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What are the Impacts of Certificate-of-Need Laws? A Review of the Evidence

Charles Courtemanche
University of Kentucky, NBER and IZA@LISER

Joseph Garuccio
University of Kentucky

IZA@LISER NETWORK
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What are the Impacts of Certificate-of-Need Laws? A Review of the Evidence*

Abstract

This study reviews the literature on the impacts of Certificate-of-Need (CON) laws, which require the approval of states' health planning agencies for health care providers to engage in regulated actions such as opening or expanding facilities or purchasing equipment. Economic theory suggests that CON laws should reduce competition, leading to higher prices, larger net revenues for incumbent providers, and weakened incentives to produce efficiently and deliver high quality care. However, defenders of CON laws argue that they ensure high quality standards for new entrants, while also offsetting distortions that disadvantage hospitals and put some at risk of closure. The preponderance of available evidence points towards CON laws restricting entry of new competitors, which in turn increases the number of procedures per hospital. At the same time, CON laws also appear to inhibit hospital expansion, and there is little evidence of increased prices or higher hospital profitability. Studies on hospital efficiency and quality of care for procedures performed exclusively at hospitals mostly point to null or negative effects, but evidence on quality is more favorable for services that can be provided outside of hospitals. With that said, there is a need for new research that utilizes the latest tools for identifying causal effects and better accounts for the wide variation in CON laws across states.

JEL classification

I11, I18, L25, L51

Keywords

certificate of need, hospitals, health care regulation

Corresponding author

Charles Courtemanche
courtemanche@uky.edu

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I. Introduction

Certificate-of-Need (CON) regulations require the approval of states' health planning agencies for health care providers to engage in regulated actions such as equipment purchases and facility expansions. These actions can fall under CON regulation either by specific designation or, depending on the program, by the amount of the proposed expenditure (Cavanaugh et al 2020). Such regulation has an over 60-year history in the United States, as CON laws were seen as early as 1964, when New York began restricting new hospital construction (Metcalf-McCloskey Act of 1964; Battistella 1967). Though administered at the state level, federal interest in the proliferation of CON programs grew with concerns over rising health care expenditures in the 1960s and 1970s, as hospital admission and other service expenses grew between six and nine percent annually from 1965 to 1978 (Sloan 1981).

To combat rising health care costs, Congress incentivized states to adopt CON programs with an amendment to the Public Health Service Act called the National Health Planning and Resources Development Act (NHPRDA). This act, which was signed into law in 1975 (National Health Planning and Resources Development Act 1975), threatened to withhold federal funds for non-compliant states without a CON program. Within four years, only three states had not yet implemented CON programs (Sloan 1981). The NHPRDA's purported aims for CON programs were to promote health care quality and accessibility while restraining costs and wasteful redundancies (National Health Planning and Resources Development Act 1975). Federal enthusiasm for CON programs, however, wilted over the next decade, and Congress repealed the amendment in 1986 (Public Law No. 99-660, § 701, 100 Stat. 3743, 3799).

In the absence of a federal incentive, the persistence and form of states' CON programs became discretionary. Eleven states ended their CON programs by 1990, though some eventually reinstated them (Mitchell and Koopman 2016). According to the National Conference of State Legislatures (NCSL), as of January 2024, 35 states and the District of Columbia (DC) had some level of CON regulation. Among the 15 states without formal CON programs, 12 (CA, CO, ID, KS, ND, NH, NM, PA, SD, TX, UT, WY) have no CON program whatsoever, while the other 3 (AZ, MN, WI) have certain approval processes that approximate CONs (National Conference of State Legislatures 2024). While ending CON programs entirely is rare, with New Hampshire the last to do so in 2016, modifications to state programs are more common. From 2021-2023, the National Conference of State Legislatures reports 30 modifications to CON programs across 18

states and DC. Over time, this has led to considerable variation in CON programs across states (Cavanaugh et al 2020).

A large literature examines the effects of CON laws. Providing an overall picture requires reconciling pieces of evidence across decades, during which the form of CON programs, other regulatory elements, medical practice, and empirical methods have changed considerably. Studies often seek to evaluate whether programs meet the aims put forth under the NHPRDA. Namely, do states' CON programs promote health care accessibility and quality while constraining costs from excessive use or service redundancies? However, the implementation of the Medicare Prospective Payment System and the rise of managed care in private insurance diluted the incentive for hospitals to over-provide care and over-invest in facilities, perhaps undercutting the original rationale for CON laws. Instead, proponents argue that these laws now serve a different important purpose: helping struggling safety-net hospitals stay financially viable.

Three prior review articles evaluate this literature (Mitchell 2024a, Mitchell 2024b, Conover and Bailey 2020). Conover and Bailey (2020) focus on two key areas: the regulatory costs of CON programs and their effectiveness in meeting their aforementioned aims. They present mixed evidence that generally does not weigh in favor of CON regulations. They also conduct a cost-effectiveness analysis, suggesting that the cost of CON laws exceeds their benefits. Mitchell's reviews show that the large majority of empirical tests provide no evidence of CON programs having intended effects.

Despite such conclusions, the authors of these reviews note a need for additional high-quality research in areas where evidence is thin. The evidence on CON laws' effectiveness is mixed in the sense that there are pro-CON findings, anti-CON findings, and imprecise null findings. Those favoring the elimination of CONs suggest that, if the combination of null and anti-CON evidence outweighs the pro-CON evidence, then CON regulation is ineffective and therefore should be repealed. Yet CON laws' prolonged existence indicates they have significant legislative inertia and have become the status quo, with repeal representing a deviation from the norm. From this perspective, one could interpret Mitchell's (2024a) tally of results as showing that repeal is nearly equally likely to fail to improve matters (49%) as it is to improve them (51%).

Our study builds on the prior reviews by Mitchell (2024a; 2024b) and Conover and Bailey (2020) in multiple ways. The first is updating to include the most recent studies. Second, we aim to provide a clearer grounding of the literature in economic theory as well as the context of the broader health care policy landscape. In so doing, we emphasize that health care policies should not be evaluated in a vacuum. A policy that would not be economically defensible in an idealized, perfectly competitive market could nonetheless be desirable if it offsets distortions created by other policies, such as regulations requiring hospitals to treat patients regardless of insurance type or ability to pay. Next, we offer a more extensive discussion of methodological challenges, loosely categorizing studies as "causal" or "not causal" based on the methods used.

We begin by providing more detail about CON laws and the process through which applications are made and evaluated. We then turn to a theoretical discussion of the predictions of standard economic models regarding the effects of CON laws, as well as why these models might not adequately depict the heavily regulated market for hospital services. Next, we discuss the relevant empirical studies, focusing on the outcomes most closely related to the delivery of health care.[1]

The available evidence points towards CON laws reducing the number of competing facilities in most cases, thereby increasing the number of surgeries per hospital. While these results imply greater market power for existing hospitals, there is little evidence that this leads to higher prices or hospital net revenues. This apparent contradiction can potentially be explained by two factors that limit hospitals' ability to take advantage of greater market power. First, studies show that CON laws can restrict expansion by incumbent hospitals. Second, hospitals are not able to directly adjust prices in response to changing market circumstances. Instead, they need to either lobby for higher government fees or renegotiate with private insurers. Alternatively, the lack of clear evidence on prices and profits could simply reflect the difficulty in measuring these variables. Nearly no research examines the impacts of CON laws on the closure rates of hospitals or hospital departments. More evidence on these outcomes would help to paint a fuller picture of the impacts on hospital finances.

[1] This means excluding, for instance, studies of CON laws' effect on labor markets. One notable such study is by Bae and Bailey (2024), who employ a triple differences approach to estimate CON laws' effect on the labor market from 1979 to 2019. They compare health care workers across states and time to non-health care workers across states and time. They find no evidence that CONs influenced health care workers' employment or wages relative to other workers.

A number of other studies investigate the impacts of CON laws on efficiency and quality of care. The evidence points to null or negative effects on efficiency and quality for procedures performed exclusively in hospitals (e.g. heart surgeries). However, the majority of estimated effects on quality are favorable for outpatient procedures (e.g. orthopedic surgeries) that can be performed at either hospitals or specialty facilities like ambulatory surgery centers (ASCs), as well as for hospice care. Viewed together, these results could imply possible quality improvements at specialty facilities that roughly offset quality reductions at hospitals. This is plausible, as CON screening can help ensure that new entrants have adequate measures in place to ensure patient safety, such as provisions for timely transportation to hospitals if emergencies arise.[2] However, evidence on quality that focuses exclusively on procedures performed at ASCs would be a helpful addition to the literature.

Another limitation of the existing literature is that studies on the effects of CON laws face considerable methodological obstacles. Causal identification is challenging due to differences between CON and non-CON states along many other dimensions. Additionally, CON laws vary widely across states and over time in terms of their comprehensiveness. Isolating the effect of a change in one state's CON law may therefore be uninformative about other types of changes in other states. Therefore, studies are needed using national data and modern econometric techniques that account for differences in other factors across states and heterogeneous treatment effects.

II. CON Application Process and Costs

The items regulated under CONs vary by state, as do the processes governing submission, review, and associated fees. In this section, we unpack some of these details, primarily based on information provided in Cavanaugh et al. (2020). While most states are CON states, some non-CON states, like Wisconsin, could be considered quasi-CON states. Such states may not have formal, mandatory programs, but have voluntary programs or moratoria on expansion for certain equipment or facilities. In the latter case, moratoria represent the more extreme side of regulation as they are bans that are more burdensome to lift or from which to be exempted. Therefore, we include moratorium states in our discussion of CON processes, as

[2] Generally, this occurs by concerns getting raised during the review process. Additionally, some states' CON laws explicitly require applicants to show a track record of providing high quality care without patient safety violations (e.g. H.P. II, 1978; New Jersey Office of the State Auditor, 2024).

restricting expansion was among CON programs' early aims. Based on what we observe in Cavanaugh et al. (2020), we end up with 38 regulated states and the District of Columbia (DC) as a result of such inclusions.

Cavanaugh et al. categorize CON regulations into six general categories. These are hospital beds, non-hospital beds, equipment, facilities/buildings, services, and emergency medical transportation. They note that eight states maintain CON laws in all categories, with seventeen states and DC having CON laws in at least five.

States also vary in terms of application timing. Roughly two-thirds (29) of the 38 states accept CON applications at any point throughout the year (Cavanaugh et al. 2020). The remainder and DC either accept applications based on their scheduled review cycles or when they call for applications based on expected needs.

In almost all CON states, there is a fee to submit an application. These fees often have upper and lower bounds, with intermediate values scaling up with the cost of the proposed project until it reaches the fee cap. Among those states charging a fee, the lowest minimum is $100 (Arizona and Delaware), while the highest minimum is $10,000 (Florida).[3,4] Nine states charge a flat fee, and two do not charge a fee, leaving their maximums and minimums equal.[5] The lowest, capped maximum among states charging differential fees is $3,000 (New York), while the highest maximums are theoretically infinite for states that use uncapped scaling fees.[6] Application fees are not only quite sizeable in some states but are inherently nonrefundable, as they are supposed to cover the cost of evaluating the application. This proposes a stark efficiency difference between the ability to evaluate an application with a proposed cost of a billion dollars in Connecticut (Fee = $500) versus that in Massachusetts (Fee = The greater of $500 or 0.2% of the total value of the proposed project).[7]

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[3] Arizona is considered a non-CON state, but Cavanaugh et al indicate that it requires a certificate of necessity for ground ambulances. The application fee mentioned is related to this certification.

[4] In Cavanaugh et al, this was Tennessee at $15,000. However, Tennessee listed a minimum of $3,000 as of their revised statute in July 2022.

[5] It's unclear if a third state, Virginia, charges a fee or not.

[6] For example, Hawaii uses the following application fee schedule: $200 + 0.001 × (First Million Dollars) + 0.0005 × (Total Capital Costs – First Million Dollars) (Hawaii State Health Planning and Development Agency, 2025). If the total capital costs were one billion dollars, the fee would be $200 + 0.001 × ($1,000,000) + 0.0005 × ($999,000,000) = $200 + $1,000 + $499,500 = $500,700.

[7] With that said, Connecticut recently modified its evaluation process. CON applicants submitting applications in Connecticut since October 1, 2023, may be billed for consulting services used by the state. For such submissions, the statute states that if the reviewing unit cannot reasonably conduct the review independently without outside

Figure 1 categorizes states by their maximum fees based on information in Cavanaugh et al. (2020). While the large majority of CON states cap application fees under $100,000—just four states have hard caps above this in Cavanaugh et al.—only about a quarter do so under $10,000. These fees are inescapable as they must be paid for an application to be deemed complete and are nearly always nonrefundable. In Kentucky, for example, the application fee is only refundable if an application is withdrawn within five business days of submission (900 KAR 6:020 § 2(3)).

Submission fees may not be the earliest monetary costs incurred by applicants. To increase the probability of approval, applicants may hire consulting firms to assist them in the preparation and review process. A 2011 article focusing on North Carolina uses information from a single consulting firm to explore these costs. It suggests that, at a minimum, an applicant hospital would have to pay $27,000 in consulting fees for help with application preparation and a public hearing (Conley and Valone 2011). However, this was a proposed floor, and the ceiling could reach into the hundreds of thousands of dollars for non-expedited reviews, with consulting fees capping out at $300,000 for appeals alone.

While consultants can assist in creating an application, the application itself and accompanying fees are not always sufficient for it to be considered complete. To illustrate, we turn to Connecticut's CON application process described in Connecticut General Statutes § 19a-639a. In Connecticut, there are preconditions to submitting an application. The statute states that at least 20 days before submitting an application, a notice must be published in a well-circulated newspaper in the area where a proposed project is to be undertaken. The notice must include details about the scope and nature, location, and total capital expenditure for the proposed project. The application must then be filed within 90 days, but no sooner than 20 days, after posting the notice (Connecticut Department of Public Health, 2015).

Once an application has been submitted, it is subject to a 30-day completeness review. If the state decides additional information or items must be added to the application, the applicant has 60 days to update the application and resubmit it. If this is not done, the application is considered withdrawn. Once received, an updated application re-enters the completeness review,

expertise, it may retain an independent consultant with expertise specific to the application's area of health care. The cost of this consultation is transferred to the applicant and must be paid within 30 days (Connecticut General Statutes § 19a-639a (g)). This seems to equate to a nonrefundable, unforeseeable, incremental, and retroactive increase in the application fee for more complex applications.

and the state has another 30 days to evaluate the application's completeness. This cycle continues indefinitely until the application is deemed complete (Connecticut Department of Public Health, 2015).

Once an application is deemed complete and notice of the complete application is posted to the government's website, a 90-day review period begins.[8] Nearly all CON states take 60 or more days for formal reviews, with many taking over 100 (Cavanaugh et al. 2020). In Connecticut, a decision will be made by the end of this period, unless one of two things occurs: the reviewing unit finds good cause to extend the period by 60 days, or a public hearing is called. If a public hearing is called, a decision will be made no later than 60 days after the reviewing unit closes the public hearing record for the application (Connecticut General Statutes § 19a-639a (d)(3)). While good cause is not explicitly defined in subsequent subsections, the conditions to trigger a public hearing are made clear. The reviewing unit "shall hold a public hearing … if three or more individuals or an individual representing an entity with five or more people submits a request, in writing, that a public hearing be held on the application" (Connecticut General Statutes § 19a-639a(e)).[9] Public hearings also occur when the application involves the transfer of a hospital's ownership or at the reviewing unit's discretion. For the latter, the applicant and public must be given two weeks' notice about an upcoming hearing (Connecticut General Statutes § 19a-639a (f)(2)).

A public hearing allows for the exercise of what is sometimes referred to as the competitor's veto. States that hold public hearings on applications often allow other interested parties to present evidence on why the application should be denied. Figure 2 displays which states allow or disallow others to intervene in the CON application process. Only six of the 38 states we consider disallow any form of intervention in the CON process. In Oklahoma, interested parties can ask for reconsideration of a denial or approval, and if sufficient cause is found for reconsideration, then a public hearing is held. This suggests that in some states, competitors with sufficient interest may still impose further costs on the applicant even after approval (Oklahoma Administrative Code § 310:4-1-8).

[8] Except in the case of a voluntary offer of sale for a large practice, which has a 60-day review period (Connecticut General Statutes § 19a-639a (d)(3))

[9] For sales of large practices, this gets bumped up to 25 or more people, or an individual representing 25 or more people.

The incentive to impose added costs on an applicant may or may not be sufficient to induce challenges from the applicant's competitors. A challenge to an application likely depends on 1) how damaging the application's approval would be for the competitor and 2) how great of a cost can be imposed relative to the expense of imposing it. Naturally, the greatest cost that can be imposed would be added time and monetary costs spent defending against a competitor's attacks, followed by a denial of the application. If competitors' efforts have little impact on the outcome, then few attempts would be made to defeat or defend applications.

While there is relatively little information on the rates of denial based on competitors' interventions, a case study from Kentucky provides some insight. Cavanaugh and Mitchell (2023) examined CON applications submitted in Kentucky from January 2019 to May 2023. Of the 262 examined applications, incumbent providers in Kentucky submitted 76 percent. Of note, however, is that over 60 percent of the applications by incumbents qualified for non-substantive review. In Kentucky, non-substantive review has the advantage of no competitor intervention, no burden to show need, and a faster review time. An example of an application that would likely qualify for non-substantive review in Kentucky would be the relocation of a health care facility within the same county (Kentucky Revised Statutes § 216B.095). Of the applications in the non-substantive category, only about four percent were denied. Among those requiring a formal review, 16 percent of unopposed applications were denied. In contrast, 57 percent of opposed applications were denied. These statistics provide a possible indication of the impact of competitors' intervention; however, they also leave rather significant questions unanswered.

In Kentucky, any affected person can request a public hearing within 15 days of the start of the review process (Kentucky Revised Statutes 216B.085). Affected persons can only be Kentucky residents, and if one acts as a surrogate, they can only do so on behalf of an affected person. For example, a Kentuckian cannot act on behalf of a non-Kentucky resident, as non-residents would be deemed unaffected. Applicants can challenge the right of a person to call for or attend a public hearing in opposition to the application (Title 900 Kentucky Administrative Regulations 6:090 § 3(4)(a)-(b)). This results in an evidentiary hearing where sworn statements are taken and the applicant can cross-examine the opposing party. This process suggests that opposition cannot be arbitrarily offered by relatively uninvolved parties. In conjunction, as not all applications are opposed and entities are strategic decision makers, opposition almost

certainly occurs non-randomly. Therefore, it is unclear how much of the difference in the approval rates is due to opposition as opposed to other factors.

Cavanaugh and Mitchell (2023) leave unclear how many of the opposed or unopposed applications come from would-be new entrants or specific types of proposals. Knowing the breakdown within these categories would give some insight as to whether opposition is focused on particular applications and or applicants. Nevertheless, in the absence of better information, opposition may well be a fruitful endeavor for incumbents when they elect to implement it. Opposition, at least naively, appears to add additional time costs for applicants. Cavanaugh and Mitchell state that the average length of time for an unopposed application decision was 5.4 months, while an opposed decision took an average of 10.2. They do note, however, that decision times were trending downward over time. In addition, given the limited information, we cannot rule out that the review process for applications that happened to be opposed may take longer for non-opposition reasons.

Kimbrell and Schmidt (2024) review heterogeneous CON application data across seven states (GA, IA, MI, NC, SC, VA, and WV) for at least three years per state. They find overall application approval rates between 78% (WV) and 94% (SC). However, while West Virginia has a low denial rate (4%), the authors indicate that 17% of applications were withdrawn due to competitors' opposition. Kimbrell and Schmidt indicate that between 2017 and 2021, withdrawn projects in West Virginia had a proposed value of over $53 million. In North Carolina, from 2012 to 2022, the proposed value of denied applications was about $1.48 billion.

Generally, it seems the application process can take several months or more from preparation to decision, occupying applicants' financial and administrative resources for the duration. Additional time and monetary costs can be imposed through opposition and may increase the probability that an application is rejected. Further, pursuing large projects relative to provider size may add significant time if government grants or partnerships that have their own review times and costs must be sought. Even when a provider finances a project itself, funds must be set aside to ensure a project can move forward in the event of approval, preventing them from being used for other purposes.

The burden of application preparation, submission, and defense as well as the heterogeneity of regulations and procedures among CON states likely influence the number, nature, and size of health care projects. Regulations may incentivize the diversion of resources to

unregulated areas or less-regulated areas, where regulatory costs and competitors are minimal. The widespread ability for competitor opposition could restrict optimal capacity expansions. Obstacles to output optimization via restraints on expansion may also avert optimal capacity contractions, as regaining output capacity in the future may be perceived as too costly or too improbable. As a result, incumbent health care providers may maintain sub-optimal levels of output – involuntarily in the case of expansion, and voluntarily in the case of contraction. Such quantity constraints in the long run could harm efficiency and profitability. We next turn to a more detailed discussion of what economic theory has to say about the effects of CON laws.

III. Theoretical Foundations

According to conventional economic theory, an increase in a market's barriers to entry enhances the position of market incumbents. All else equal, with fewer entrants, any quantity demanded in the market will be distributed across fewer firms, and firm-level demand curves will be relatively less elastic as there are fewer suppliers between which demanders can choose. All else equal, this should lead to an equilibrium with higher prices and lower market-wide quantities. When market demand is inelastic, the increase in market price will be more pronounced than the drop in quantity, and vice versa. Profitability rises for incumbent producers, and consumer surplus falls, as do overall gains from trade. Aggregate spending can either rise or fall depending on the relative magnitudes of the decrease in quantity and increase in price.

Therefore, if CON laws function mainly as a barrier to entry in an otherwise competitive market, then we would expect lower market quantities, greater concentration of patients across hospitals, higher market prices, and higher per-hospital net revenues. Per-hospital gross revenues do not necessarily increase, as profit-maximizing quantities are not inherently revenue-maximizing. Overall spending on hospital services across all hospitals could either rise or fall. In terms of efficiency, oligopolistic profit maximization does not necessitate that firms operate at their minimum efficient scale. Efficiency would decrease if firms move away from their minimum efficient scale, which could reduce quality of care. Additionally, if the reduction in market-wide quantity reflects services that would have been beneficial for patient health, then population health could worsen. Moreover, there could also be adverse health effects for those

who do receive care if having fewer competitors reduces the incentive to compete along the quality dimension.[10]

However, *the above conclusions hinge on the assumption that the market for hospital services is perfectly competitive aside from the CON laws*. In other words, all parties have perfect information, there are many buyers and sellers, and there are no other barriers to entry, externalities (spillover effects on others), or differentiation of products or services across providers. Dating back to seminal work by Arrow (1963), health economists have long understood that health care markets tend to look nothing like these idealized markets found in economics textbooks. *Asymmetric information* is inherent with health care, as knowledge of one's health status and treatment options depends on information provided by suppliers with a vested interest in treatment decisions. *Asymmetric information* is also present in the market for health insurance, as consumers know more about their health risks than insurance providers. While certainly many patients and health care providers exist, insurance networks can restrict the number of providers so that there are functionally very few. *Barriers to entry* are inherent to any market with large entry costs. Health care services that slow the spread of communicable diseases have *positive externalities*. However, insured medical expenses have *negative externalities* on others in the insurance pool. This leads to the phenomenon of *moral hazard*, where individuals make decisions based on the out-of-pocket cost rather than the full cost of medical care, leading to consumption beyond the socially optimal level. Additionally, variation in service offerings and the quality of these offerings can further distort market outcomes by creating a form of market power.

Additional distortions arise from the extensive government intervention into health care markets. For instance, public health insurance and government subsidies for private insurance are common, which impacts demand for both insurance and medical care. Medical care prices in the U.S. tend to be set through a process of negotiation between insurers and providers, making them reflective of these companies' levels of market power rather than the underlying forces of supply and demand. In the case of public insurance, the government sets prices, making them susceptible to political and budgetary considerations. Hospitals cannot simply raise and lower prices as market conditions warrant, which could limit their ability to take advantage of CON laws. In an environment of fee negotiations with intermediaries, CON laws can only affect prices

[10] This phenomenon has been noted in other contexts such as cable television (Crawford and Shum, 2007).

indirectly by limiting competition and therefore increasing incumbent hospitals' bargaining power. Additionally, CON laws themselves can limit hospitals' ability to respond on the quantity dimension by imposing regulations on capital investments. Furthermore, regulations prevent hospitals from turning away those with emergency medical conditions irrespective of their ability to pay (Cassin, 2025). Non-profit hospitals also have to accept Medicaid and Medicare in order to maintain their tax-exempt status, which can lead to reimbursement levels below the cost of care (American Hospital Association, 2022). Margins made on the most profitable procedures and insurance types help to cover these losses (Priselac 2023).

Given the large number of distortions that can point in different directions, it is impossible to determine with confidence whether their net effect is to increase or decrease prices and quantities relative to the social-welfare-maximizing levels. A clearer conclusion is simply that there are far too many important deviations from the assumptions of perfect competition for it to be safe to assume that CON laws will have the effects predicted by basic economic theory.

A good illustration of this conclusion is the theory of the "medical arms race" (MAR), which suggests that competition could actually *worsen* efficiency in the market for hospital services. This theory arose because of the presence of multiple distortions. First, at the time the theory was introduced, payment from private and government insurers was generally cost-based, meaning that hospitals had little incentive to keep costs down. Although this is no longer the case, hospitals still are limited in their ability to compete along the price dimension because of the important roles of third parties in setting fees. Next, the prevalence of third-party payers and the apparent necessity of many medical services likely leads to relatively low demand elasticities that limit the effectiveness of price competition. Additionally, most hospitals are not-for-profit or public, which suggests that they are not only motivated by profits but also less measurable outcomes such as prestige.[11]

Putting these factors together, the MAR hypothesis asserts that hospitals respond to increased competition along the dimensions of technology and amenities. This might entail investing in excess capacity, creating a need for more patients or more extensive treatments. In turn, this can trigger *supplier-induced demand*, which arises from the combination of asymmetric information in favor of medical providers and moral hazard from third-party payers that limits patients' incentive to question treatment recommendations. In the end, costs rise and efficiency is

[11] For a discussion of MAR, see Frakt (2011) and the studies cited therein.

reduced. The empirical literature generally supported the existence of a MAR prior to the mid-1980s. This changed after the rise of managed care in the 1980s and 1990s and the implementation of the Medicare prospective payment system – which replaced cost-based reimbursement – in 1983, with evidence now pointing to efficiency gains from competition (Social Security Amendment of 1983). Nonetheless, the MAR theory illustrates how the standard conclusion from economic theory that CON laws stifle competition and therefore lower prices might not apply because of all the other distortions already present in the market for hospital services.

Ultimately, the desirability of CON laws depends on the reality of how things are rather than an idealized abstraction. Some of the distortions to the market for hospital services, such as moral hazard from insurance-induced inflated demand for health care, may work in hospitals' favor. Others, such as requirement to treat emergency room patients regardless of ability to pay and to accept Medicare and Medicaid, appear to work against them. If the net effect of the other distortions is to hurt rather than help hospitals, then CON laws could conceivably serve as a countervailing force that pushes price and quantity outcomes closer to their efficient levels, even if these laws would be detrimental to efficiency in isolation. For instance, inhibiting entry to specialized facilities like ambulatory surgery centers could be desirable if these facilities cherry pick the most profitable outpatient procedures, causing financially vulnerable safety net hospitals to shut down lines of service or close completely (Ascendient 2019; Courtemanche and Plotzke 2010; Plotzke and Courtemanche 2011).[12]

IV. Evidence

Given this theoretical ambiguity, we next examine the empirical evidence on the effects of CON laws on various outcomes related to health care. We classify these outcomes as falling into one of the following categories: (i) competing facilities and programs, (ii) market concentration, (iii) beds per hospital, (iv) total patient days, (v) average length of stay, (vi) total surgeries, (vii) surgeries per hospital, (viii) imaging providers, (ix) imaging machines per hospital, (x) rural health care access, (xi) hospital prices, (xii) hospital efficiency, (xiii) total expenditures, (xiv) quality of hospital care, (xv) quality of care that can be given outside of hospitals, and (xvi) hospital profitability. We do this for purposes of organization and readability,

[12] Sometimes CON laws' protection of access to care in vulnerable hospital departments is explicit. For instance, in Connecticut, CON approval is needed to *close* particular service lines (Pattee 2024).

while acknowledging that these categories can overlap (e.g. rural health care access depends on hospital profitability) and in some cases judgment calls have to be made about which category best fits a particular result.

We often distinguish between total (i.e. aggregate) and per-hospital variants of the same outcome (e.g. number of surgeries) because the theoretical predictions are different. For instance, if a state repeals its CON law, standard economic theory predicts a rise in *aggregate* quantity, as the removal of barriers to entry leads to more competitors. However, *any given hospital's* quantity could drop or stay the same. Additionally, recall that CON laws not only inhibit new entrants; they also constrain expansion by incumbents. This means aggregate quantity could rise after CON repeal even without new entry – and in this case per-hospital quantity would unambiguously rise. As another example, anti-competitive effects of CON laws could plausibly lead to a lower quality of care at hospitals even as they improve quality at specialty facilities by weeding out those that would have been less safe. In this case, the effect on aggregate quality across all provider types is ambiguous.

Causal Inference Methods

Before discussing the individual studies, it is important to emphasize that several different types of methodological approaches with varying levels of rigor and credibility have been used in the CON law literature. The long history of CON laws and CON research coincides with important evolutions in computational power and econometric methods that are evident in the CON research timeline. A tally of positive and negative results is useful, but the information from one well-designed study can be more valuable than the information from numerous less rigorous studies. Therefore, within each topic, we also aim to categorize by method.

Many studies are simple cross-sectional comparisons between states with and without CON laws. While these papers can be of value, particularly if no other evidence exists on the topic, their results are unlikely to capture causal effects. States vary along innumerable dimensions that could correlate with both CON law status and health care outcomes, and it is nearly impossible to measure and control for all of them.

A more credible strategy is to use quasi-experimental methods like difference-in-differences (DiD) and two-way fixed effects (TWFE) to estimate how *changes* in CON laws across states over time correlated with *changes* in outcomes. These approaches control for unobserved state-level characteristics as long as they are fixed over time. Many potential

confounders, such as a state's population density and its residents' health, income, education, and political views, tend to be reasonably stable across the duration of the typical sample. While time-varying confounders cannot be ruled out, DiD and TWFE methods represent a clear improvement over associational approaches.

With that said, CON law studies using these more advanced approaches still face major challenges, perhaps most notably from the limited number of policy changes often utilized for identifying variation. The specific details of what CON laws do and do not regulate vary substantially across states. CON regimes are often modified incrementally rather than eliminated wholesale, with exceptions or restrictions for certain items or areas (rural vs urban) being implemented on an ad hoc basis. Given the specificity in what is regulated, few states may change their regulations for any given item listed in Cavanaugh et al (2020), such as hospital beds, non-hospital beds, equipment, buildings/facilities, and emergency transport services. Even within these categories, the change may be specific to imaging equipment rather than equipment generally. For these reasons, there tend to be few comparable changes in CON laws during any particular time period. Consequently, many "causal" analyses are case studies involving a single, unique policy change, such as Pennsylvania's 1996 CON law repeal (Cutler et al. 2010; Li and Dor 2014).

Relying on a single or only a few policy changes leads to two distinct limitations. The first is generalizability to other states, time periods, types of CON law changes, and outcomes. For instance, the effects of a full repeal like the one in Pennsylvania in 1996 are likely quite different than those of an incremental change in a different state in a different time period. The second limitation is that relatively recent developments in econometric theory have shown that standard errors can be substantially understated if identification comes from a small number of treated or control units, and that conventional solutions like clustering standard errors are inadequate (e.g. Cameron and Miller, 2015). Most of the studies in the CON literature were completed prior to this issue and potential solutions being commonly understood, meaning that they could have overstated levels of statistical significance.

With that said, studies that utilize a number of CON law changes face their own challenges. Incorporating multiple changes requires utilizing a staggered-treatment-time design, which recent research has revealed can lead to bias when treatment effects are heterogeneous across time or space (de Chaisemartin, C. and D'Haultfœuille, X. 2023). Most CON law studies

using multiple policy changes were published before these problems were understood or methods to correct for them were developed.

Other studies use a "border discontinuity" approach that utilizes cross-sectional variation and "zooms in" on areas on both sides of a state border, arguing that both sides are plausibly similar except for state CON laws. This circumvents the need for identifying off changes over time in CON laws and the associated challenges. However, the border discontinuity strategy faces its own challenge: it is difficult to separate the effects of CON laws from the effects of other state policies that also vary discontinuously at the border.

We therefore categorize methods based on whether they identify off of (i) cross-sectional, (ii) DiD-style with one policy change, (iii) DiD-style with multiple treatments (i.e. TWFE), or (iv) border discontinuity. Generally speaking, (iii) is more credible than (ii) which is more credible than (i). While (iv) is more credible than (i), its validity relative to (ii) and (iii) is difficult to evaluate without further context. In our review, we will place the most emphasis on the studies that use the most advanced methods. All that said, we acknowledge that the merits of individual studies vary, and these rules of thumb are meant to be general rather than definitive.

Competing Facilities

We begin by examining the literature on the effect of CON laws on the number of competing facilities. Evidence shows that state CON laws are associated with fewer hospitals per capita (Custer et al. 2006; Eichmann and Santerre 2011; Stratmann and Koopman 2016; Ascendient 2019). However, Ascendient (2019) argues that this is because non-CON states tend to be more sparsely populated, necessitating a larger number of hospitals, rather than because of the CON laws themselves. Accordingly, there is no detectable difference in number of hospitals when scaled by land area.

A reduction in competition could also arise from fewer specialized facilities that compete with hospitals for certain profitable service lines. A prominent example is ambulatory surgery centers (ASCs), which are typically physician-owned and specialize in highly profitable outpatient procedures such as orthopedics. Stratmann and Koopman (2016) document that CON regulations are associated with fewer ASCs in rural areas, though Ascendient (2019) finds no statistical association for states as a whole. In a study that examines changes after CON repeal in six states rather than merely cross-sectional associations, Stratmann et al. (2024) find that CON law repeal increased the number of ASCs by an average of over 40%, with the effect being over

90% in rural areas. Stratmann et al. (2024) estimate the effect of ASC CONs on ASC supply from 1991 to 2019. During this time, six states repealed their ASC CON laws. The paper utilizes several of the new DiD estimators that account for bias from treatment effect heterogeneity, making it particularly rigorous. The results indicate that ASC-CON repeal increases states' per capita ASCs by over 40 percent, with over 90 percent increases in rural areas.

Numerous studies focus on particular lines of service. CON laws are associated with fewer neonatal intensive care units (Lorch et al. 2012). Additionally, the elimination of a trauma center CON requirement in Florida led to more trauma centers opening (Broecker et al. 2024). Several papers indicate that CON laws are associated with reduced numbers of programs providing heart surgeries or related diagnostics (Robinson et al. 2001; Popescu et al. 2006[13]; Vaughn-Sarrazin et al. 2010), or that CON law repeal in a particular state (Cantor et al. 2009; DeLia et al. 2009; Cutler et al. 2010; Li and Dor 2014) or multiple states (Ho et al. 2007; Ho et al. 2009) increased them. Similarly, Short et al. (2008) find that CON laws lower the number of hospitals performing cancer resections. However, estimating a lagged dependent variable model that is functionally similar to a DiD, Conover and Sloan (1998) find no effect of CON law implementation or repeal on open heart, organ transplant, or ambulatory surgical units per million for hospitals or for a broader variable including free-standing units. Additionally, Conover and Sloan (2003) find no lasting effect of lifting CON laws across several states on technology diffusion (trauma centers, open heart surgery, computed tomography scanners, magnetic resonance imaging scanners, and cardiac catheterization labs). Finally, Yu and Whaley (2024) employ a DiD strategy with several treatments to study the effect of moratoria on CON regulations for nursing home beds during the COVID-19 pandemic. Using Healthcare Provider Cost Reporting Information System data from 2015 to 2021, they find that the temporary moratoria on CONs had little effect on nursing home capacity.

In short, a substantial body of evidence from various settings mostly shows that CON laws are associated with fewer service providers. As discussed previously, in an otherwise perfectly competitive market, this would lead to lower market-wide quantities, higher prices, and higher net revenues for incumbent hospitals. However, the substantial distortions in the market

[13] Popescu et al. (2006) find that Medicare beneficiaries with acute myocardial infarction were less likely to be admitted to hospitals with revascularization services in CON states or undergo such surgeries, implying fewer such programs, all else equal.

for hospital services means that these results cannot be taken for granted. A large body of empirical studies examines whether CON laws have these (or other) effects.

Market Concentration

If CON laws reduce the number of competing facilities, we would expect them to also increase market concentration. Only a few studies have examined direct measures of concentration such as the Herfindahl-Hirschman Index (HHI), finding mixed results.[14] Custer et al. (2006) construct an HHI for hospital beds and observe that states with more expansive CON laws have more concentrated markets. However, Paul et al. (2019a) find that CON laws are associated with *decreased* inpatient service concentrations in hospital referral regions.[15] Yuce et al. (2020) examine median market shares for ten surgical procedures and suggest they find no statistically significant difference between concentrations in CON and non-CON jurisdictions. However, the median market share for hospitals for each procedure is always higher in CON states. Half of these procedures have at least marginally significant differences before a multiple hypotheses correction is applied, and the result for their overall measure indicating this difference is very close to marginal significance ($p=0.11$).[16] Therefore, the preponderance of Yuce et al.'s evidence points to higher concentration in CON states.

Hospital Beds

A number of studies examine whether CON laws influence the number of hospital beds – a readily available measure of capacity. Consistent with the MAR, early advocates suggested that hospitals over-invested in beds, which, if unused, increased hospital costs and the incentive to fill them with patients via induced demand, leading to excessive increases in medical expenditures. Therefore, an initial goal of CON regulations was to curtail hospitals' investment in hospital beds. Some of the studies on hospital beds use total number of beds across all hospitals in a given state or market, while others conduct hospital-level analyses and estimate the effect on the

[14] Other studies have drawn conclusions about concentration based on average or median procedures per hospital. However, this only captures concentration is there is no change in market-wide quantity, which seems unlikely given the aforementioned theoretical predictions.

[15] They estimate models using state-level science and technology index, excise tax rate on beer, and Gini index as instruments for CON laws. Ultimately, they cannot reject the exogeneity of their CON dummy and downplay their insignificant IV results. Their ordinary least squares (OLS) regression results indicate that CONs reduce market concentration as measured by share of inpatient admissions.

[16] The median market share for total knee arthroplasty, total hip arthroplasty, coronary artery bypass graft, lower extremity bypass, and lung resection all have p-values < 0.1.

average number of beds per hospital. We discuss the results from these two types of analyses separately for the reasons discussed earlier in this section.

Evidence on the effect of CON laws on aggregate hospital beds is somewhat mixed, though the majority points to a reduction. Early studies finding fewer beds include Salkever and Bice (1976; 1979) and Conover and Sloan (1998). However, Eastaugh (1982) finds no evidence of an association, while Salkever and Bice (1976; 1979) and Eastaugh (1982) find evidence of increases in other investments or anticipatory investments before CON implementation (Salkever and Bice 1976; Salkever and Bice 1979; Eastaugh 1982).

Several more recent studies examine data from after the expansion of managed care and implementation of the Medicare Prospective Payment System. Some find CON laws to be associated with decreases in the aggregate number of beds (Hellinger 2009; Lorch et al. 2012[17]; Stratmann and Russ 2014). Mitchell and Stratmann (2022) find that, during the COVID-19 pandemic, states with bed CONs had higher rates of bed utilization, implying lower numbers of beds all else equal. They also utilize a multi-treatment DiD approach to study the effect of relaxing CON requirements during the pandemic, finding no evidence of impacts on statewide bed utilization rates, implying no effect on capacity all else equal. We view Mitchell and Stratmann as effectively being two papers in one – a cross-sectional one finding reductions and a causal one finding no evidence of an effect. With that said, the lack of capacity increase after CON relaxation could indicate that supply was simply not able to adjust quickly enough to match the fast-moving pace of the pandemic. Longer-run effects during more typical times could be different. However, Conover and Sloan (2003) also find no evidence that lifting CON laws increased beds per capita in a multi-treatment causal analysis, despite their longer time frame of data.[18] Finally, Custer et al. (2006) find an overall nationwide decrease in the number of beds over time but no evidence that this decrease correlated with cross-sectional variation in state CON laws.

At the hospital level, the majority of evidence again points to decreases in beds (i.e. fewer beds per hospital). This includes early work by Joskow (1980) and Mayo and MacFarland (1989)

[17] Lorch et al. (2012) look at neonatal intensive care unit beds.
[18] They actually find that removing CON laws resulted in a *decrease* in the number of beds per capita; however, this decrease began two years *before* removal, suggesting it is unlikely to be causal.

as well as later analyses by Eichmann and Santerre (2011) and Paul et al. (2019b).[19] One study finds a positive association between CON laws and beds based on the interaction between the square root of hospitals' average daily census and the length of time a CON law has been in place (Anderson 1991). The aforementioned Mitchell and Stratmann (2022) also conducts hospital-level analyses, finding a positive association between state CON laws and the likelihood of individual hospitals using all their beds during the pandemic (implying fewer beds), but no evidence of a causal effect of relaxing CON laws on this likelihood.

In short, the preponderance of evidence suggests that CON laws had the intended effect of curtailing expansions in the number of hospital beds. Since aggregate and hospital-level measures both suggest reductions in facilities and beds, the results are inconsistent with new entrants reducing the number of beds at the average hospital but keeping overall supply the same. This in turn implies that the effect comes – at least in part – from CON laws inhibiting incumbent expansion. Accordingly, Mayo and MacFarland (1989) restrict their Tennessee sample to hospitals observed continuously from 1980-1984, thus isolating effects on hospitals that entered before the sample period, and still find a decrease.

It is important to note that, while bed reductions may have been social-welfare-improving in the 1970s and early 1980s when cost-based reimbursement incentivized overinvestment, it is unclear whether this is still the case. As discussed previously, normally barriers to entry would worsen economic efficiency and social welfare. However, given the numerous distortions still present in the market for hospital services, some of which push towards excessive service provision (e.g. asymmetric information and moral hazard), it is difficult to ascertain the welfare effects of curtailing hospital expansion or entry.

Patient Days

If reduced capacity in the form of hospital beds correlates with a lower quantity of services, this should show up in the form of number of patient days. Mechanically, patient days equals the number of patients times the average length of stay per patient, so studies of those outcomes are also relevant here. More patients presumably mean more money paid by the

[19] Paul et al. (2019b) use a similar IV approach as Paul et al. (2019a) but replacing the beer tax instrument with the Consumer Price Index. Both the OLS and IV results indicate reductions in emergency department length of stay. We do not view the instruments as being likely to satisfy the independence or exclusion restriction assumptions and therefore classify the paper as if it only used OLS.

government and private insurers to hospitals, but the same is not necessarily true for length of stay. The implementation of the Medicare Prospective Payment System in 1983 aimed to incentivize shorter stays by providing a flat amount per diagnosis code. The rise in managed care in the 1980s and 1990s changed the incentives for hospitals when treating privately insured patients. Therefore, when examining length of stay, it is useful to distinguish between studies using data from before these changes versus after.

The early evidence is mixed. Several studies suggest little association between CON laws and patient days per capita, along with possible increases in administrative services but not clinical services (Salkever and Bice 1976; Salkever and Bice 1979; Cromwell and Canak 1982). One study, Sloan (1983), indicates CON laws were associated with reduced lengths of stay. This would be consistent with these laws inhibiting facility expansion, leading to earlier discharges to avoid overcrowding. This would mean a loss of revenue for hospitals, though the effect on social welfare could be positive if the additional days were medically unnecessary. With that said, Ashby (1984) finds no relationship between CON laws and the percent change in total admissions per capita or average length of stay.

Several studies examine more recent data. Kahn et al. (2012) find CON laws reduced the likelihood of a stay in a long-term acute care hospital after a stay in an intensive care unit, implying a reduction in the total number of days spent in the hospital. Ho and Ku-Goto (2013) find no evidence that CON law repeal influences length of stay in a DiD study with several treated states. Paul et al. (2019b) show that CON laws reduced hospital bed occupancy rates, implying fewer total patient days unless CON laws increased the number of beds.

Surgeries

Several studies examine the link between CON laws and heart surgeries such as coronary artery bypass grafts (CABG), percutaneous coronary intervention (PCI). CABG is an invasive surgery wherein blood vessels are taken from elsewhere to reroute blood flow around a blocked artery. PCI is less invasive and uses a stent to expand a narrowing or blocked artery and reestablish blood flow. The appropriateness of each is based on the complexity and severity of a patient's condition.

Evidence on the effect of CON laws on aggregate-level heart surgeries is inconsistent, with the results varying across data sources and methodologies. Robinson et al. (2001) finds no evidence that Pennsylvania's CON repeal influenced the number of CABG surgeries performed.

However, Li and Dor (2015) find that the same repeal induced substitution from less-invasive PCI to more invasive CABG, which is consistent with Vaughn-Sarrazin et al.'s (2010) finding of CON repeal increasing the number of CABG programs but not PCI programs. Leveraging variation from several state repeals, Conover and Sloan (1998) find null results for open-heart surgeries. Associational studies also reach conflicting conclusions, with Fric-Shamji and Shamji (2010) finding CON states to have higher rates of CABG but lower rates of cardiac transplant, Popescu et al. (2006) finding lower rates of heart surgery in general, and Custer et al. (2006) finding higher per capita admission rates for CABG.

Three recent studies on back surgeries together imply that CON laws induce substitution from more to less serious procedures, which would mirror substitution from CABG to PCI. Malik et al. (2019) and Sridharan et al. (2020) find that CON states had lower utilization of elective 1-to-3-level posterior lumbar fusions per capita relative to non-CON states. At the same time, Ziino et al. (2021) document utilization and growth of lumbar micro decompressions being higher in CON states. Lumbar micro decompression is a minimally invasive surgery that alleviates bone or disk pressure on nerves.

Several papers examine impacts on total knee, hip, and shoulder arthroplasty (TKA, THA, TSA), commonly referred to as knee, hip, and shoulder replacements. A majority of studies find that CON regulations were associated with lower levels of TKA, THA, TSA, and simple knee arthroscopy, but with higher growth rates for TKA and THA (Browne et al. 2018; Casp et al. 2019; Cancienne et al. 2020; Schultz et al. 2021). Contrarily, Fric-Shamji and Shamji (2010) find no detectable difference in the rates of THA and TKA.

Effects of CON laws on other surgical procedures have also been examined. Short et al. (2008) show no difference in procedures per cancer incident in CON and non-CON states. Cosby (2011) finds no detectable difference in heart and kidney transplant facilities or procedures per 100,000 population. Liang and Lindsey (2024) show that the frequency of cataract surgery was lower in CON states than non-CON states and declined more rapidly from 2017-2021.

In short, in most cases, CON laws were found to have either no detectable effect or a quantity-reducing effect on aggregate (state- or market-wide) surgical procedures. These findings appear to be grouped by the relative seriousness of the condition. Heart surgeries, organ transplants, and cancer-related surgeries showed little response to CON regulation, which seems plausible for potentially life-threatening conditions. Quantities of less life-threatening conditions,

such as joint replacements, back surgery, and cataract surgery were generally sensitive to CON regulations.

In contrast to the murkier results from the literature on market-wide quantity of services, studies on per-hospital quantity generally find CON laws increase volume (or repealing them reduces it). This is most widely seen for heart procedures (Robinson et al. 2001[20]; Vaughn-Sarrazin et al. 2002; Ho 2004; DiSesa et al. 2006; Dobson et al. 2007; Ho 2007; Ho et al. 2009; Cutler et al. 2010; Vaughn-Sarrazin et al. 2010; Li and Dor 2014). A handful of other studies suggest increased per-hospital volume for joint procedures, procedures for cancer patients, non-heart surgical procedures, lumbar fusions, and imaging services (Short et al. 2008; Sridharan et al. 2020; Myers and Sheehan 2020[21]; Baker and Stratmann 2021).

Also, combining results from multiple studies implies that CON laws that restrict ASC entry preserve per-hospital outpatient surgical volume. As discussed previously, Stratmann et al. (2024) show that CON repeal significantly increases the number of ASCs by over 40 percent, with more than double that increase in rural areas. Courtemanche and Plotzke's (2010) finding that the entry of a nearby ASCs reduces a hospital's outpatient procedures implies an increase in outpatient volume from CON laws. Accordingly, Lynk and Longley (2002) find at least a temporary decline in outpatient procedures at a Louisiana hospital when physicians opened a nearby ASC. Yee (2011) shows that physicians who become directors at ASCs increase their procedure load, and part of the increase is from patients who would have been referred to other facilities. This change, however, declines when the physician is no longer a director at an ASC. Bian and Morrisey (2007) find that ASCs reduce hospital outpatient surgical volume by 4.3 percent. Combined, these results suggest that CON laws restricting ASC entry concentrate outpatient surgeries in hospitals.

Imaging

Another point of focus for recent CON literature has been medical imaging, particularly Magnetic Resonance Imaging (MRI). Conover and Sloan's (2003) study with multiple treatments

[20] Specifically, they find CON repeal increased open heart surgery programs but did not change the number of CABGs occurring. This implies that repeal led to less concentration within incumbents, which in turn implies that CON laws increase per-hospital volume.

[21] They find CON intensity increased emergency department wait times for examinations by medical professionals, pain medication for fractures, hospital admittance, and hospital discharge. We take this to suggest there are more patients per medical professional in CON states and not lower medical professional competence.

shows that CON law repeal increases the number of MRI machines per capita. This is consistent with Stratmann and Russ's (2014) finding that CON laws are associated with fewer hospitals that report providing different types of imaging services. Horwitz and Polsky (2015) evaluate the effects of MRI CON laws using a border discontinuity approach. The authors categorize a border county as a similar-regime county or different-regime county based on the presence or absence of an MRI CON in the county itself and its neighbors. The proposition is that freestanding MRI facilities would increase in unregulated counties to capture demand in neighboring regulated counties. Horwitz and Polsky find significant spillover effects, as unregulated different-regime counties had 6.4 more MRIs per million people than regulated different-regime counties. This effect is seen more strongly in border counties that are not divided by a major river.

Aggregate studies like these do not differentiate between would-be competitors being unable to enter the market versus existing hospitals being unable to invest in new machines despite abundant demand. The available evidence suggests that both of these phenomena occur to at least some extent. Perry (2017) documents reliance on unregulated mobile scanners that goes away once state restrictions are loosened and existing facilities can purchase a new scanner. At the same time, Baker and Stratmann (2021) show that CON law states have lower entry of new MRI providers. Consistent with that finding, Horwitz et al. (2024) use a regression discontinuity border discontinuity strategy and find that moving from a tract in an unregulated state across the border to one in a regulated state results in a 14 percent lower probability that the tract has an MRI provider, but without a similar finding for computed tomography providers.

Access in Rural Communities

CON laws could uniquely affect access to medical care in rural areas. One might expect that a supply reduction from CON regulation should only result in increased travel times, as implied by Stratmann et al.'s (2024) finding of a 90% increase in the number of ASCs in rural areas after CON repeal. However, an explicit aim for some CON programs is geographic redistribution of services to sparsely populated areas. Additionally, a common advantage for CON state incumbents is the ability to oppose localized entry. In the absence of CON regulations, initial competition may be focused in heavily populated areas, with providers entering less populated areas only once more populated areas are saturated. If CON programs restrict expansion and entry to areas that have little territorial overlap with incumbents, then this could result in reduced travel times in less population-dense areas. Cavanaugh et al. (2020) note

that several states exempt rural areas from CONs for at least some service types, providing an incentive for rural expansion. How feasible and focused expansions in rural areas are may correlate with states' focus and population distributions.

According to the Census Bureau's American Community Survey from 2011-2015, 64.4% of the total rural population in the United States (US) resides east of the Mississippi River (Census Bureau n.d.). Data from the 2020 Census indicates that 46% of the US' rural population lives in the South census region, under 27% live in the Midwest, and the Northeast and West contain under 15% each. Herb et al. (2020) find that CON laws significantly reduced rural travel time for radiation oncology in the South, increased it in the Northeast and Midwest, and had no detectable effect in the West. Given the sizeable rural population, the South may be conducive to aligning CON intent and financial feasibility. If other regions' populations are insufficiently rural. CON programs may not have a rural focus or investments may not be financially feasible, resulting in fewer urban investments being redirected to rural areas.

CON programs may also improve access to medical care in rural communities by preventing struggling rural hospitals from closing or reducing lines of service. Indeed, D'Aunno et al. (2000) find that rural hospitals in CON states were less likely to convert to non-hospital health care providers than those in non-CON states. Ascendient (2019) document a loss of fourteen hospitals with (relatively unprofitable) obstetric programs after CON law repeal in Ohio. In contrast, Stratmann et al. (2024) find no evidence that CON repeal led to rural hospital closures or service reductions. However, when studying extreme outcomes like closures with quasi-experimental methods, it is difficult to obtain precise enough estimates to rule out plausible effect sizes. Indeed, Stratmann et al. are unable to rule out effect sizes of greater than the repeal state mean for rural hospital closures per capita, hospital beds per capita in closed hospitals, service reduction, and hospital beds per capital lost in service reductions.[22] This means that, even if CON laws cause as many closures as all other factors combined, this would still not be statistically detectable.

Prices

We next turn to the expectation that CON-law-induced barriers to entry should result in higher prices, all else equal. Pricing data are notoriously hard to obtain in health care research,

[22] For instance, their estimated effect on rural hospital closures per 100,000 residents is -0.042 with a standard error of 0.093, implying an upper bound of the 95% confidence interval of 0.144, or 137% of the mean in repeal states.

and the evidence is sparse here, with none of the studies being causally interpretable. Noether (1988) finds CON laws associated with higher prices for certain conditions and treatments such as diabetes, cataract surgery, acute myocardial infarction, and congestive heart failure. Custer et al. (2006) find CON regulations are associated with increased inpatient stay payments per episode for private payers, though not by as much in rural areas. Casp et al. (2019) find that average per-patient charges for THA are lower in CON states. Ascendient (2019) obtains similar findings for price per inpatient discharge, as do Cancienne et al. (2020) for simple knee arthroscopies and Wu et al. (2025) for TSA. However, Schultz et al. (2021) find that costs for TKA and TSA were higher in CON states. Most of these studies use Medicare claims data. Schultz examines Humana data for patients diagnosed with arthritis in a relevant joint. Wu et al. use 2024 data from the Centers for Medicare and Medicaid Services mandated disclosure of hospital pricing for TSA. However, the required disclosure covers prices for a variety of payors, and it is unclear how a final price was constructed.

In short, evidence on the effect of CON laws on prices is limited and mixed. Section III provided a possible explanation for prices not increasing as much as standard economic theory might suggest. Market distortions from public insurance price setting and commercial insurance bargaining limit the price-setting power hospitals would otherwise garner from restricted competition. This prevents hospitals from changing prices in a profit-maximizing way.

Hospital Efficiency

In this subsection, we turn to evidence of CON laws' influence on hospital efficiency, or cost per unit.[23] Whether or not CON laws should be expected to improve efficiency depends on where hospitals are producing along their average total cost curve. If they are overproducing relative to their minimum efficient scale (perhaps due to the MAR), CONs that decrease output would improve efficiency. However, if as oligopolists, hospitals were producing below their minimum efficient scale as a means to maximize profits, then further reductions would only increase inefficiency. As a consequence, CON laws' effects likely vary with the state of the pre-CON market and shifts in health care demand over time.

A number of papers study effects on the average cost per unit of output, service, or patient, finding mixed results. Starting in the 1980s, Sloan and Steinwald (1980) find CONs had

[23] This is a distinct concept from overall economic efficiency, which was emphasized in Section III.

either no detectable effect on efficiency or increased total costs per adjusted patient day or per admission. Coelen and Sullivan (1981) include CON dummies for specific states and find mixed signs and significance for several outcomes related to hospital expenditures per adjusted admission, per capita, and per adjusted patient day. Sloan (1981; 1983) document a reduction in expenses per admission but not per adjusted admission nor expense per adjusted patient day. Ashby (1984) and Noether (1988) find CONs increased the percent change in total costs per capita and expenses per admission respectively.

Several more studies emerged in the 1990s. Eakin (1991) finds that CON laws increase deviations from minimum cost production. Anderson (1991) shows that CON stringency was associated with increased variable costs and an increased probability of hospitals having less than 100 beds, which he argues is below optimal size. Mayo and MacFarland (1991) find mixed evidence supporting higher costs in their full sample but lower costs in the most recent year of their sample. Antel et al. (1995) utilize a two-decade long state panel to examine both the implementation and repeal of CON laws. They find CON programs to increase hospital costs per admission and per patient day but no evidence of an effect on per capita costs. Conover and Sloan's (1998) multiple-treatment study find mature CON programs to be associated with increased hospital expenses per adjusted patient day and per admission.

Turning to the 2000s, Bates et al. (2006) find no evidence that CONs worsened the input-per-output efficiency of hospitals. Rivers et al. (2007; 2010) find CON hospitals associated with higher costs per adjusted admission. Ferrier et al. (2010) show that CON laws reduce aggregate technical (output per input) and structural (mix and scale) inefficiency. However, in the decomposition of structural inefficiency, CON laws decrease mix inefficiency but increase scale inefficiency. In studies leveraging variation from repeal in several states. Granderson (2011) finds that repeal improved cost efficiency while Ho and Ku-Goto's (2013) show that it improved costs per CABG but not per PCI.

In short, the available evidence points towards CON laws reducing efficiency or having no effect, depending on the context. This is consistent with market power leading hospitals to deviate from producing at the minimum of the average total cost curve, at least in some cases.

Aggregate Hospital Expenditures

The effect of CON laws on aggregate expenditures on hospital services is ambiguous according to standard economic theory, which predicts that prices increase but quantities

decrease. Lanning et al. (1991) find that CON regulations increase total hospital expenditures using an instrumental variables strategy.[24] Conover and Sloan (1998) find mixed evidence as both mature CON programs and CON repeal were associated with increases in Medicare spending, particularly for Part B. Conover and Sloan (2003) document that CON law repeal in several states increased hospital spending per state resident and Medicare spending per eligible state resident. Polsky et al. (2014) use a border discontinuity strategy and find no evidence that CON laws affected overall Medicare expenditures. Averett et al. (2019) show no evidence of changes in hospital total charges after CON removal in Pennsylvania. Malik et al. (2019) and Sridharan et al. (2020) find that average Medicare reimbursements were slightly higher in CON states by the end of their sample period. Ascendient (2019) documents higher per capita spending in CON law states but argue that this is because they have sicker populations on average. Bailey and Hamami (2023) show that CON repeal in four treated states is associated with a three percent decrease in per capita health care spending, with the effect concentrated among those not in excellent health. Finally, Liang and Lindsey (2024) show that inflation-adjusted expenditures increased more in CON states.

In short, the available evidence regarding aggregate expenditures is mixed between CON laws increasing them, decreasing them, or having no discernable effect. There are multiple studies, at least one of which is causal, in each category. An increase in expenditures from CON laws would be consistent with a supply decrease combined with relatively inelastic demand. Proportionally, if price increases by more than quantity decreases, then the product of price and quantity increases. Conversely, a decrease implies a proportionally larger change in quantity than price. The observed mixed evidence is consistent with each of these scenarios occurring in particular places and times.

Quality of Care

There are reasons to suspect that CON laws might lower quality of care. Reduced competition is generally thought to weaken the incentive to provide high quality service among

[24] Their instruments are prior period health expenditures per capita, state Medicaid expenditures per capita, state budget revenues per capita, American Democratic Action rating, commercial hospital insurance premiums as a percent of total premiums, hospital beds per capita, percent of beds in investor-owned hospitals, and an indicator for a party split between states' governor's office and the legislative bodies as instruments. This strategy would have been viewed as credible at the time of publication. However, based on our current understanding of the assumptions required in instrumental variable estimation, this approach seems highly unlikely to satisfy either the independence or exclusion restriction assumptions. We therefore do not view the results as causal.

incumbent firms. Moreover, it could lead to capacity shortages that worsen care. However, CON laws could *improve* quality of care by providing a screening mechanism for the safety of new entrants' plans. Therefore, effects on quality could conceivably be heterogeneous, with lower quality among incumbent hospitals and higher quality among specialty providers like ASCs, making the net market-wide effect ambiguous.

With that said, quality of care is notoriously difficult to measure. Documentable adverse outcomes are relatively rare and could be influenced by numerous factors besides the care given, such as the underlying health of the population served. Quality is especially difficult to measure for the sort of outpatient procedures generally performed at ASCs, which have low rates of complications in any setting. Econometric methods that identify average treatment effects tend not to be well suited to study extremely rare outcomes, such as a patient dying after an orthopedic procedure at an ASC because the nearest hospital was too far away. Outcome variables for low-risk outpatient procedures that would have more variability, such as amount of pain reduction, tend to be subjective and not available in the sort of datasets that could be used to study quality. Therefore, the literature on the effect of CON laws on quality of care mostly focuses on riskier procedures that are only done at hospitals – effectively studying only one side of the coin. We discuss the handful of papers that include care delivered outside of hospitals separately at the end of this section.

Mortality is the most commonly used proxy for quality in the CON law literature. Shortell and Hughes (1988) find CON regulations to be associated with increased mortality after hospitalizations for 16 selected clinical conditions. Vaughn-Sarrazin et al. (2002) suggest CABG mortality is higher in non-CON states. DiSesa et al. (2006) and Popescu et al. (2006) find no relationship between CON laws and CABG mortality. Other studies document that CON repeal decreased mortality for CABG (Ho et al. 2009; Kolstad 2009; Cutler et al. 2010). Ho et al.'s study with several treated states finds that statistical significance fades after about 5 years, though this is mostly because of larger standard errors rather than decreased point estimates. Cosby (2011) finds no detectable difference in transplant failures or deaths between CON and non-CON states. Lorch et al. (2012) find no association between CON and neonatal mortality. In a border discontinuity study, Chiu (2021) finds that CON regulations increased heart attack deaths three years after implementation by six to ten percent. Choudhury et al. (2022) show in a study with several treated states that CON relaxation in the early months of the COVID-19

pandemic reduced mortality related to COVID-19, septicemia, diabetes, chronic lower respiratory disease, influenza/pneumonia, and Alzheimer's disease. Stratmann (2022) finds that hospitals in CON law states performed worse in mortality for surgical inpatients with serious but treatable complications, pneumonia, and heart failure.

Other proxies for quality have also been used. Custer et al. (2006) provide no evidence of differential acute care quality between CON and non-CON markets as measured by indicator variables developed by the Agency for Healthcare Research and Quality. Cutler et al. (2010) show that CON repeal in Pennsylvania redistributed CABG procedures to surgeons with lower patient mortality rates, implying higher quality on average. Ho and Ku-Goto (2013) find that repeal reduced complications from stroke in a DiD analysis with several treated states. Li and Dor (2014) find that repeal increased the sorting of patients into CABG and PCI by condition severity. Polsky et al. (2014) find no evidence that CON laws influence rehospitalization rates. Stratmann and Baker (2020) show that CON laws were associated with increased ER visits per 1,000 Medicare beneficiaries and increased readmission rates for rural Medicare beneficiaries.

We next discuss studies of procedures – generally orthopedic – that are performed in both hospitals and other specialized settings. These papers use Medicare claims data, which presumably includes all facilities that bill Medicare. The estimates can therefore be interpreted as net effects that account for both potential reductions in quality from less competition and improved quality at specialty facilities from screening and weeding out. Casp et al. (2019) document that CON laws were associated with higher odds of TKA patients being readmitted after 30 days but with lower odds of infections and revisions.[25] Averett et al. (2019) find that ending CON regulation in Pennsylvania reduced the probability of dying after TKA and THA. Studies examining lumbar fusions suggest CON states had lower odds of 90-day pain-related complications and readmissions but higher odds of deep venous thrombosis, infectious complications, and renal complications (Malik et al. 2019; Sridharan 2020). Cancienne et al. (2020) find CON regulation associated with lower odds of ER visits within 30-days after simple knee arthroscopy, lower odds of infection within 6 months, and no detectable effect on the odds of hospital admission within 30 days or in-hospital death within a year. Horwitz et al.'s (2024)

[25] Also, they suggest there was no difference in the odds of dying within one year of surgery or visiting the emergency room. However, the p-value for death was P=0.003 and the odds ratio was above one, indicating that CONs increased the odds of death. The p-value for emergency room visits was P=0.071 with odds less than one, indicating that CONs reduced the odds of such visits with marginal significance.

border discontinuity study finds that CON reduced the likelihood of receiving low-value imaging with negligible effects on high-value imaging.

Only one study, Gaines and Cagle (2023), examines a type of care that occurs entirely outside of hospitals. They find that CON laws are associated with improvements in some hospice-related quality outcomes, especially for small and medium-sized facilities. While supportive of the quality screening argument, it is unclear how applicable the study's results are for facilities that compete more directly with hospitals for lucrative procedures.

In short, evidence from procedures only performed at hospitals points toward either no change or decreased quality from CON regulation. In contrast, evidence from procedures performed at both hospitals and other settings is more mixed, with the majority pointing towards *increased* quality. The only study that exclusively examines a non-hospital setting – hospice – also points to a quality improvement. Together, this pattern of results is consistent with multiple competing mechanisms reflecting both lower competitive pressure at hospitals and beneficial weeding out of low-quality specialty providers. However, more evidence focusing on the effect of CON laws on a variety of non-hospital outcomes is needed before this claim can be made more definitively.

Hospital Profitability

Basic economic theory suggests that strong barriers to entry increase and sustain profitability. They concentrate demand and prevent new entrants from compelling greater price competition and production nearer firms' minimum efficient scale. If hospitals can freely adjust prices and quantities in profit-maximizing ways, one would expect CON laws to increase their net revenues.[26]

However, there are not many studies that directly examine the impacts of CON laws on hospital margins, and those that do mostly find *reduced* profitability or no effect. Sloan (1981; 1983) find CON programs to be associated with reduced hospital profitability. Noether (1988) find higher prices for the treatment of certain conditions and infers higher margins for them but does not directly test profitability. Conover and Sloan (1998) do look at profitability using multiple dummy variables for the year before and year of CON implementation, one and two

[26] The term "net revenue" is often used in place of profit when discussing hospitals, as most U.S. hospitals are non-profit. However, this does not mean hospitals cannot make profits, just that they cannot be distributed to shareholders.

years after CON implementation, and three or more years after implementation. All three variables show statistically significant increases in profitability, making it difficult to cleanly attribute increased profitability to CON programs since one variable includes a pre-CON time period. Conover and Sloan's (2003) DiD study with multiple treatments finds that CON program removal increased hospital profitability after four years. Dobson et al. (2007) found profitability to be higher in non-CON states for safety-net and non-safety-net hospitals. Cutler et al. (2010), looking at CABG in Pennsylvania, observe that incumbent hospitals experienced drops in profitability following repeal but recovered and ultimately had increased profitability.

To provide a more recent comparison of hospital profitability in CON law versus non-CON law states, we perform our own calculation. The Kaiser Family Foundation (2024) provides a table of average hospital operating margins by state in 2024, aggregated from data on 4,194 hospitals. This table lists the number of hospitals per state. We then generate cross-state averages within the categories of CON and non-CON states. These averages are weighted by the number of sampled hospitals in each state relative to the total in each group. The weighted averages for operating margins are 5.1% for CON law states and 5.9% for non-CON-law states.

Hospitals closure rates are indicative of profitability, so the aforementioned studies of the effects of CON laws on the likelihood of hospitals closing or cutting service lines are relevant again here. These include D'Aunno et al.'s (2000) finding of an association between state CON laws and lower risk of hospitals converting to non-hospital providers (i.e. downsizing), as well as Stratmann et al.'s (2024) relatively imprecise null results for the effect of CON repeal on hospital closures and service reductions.

Perhaps the best evidence that CON laws increase hospital net revenues is indirect. Research shows that CON regulations reduce the number of ASCs (Stratmann and Koopman 2016; Stratmann et al. 2024) and reducing the number of ASCs increases hospital surgical output (Courtemanche and Plotzke 2010; Lynk and Longley 2002; Bian and Morrisey 2007). Moreover, Plotzke and Courtemanche (2011) find evidence that ASCs cherry pick the most profitable patients, implying that fewer ASCs leads to higher margins per procedure.

Overall, though, the evidence on the effect of CON laws on hospitals' net revenues is limited and mixed. This could perhaps point to these laws preventing hospitals from expanding their operations at the same time that they inhibit competition, or to hospitals' inability to directly

raise prices in response to increased demand. However, more research is needed to make more definitive claims.

V. Discussion

Economists are generally skeptical of policies like CON laws that impose barriers to entry. This is for good reason, as such barriers are a textbook example of a market failure (or government failure, if induced by a public policy) that leads to higher equilibrium prices and lower quantities than would be optimal. However, it is important not to analyze CON laws in a vacuum. They are but one of innumerable interventions by different levels of government into health care markets. Some, like the requirement to treat emergencies regardless of ability to pay and the setting of fees for publicly insured patients that are lower than those for privately insured patients, disadvantage hospitals and can lead to dire financial situations for hospitals in low income and rural communities. Therefore, even if CON laws are unsupported by economic theory in isolation, when viewed in the context of all the other distortions, they might play an important role in keeping safety-net hospitals financially viable, thereby ensuring access to health care for the most vulnerable individuals.

While evaluating the net welfare effect of CON laws is extremely challenging, some progress can be made towards that objective by synthesizing the results from the vast empirical literature on their impacts. Table 1 summarizes the results discussed in Section IV in table form, with papers that use DiD-style methods with a single treated state in bold, those that use DiD-style methods with multiple treated states in bold and underlined, and those that use border discontinuity methods italicized. We refer to these methods as "causal" for simplicity, while acknowledging that there can be considerable variation in credibility even within these categories.

Viewed in their totality, the results from the literature show signs of both the competition-reducing and expansion-reducing effects of CON laws. The available evidence suggests that these laws reduce the number of competing facilities and programs in many but not all cases. Sixteen studies point toward reductions, including seven that use some form of "causal" identification strategy. Four studies find no discernable effect, with three of those having a causal design. Fewer competitors should mean greater market concentration, which is the result found by two of the three studies that directly examine concentration, though none are causal. Also, all fourteen studies on surgeries per hospital find an increase, including five with a causal

methodology. Together, this evidence shows that CON laws reduce the number of competitors, leaving more business for incumbent hospitals. However, the majority of evidence points towards CON laws also reducing the number of beds and imaging machines per hospital, implying binding constraints on expansion. Eight of the ten studies in those categories find reductions, though little of that evidence is causally interpretable.

Although the available evidence points strongly towards CON laws increasing the number of surgeries per hospital, this is not the case for total number of surgeries across all providers. Three studies find an increase, five a decrease, and five no discernable effect. Of the three causal studies, two find null results and one a decrease. The fact that the results are more ambiguous for aggregate surgeries than surgeries per hospital is not surprising, as there are competing forces at work – the drop in the number of providers and the rise in surgeries per hospital. A related aggregate outcome is total patient days at hospitals, for which most studies (though none causal) find null results.

Estimated effects on average length of stay are mixed. One study finds an increase from CON laws, two find a decrease, and two – including one with a causal methodology – find no evidence of an effect. The implementation of the Medicare Prospective Payment System and rise of managed care reduced the financial incentive for hospitals to keep patients longer. However, there is no clear pattern of the results changing after these reforms.

Increased market power generally leads to higher prices, but the available evidence is split in terms of whether CON laws increase or decrease prices. This may point to most health care prices being determined by government fee setting and negotiation with private insurers rather than the usual market forces of supply and demand. With that said, none of the eight studies on prices use a causal research design.

Numerous studies examine measures of hospital efficiency such as average cost. Ten papers find that CON laws reduce efficiency, with one finding an increase and six no discernable change. The three causal studies on efficiency all find reductions. On balance, then, hospitals appear to respond to increased competition from CON law repeal by finding ways to deliver care at a lower average cost. A natural concern would be whether this cost cutting worsens quality of care, which is itself the subject of a substantial portion of the CON literature.

The majority of studies on quality examine outcomes of procedures performed exclusively in hospitals. Almost all of them find either worse quality or mixed/unclear results

from CON laws. Of the six that use some sort of causal methodology, five find lower quality. Lower quality could result from either reduced competition or hospitals being unable to expand. It is difficult to distinguish between these possibilities based on the available evidence.

Seven studies investigate quality outcomes for services that can be provided outside of hospitals. Five of these – including the one causal study in this category – find quality *improvements*. Therefore, there appears to be important heterogeneity in the quality effects of CON laws by either procedure type or facility type. This pattern of results is consistent with the screening of applications done under CON laws helping to ensure high standards for quality at specialized facilities like ASCs, though future research should test this hypothesis more directly.

Finally, there are a handful of studies on the effect of CON laws on hospital net revenue (profitability). The majority – including the only two with causal designs – point to a *decrease* rather than an increase, as does our own calculation using the most recent available data. Relatedly, two studies examine impacts on the financial health of rural hospitals, with one finding an improvement but the one with a causal methodology finding no evidence of an effect. The lack of clear impacts on profitability may seem surprising in light of the relatively strong evidence of increased volume per hospital. Together, these results imply that the costs of handling the additional volume roughly offset the increase in revenue. This could conceivably be because CON-law-induced restrictions on expansion prevent hospitals from implementing the lowest-cost approach to treating more patients. At the same time, the inability to easily adjust prices prevents hospitals from increasing revenues as much as they might otherwise.

VI. Conclusion

Economic theory predicts that regulations imposing barriers to entry like CON laws lead to reduced competition and therefore higher prices, lower aggregate quantities, greater profitability for existing firms, and perhaps also lower quality. The extensive empirical literature on the impacts of CON laws does provide evidence of a reduction in the number of competitors faced by incumbent hospitals in many cases. However, effects on prices, aggregate quantities, quality of care, and hospital profits are less clear, with some studies finding the predicted effect, others finding the opposite, and still others finding no clear evidence in either direction.

Results that are only partially consistent with theoretical predications are plausible since the market for hospital services bears little resemblance to the idealized markets of economics textbooks. CON laws not only restrict the entry of new competitors but also often inhibit

expansion by incumbent facilities. Therefore, while incumbent hospitals are clearly able to add volume to some extent given the extensive evidence that CON laws increase surgeries per hospital, they may not be able to fully accommodate the additional demand created by facing less competition. Firms unable to fully meet demand would typically raise prices, but hospitals are unable to readily do so. They may increase nominal charges, but the actual payments they receive are typically determined either by the government or negotiation with private insurers. In other words, hospitals are constrained in terms of their ability to change all of the components of net revenue: price, quantity, and cost. Moreover, implications for quality of care are complicated by the potentially useful role CON screening might play in ensuring that new entrants have adequate provisions for patient safety.

CON laws should be evaluated within the broader landscape of health care policy rather than in isolation. According to the American Hospital Association (2017), hospitals face 341 distinct regulations from the federal government alone. An average hospital devotes 59 full-time employees and $7.6 million annually simply to ensure compliance, to say nothing of the substantive effect of these regulations on hospital revenues and costs. These regulations do not each exist in a vacuum, but instead often result from a process of give-and-take involving lobbying from different groups representing stakeholders, federal agencies, and elected representatives. State regulations and federal and state policies related to insurance and payment – such as Medicare and Medicaid reimbursement rates – are also important components of the public policy landscape. Therefore, focusing only on whether CON law reform is desirable holding all other variables constant misses a myriad of reform possibilities involving combinations of policy levers. To illustrate, the American Hospital Association report cited above recommends twelve specific regulatory reforms. CON laws provide a point of leverage that conceivably could be "traded" for other reforms as part of a broader deregulation than benefits all constituencies.

Our review points to several important avenues for future research. The CON law literature spans a half century, and very few of the studies we discussed (even the ones we classified as "causal") meet all of today's high standards for econometric best practices. Therefore, there is room for future work on every single topic within the CON law literature – even those where there is an apparent consensus.

With that said, some important areas stand out as most glaringly in need of additional, rigorous research. These include the effects on prices, quality of care at specialty providers like ASCs, hospital net revenues, and closure rates of hospitals and hospital service lines. There is little to no causally interpretable evidence on these topics. This is perhaps for good reasons, as they are difficult topics to study. It is challenging to find reliable data on health care prices, profit margins, and quality. Moreover, outpatient procedures leading to severe complications and hospitals closing in a given year are rare outcomes in a statistical sense, making it difficult to obtain a dataset with sufficient statistical power.

Additionally, there is a clear need for more detailed modeling of the wide variability in CON laws across states. To illustrate, one state's CON law might be especially stringent for entry of new facilities but lenient regarding expansion decisions by existing facilities, while the reverse might be true of another state's law. The former would seem especially likely to increase hospitals' operating margins, while the latter could have the opposite effect. An estimate of the average effect across all types of laws might yield a null result that masks this important heterogeneity, ultimately resulting in missed opportunities for reform. In short, much progress has been made in understanding the impacts of CON laws, but much work remains.

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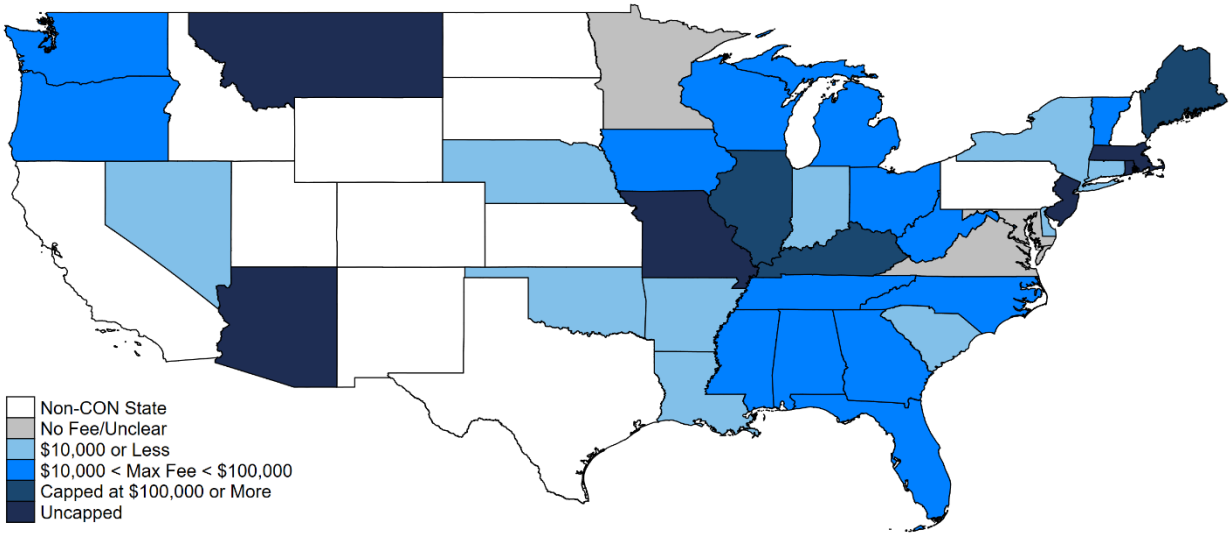
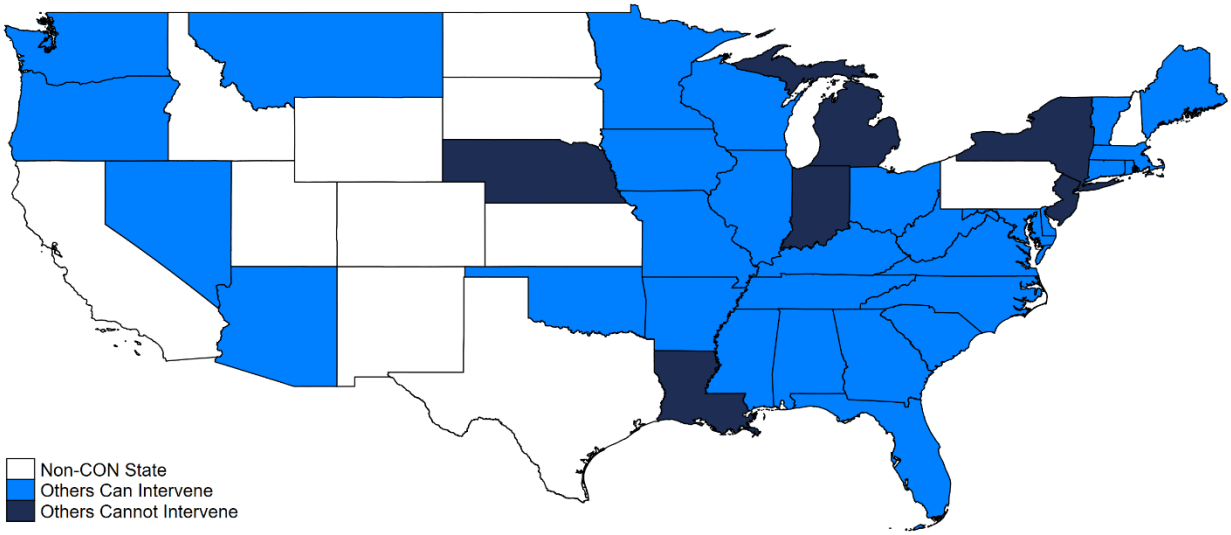
Figure 1. Application Fee Categories for U.S. States



Notes: Not shown: Alaska ($10,000 < Max Fee < $100,000) and Hawaii (Uncapped). Arizona is technically uncapped as shown; however, Arizona only regulates ambulances, and the application fee is $100 + $200 × number of ambulances.

Figure 2. CON Application Intervention Categories for U.S. States



Notes: Not shown: Alaska and Hawaii both allow intervention.

Table 1 – Summary of Results in Literature

	Increase	Decrease	Neither or Mixed
Competing facilities and programs		• **Broecker et al. (2024)** • **Cantor et al. (2009)** • Custer et al. (2006) • **Cutler et al. (2010)** • **DeLia et al. (2009)** • Eichmann and Santerre (2011) • Hellinger (2009) • Ho et al. (2007) • **Li and Dor (2015)** • Lorch et al. (2012) • Popescu et al. (2006) • Robinson et al. (2001) • Short et al. (2008) • Stratmann and Koopman (2016) • **Stratmann et al. (2024)** • **Vaughn-Sarrazin et al. (2010)**	• **Conover and Sloan (1998)** • **Conover and Sloan (2003)** • Ascendient (2019) • **Yu and Whaley (2024)**
Market concentration	• Custer et al. (2006) • Yuce et al. (2020)	• Paul et al. (2019a)	
Total hospital beds		• **Conover and Sloan (1998)** • Hellinger (2009) • Lorch et al. (2012) • Salkever and Bice (1976) • Salkever and Bice (1979) • Mitchell and Stratmann (2022) • Stratmann and Russ (2014)	• **Conover and Sloan (2003)** • Custer (2006) • Eastaugh (1982) • **Mitchell and Stratmann (2022)**
Beds per hospital	• Anderson (1991)	• Eichmann and Santerre (2011) • Joskow (1980) • Mayo and MacFarland (1989) • Mitchell and Stratmann (2022) • Paul et al. (2019b)	• **Mitchell and Stratmann (2022)**

Total patient days		• Paul et al. (2019b)	• Ashby (1984) • Cromwell and Canak (1982) • Salkever and Bice (1976) • Salkever and Bice (1979)
Average length of stay	• Casp et al. (2019)	• Sloan (1983) • Kahn et al. (2012)	• Ashby (1984) • **Ho and Ku-Guto (2013)**
Aggregate surgeries	• Custer et al. (2006) • Schultz et al. (2021) • Ziino et al. (2021)	• Cancienne et al. (2020) • **Li and Dor (2014)** • Malik et al. (2019) • Popescu et al. (2006) • Sridharan et al. (2020)	• Browne et al. (2018) • Casp et al. (2019) • **Conover and Sloan (1998)** • Fric-Shamji and Shamji (2010) • **Robinson et al. (2001)**
Surgeries per hospital	• Baker and Stratmann (2021) • **Cutler et al. (2010)** • DiSesa et al. (2006) • Dobson et al. (2007) • Ho (2004) • Ho (2007) • **Ho et al. (2009)** • **Li and Dor (2014)** • Myers and Sheehan (2020) • **Robinson et al. (2001)** • Short et al. (2008) • Sridharan et al. (2020) • Vaughn-Sarrazin et al. (2002) • **Vaughn-Sarrazin et al. (2010)**		
Imaging providers		• **Conover and Sloan (2003)** • *Horwitz and Polsky (2015)* • Stratmann and Russ (2014)	
Imaging machines per hospital		• Baker and Stratmann (2021) • Perry (2017)	

		• *Horwitz et al. (2024)*	
Rural access	• Ascendient (2019) • D'Aunno et al. (2000) • Herb et al. (2020)		• **Stratmann et al. (2024)**
Prices	• Custer et al. (2006) • Noether (1988) • Schultz et al. (2021)	• Cancienne et al. (2020) • Ascendient (2019) • Casp et al. (2019) • Wu et al. (2025)	• Mayo and MacFarland (1991)
Efficiency	• Ferrier et al. (2010)	• Ashby (1984) and Noether (1988) • Anderson (1991) • **Antel et al. (1995)** • **Conover and Sloan (1998)** • Eakin (1991) • **Granderson (2011)** • Ho and Ku-Goto (2013) • Rivers et al. (2007) • Rivers et al. (2010)	• Bates et al. (2006) • Coelen and Sullivan (1981) • Mayo and McFarland (1991) • Sloan (1981) • Sloan (1983) • Sloan and Steinwald (1980)
Aggregate expenditures	• **Bailey and Hamami (2023)** • Lanning et al. (1991) • Malik et al. (2019) • Sridharan et al. (2020)	• **Conover and Sloan (2003)** • Liang and Lindsey (2024)	• Ascendient (2019) • **Averett et al. (2019)** • **Conover and Sloan (1998)** • *Polsky et al. (2014)*
Quality of hospital care	• Vaughn-Sarrazin et al. (2002)	• *Chiu (2021)* • **Choudhury et al. (2022)** • Cutler et al. (2010) • **Ho et al. (2009)** • **Ho and Ku-Goto (2013)** • Kolstad (2009) • **Li and Dor (2014)** • **Stratmann (2022)** • Stratmann and Baker (2020)	• Cosby (2011) • Cromwell and Kanak (1982) • Custer et al. (2006) • DiSesa et al. (2006) • Lorch et al. (2012) • Malik et al. (2019) • *Polsky et al. (2014)* • Popescu et al. (2006) • Sridharan (2020)
Quality of care that can be given outside of hospitals	• Cancienne et al. (2020) • *Horwitz et al. (2024)* • Malik et al. (2019) • Sridharan (2020) • Gaines and Cagle (2023)	• Averett et al. (2019)	• Casp et al. (2019)

Profitability	• Noether (1988)	• **<u>Conover and Sloan (2003)</u>** • **Cutler et al. (2010)** • Dobson et al. (2007) • Sloan (1981; 1983)	• **<u>Conover and Sloan (1998)</u>**

Notes: Studies that use a DiD-style method with a single treated state are in bold, those that use a DiD-style method with multiple treated states are in bold and underlined, and those that use a border discontinuity approach are italicized. We consider the remaining studies to not have a causal identification strategy.