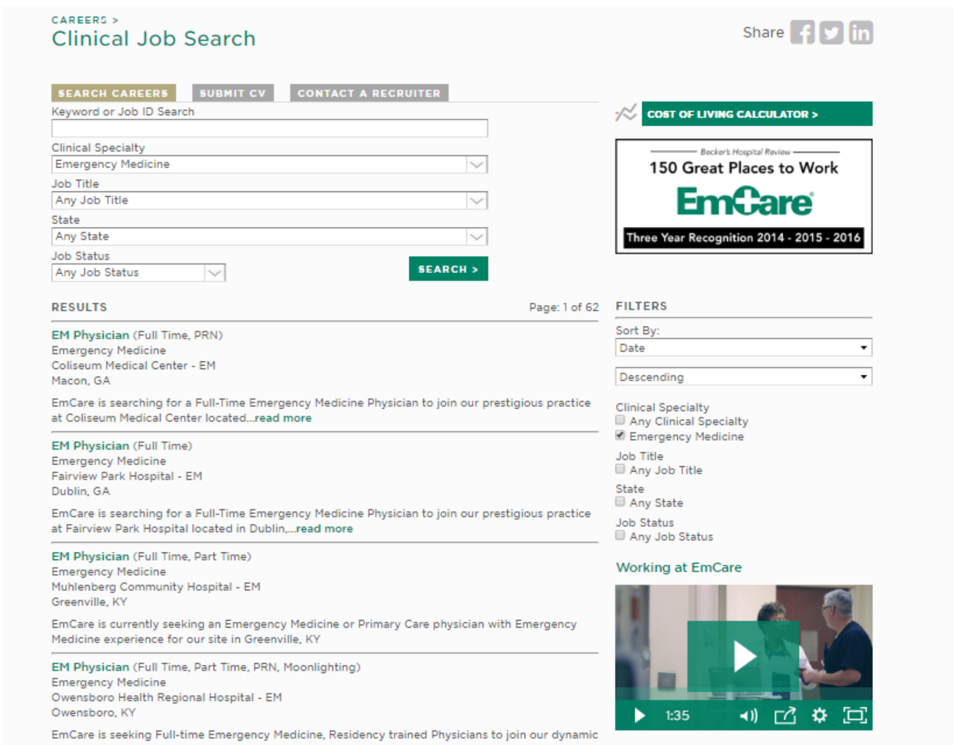
Notes: The table shows summary statistics for our data in New York State. Only episodes that occur in an in-network hospital are included. There are a small percentage of episodes ($>$ 0.5%) that are missing a label for ASO or fully-insured.

Appendix Figure A.1: Envision Healthcare (http://www.evhc.net/) Map of EmCare Contract Locations



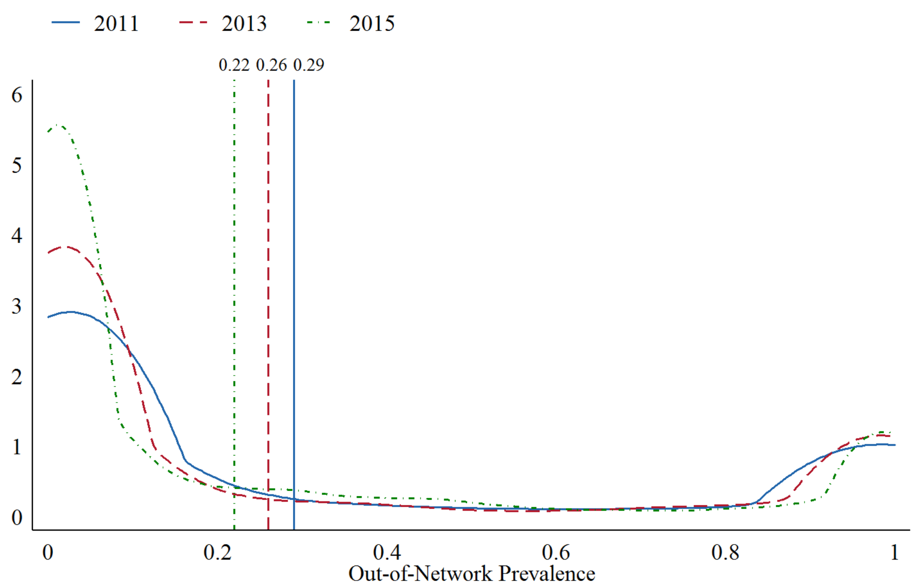
Notes: This map was taken from the webpage of EmCare's parent company Envision Healthcare (https://www.evhc.net/vision/emcare). To determine the hospital locations shown on this map, we used georeferencing in ArcGIS. Georeferencing takes an image or scanned photo without spatial reference information and aligns it to a map with a known coordinate system. In our case, we used a map of the United States (obtained from the US Census: (https://www.census.gov/geo/maps-data/data/cbf/cbf_state.html), and linked control points from the US map to the map of EmCare's locations. To link control points, the location of two identical points on each map are identified (for example, the southern tip of Florida). With several control points defined, the EmCare map is then warped and transformed to overlay directly onto the known US map. With the map in place, we mark the center of each dot as a hospital location. Because the map now has a defined coordinate system, we are able to obtain the latitude and longitude from these markers. We subsequently calculate each coordinate pair's distance to AHA-identified hospital coordinates, and keep hospitals that are within only a 30-mile radius from an AHA-identified hospital. We cross-validate our mapping with hospitals from EmCare's job listings page on their website. Our final list of hospitals only includes hospitals that are both identified from the map and appear in job listings.

Appendix Figure A.2: Sample EmCare Job Listing Page



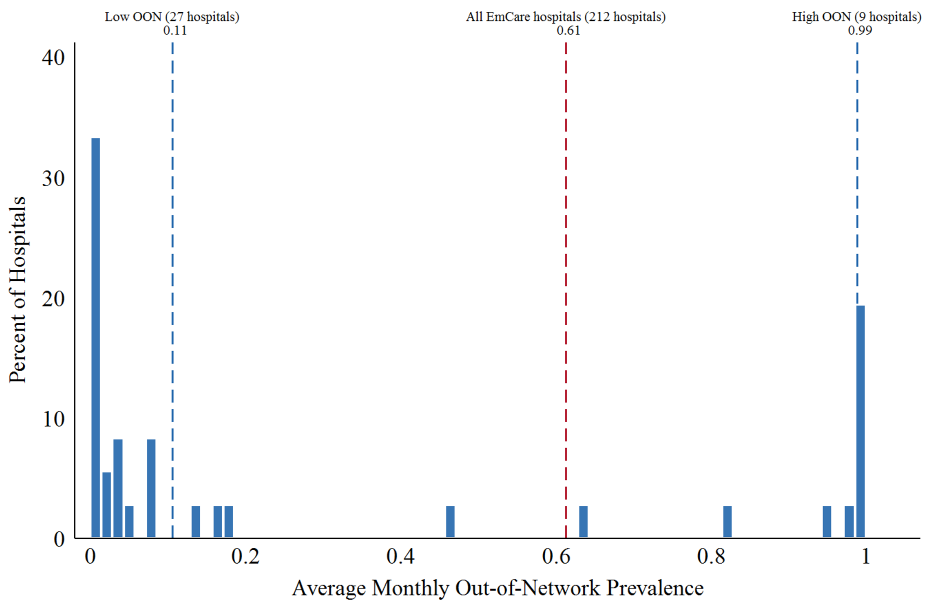
Notes: This screen grab is taken from EmCare's job hiring page. (https://www.emcare.com/careers/clinical-job-search)

Appendix Figure A.3: The Distribution of Out-of-Network Billing Across Hospitals – 2011, 2013, and 2015



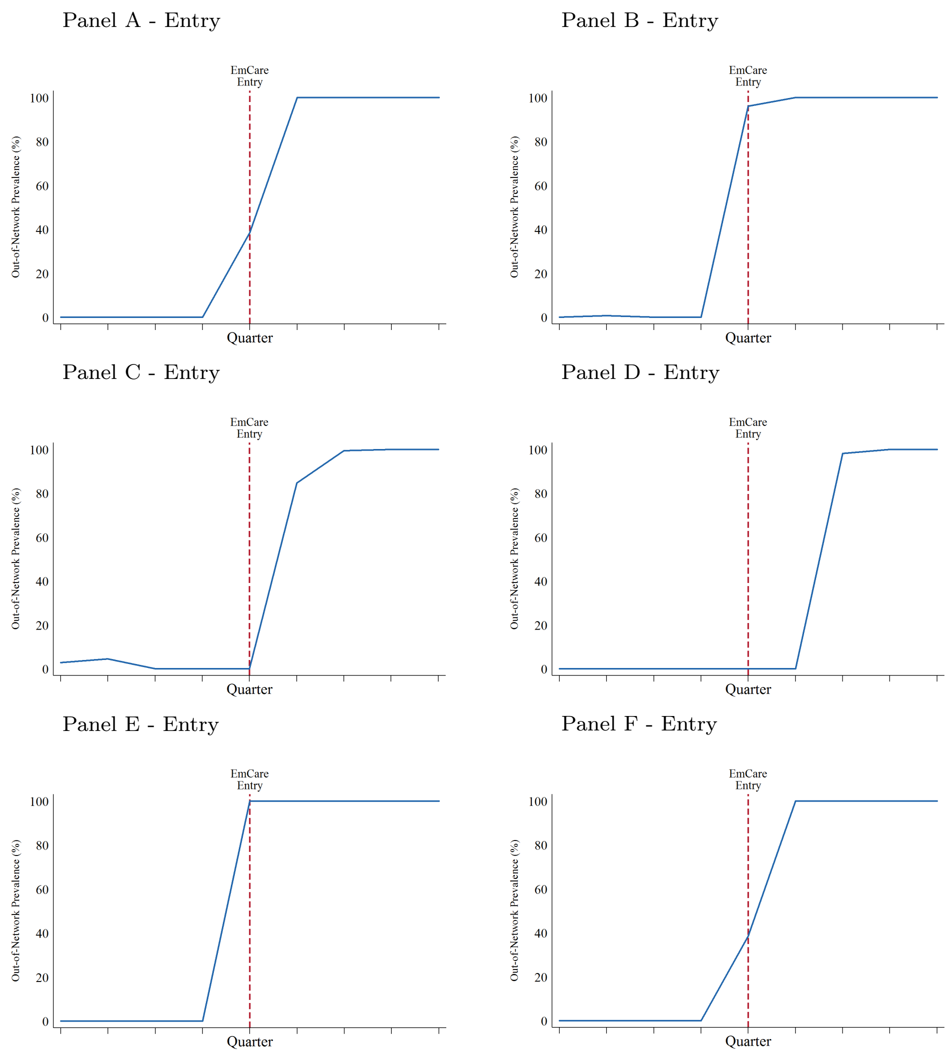
Notes: The figure shows the distribution of the prevalence of out-of-network billing across hospitals in 2011, 2013, and 2015. There are 3,345 hospitals in each year of this data.

Appendix Figure A.4: The Distribution of Average Out-of-Network Prevalence at Hospitals that EmCare Entered Measured Prior to Entry

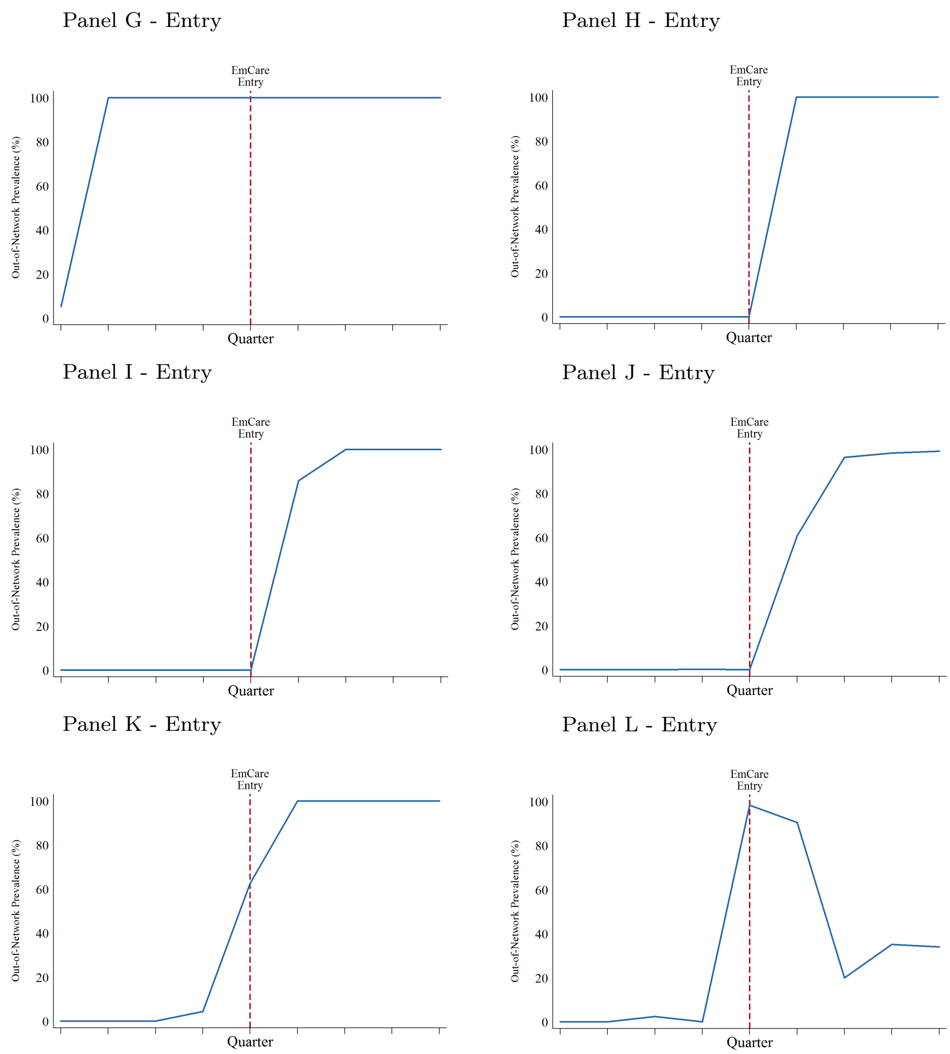


Notes: The figure shows a histogram of the average out-of-network prevalence for hospitals where EmCare entered in the months before EmCare entry occurred. There are a total of 36 hospitals where EmCare entered. Each bar shows the percent of hospitals falling into a given out-of-network prevalence. The red vertical line is the average of all EmCare hospitals from 2011-2015.

Appendix Figure A.5: Out-of-Network Prevalence at Hospitals Where EmCare Entered and Exited

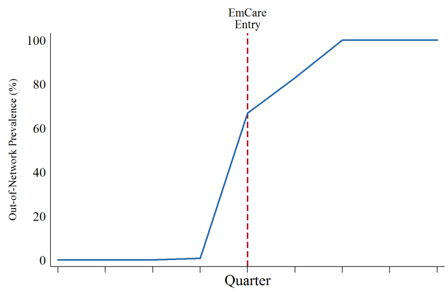


Appendix Figure A.5: Out-of-Network Prevalence at Hospitals Where EmCare Entered and Exited (continued)

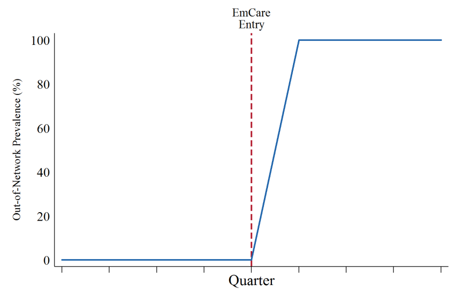


Appendix Figure A.5: Out-of-Network Prevalence at Hospitals Where EmCare Entered and Exited (continued)

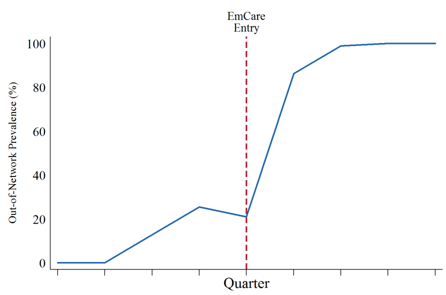
Panel M - Entry



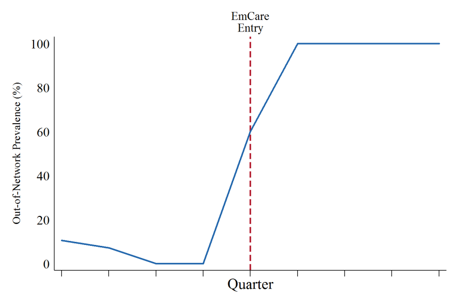
Panel N - Entry



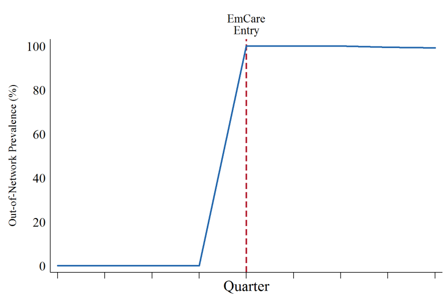
Panel O - Entry



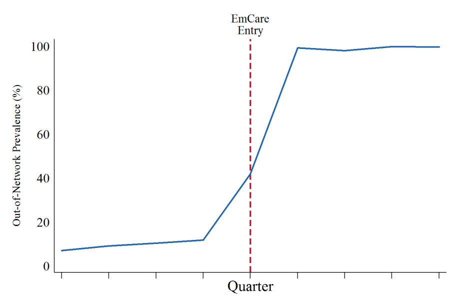
Panel P - Entry



Panel Q - Entry

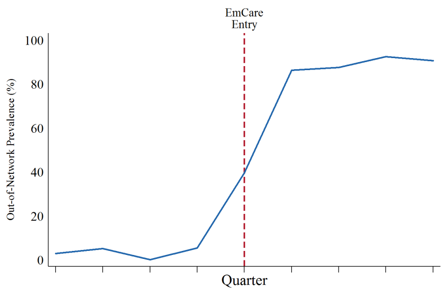


Panel R - Entry

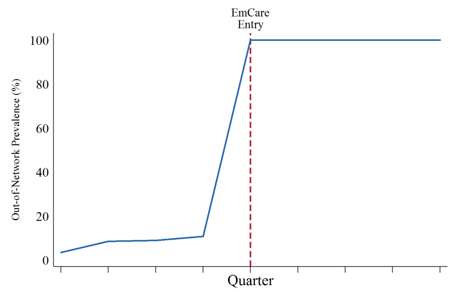


Appendix Figure A.5: Out-of-Network Prevalence at Hospitals Where EmCare Entered and Exited (continued)

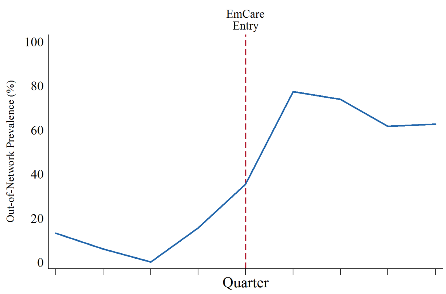
Panel S - Entry



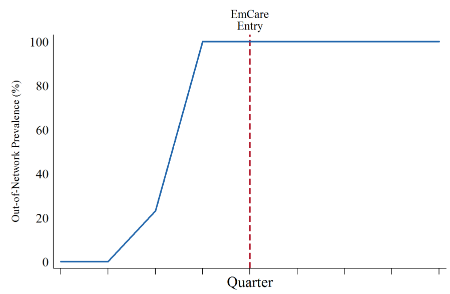
Panel T - Entry



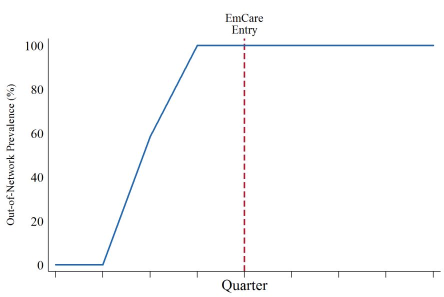
Panel U - Entry



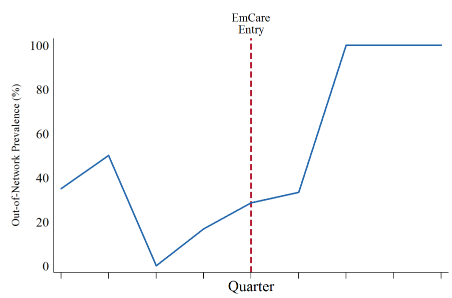
Panel V - Entry



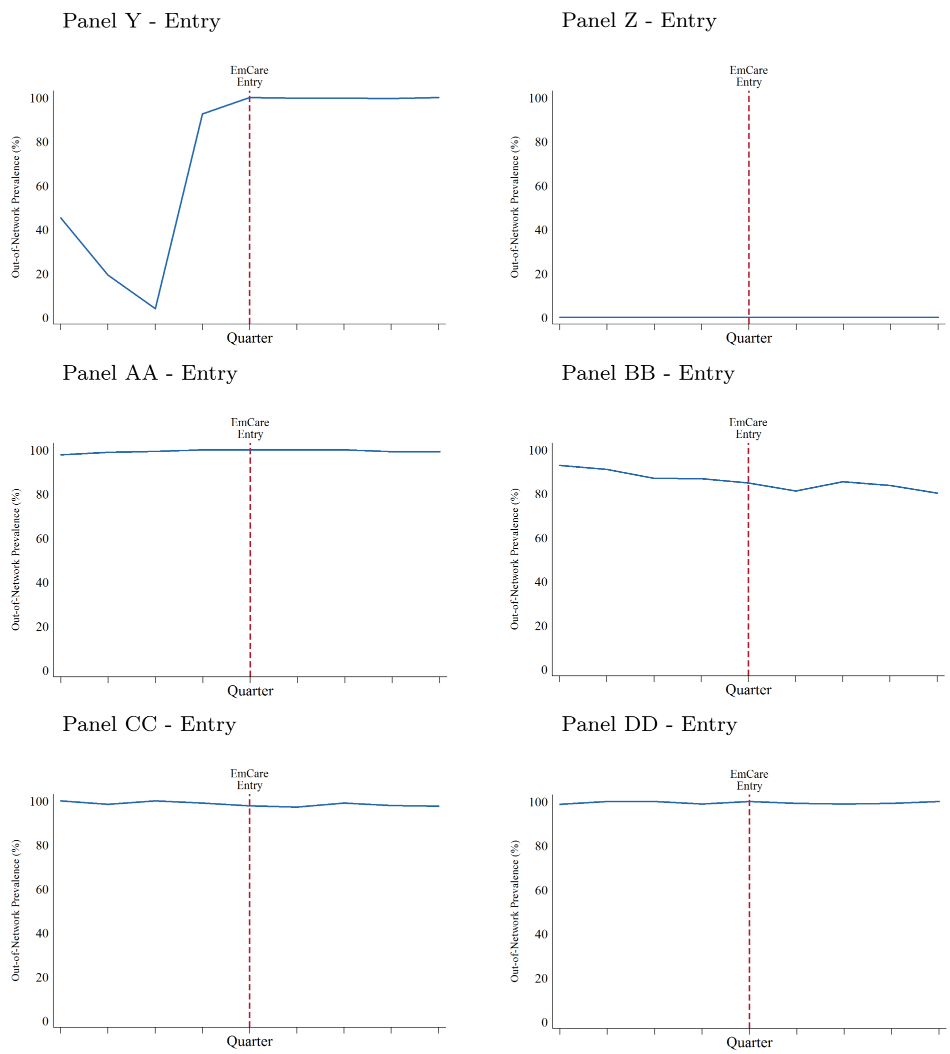
Panel W - Entry



Panel X - Entry

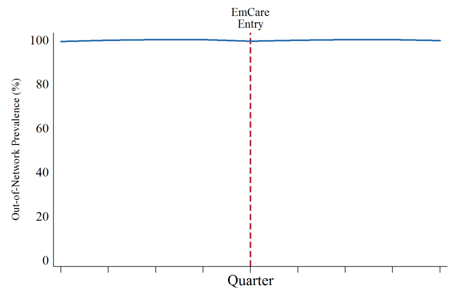


Appendix Figure A.5: Out-of-Network Prevalence at Hospitals Where EmCare Entered and Exited (continued)

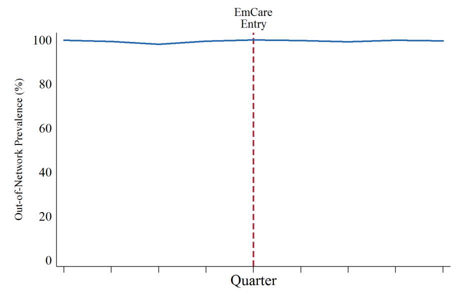


Appendix Figure A.5: Out-of-Network Prevalence at Hospitals Where EmCare Entered and Exited (continued)

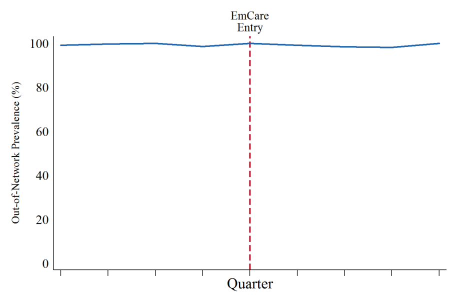
Panel EE - Entry



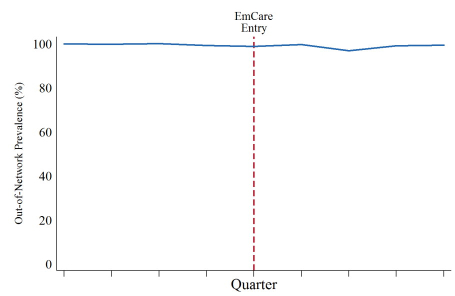
Panel FF - Entry



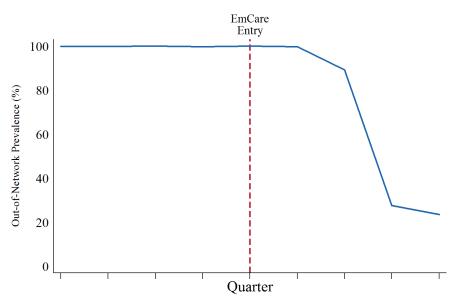
Panel GG - Entry



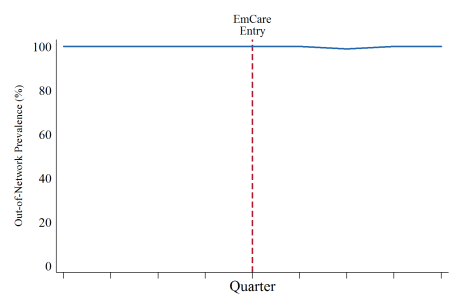
Panel HH - Entry



Panel II - Entry

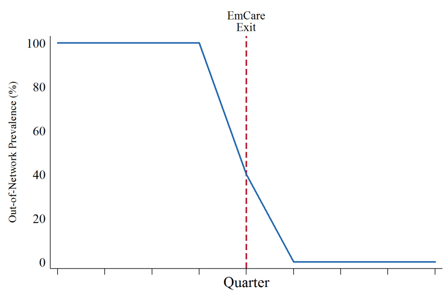


Panel JJ - Entry

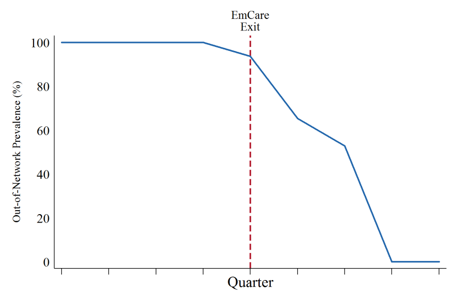


Appendix Figure A.5: Out-of-Network Prevalence at Hospitals Where EmCare Entered and Exited (continued)

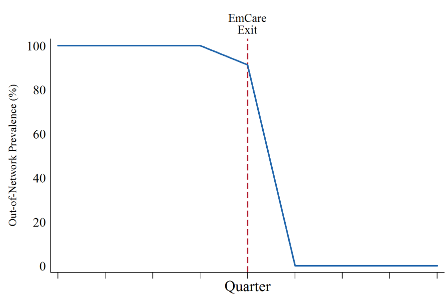
Panel KK - Exit



Panel LL - Exit



Panel MM - Exit



Notes: Each panel plots the average quarterly out-of-network billing prevalence at hospitals where EmCare entered and exited. We present the data from the four quarters before and after an entry or exit event.

Appendix Figure A.6: The Impact of EmCare Entry on Patients' 6- and 12-month hospital spending and 6- and 12-Month Charlson Score

Notes: The panels plot the monthly average by hospital from 12 months before to 12 months after EmCare entered the hospital. Panel A presents the impact of entry on 6-month historical spending, Panel B presents the impact of entry on 12-month historical spending, Panel C presents the impact of entry on the 6-month historical Charlson score, and Panel D presents the impact of entry on the 12-month historical Charlson score. We exclude the top 1% observations in each panel. The local polynomial is weighted by the number of episodes in each month. There is six month period of uncertainty on either side of entry and exit dates, which we denote by shading the area gray.