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TESTIMONY

ALASKA'S CERTIFICATE-OF-NEED LAW

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Senate Labor and Commerce Committee

February 6, 2018

Chairwoman Costello and distinguished members of the Senate Labor and Commerce Committee:

My name is Matthew Mitchell. I am an economist at the Mercatus Center at George Mason University, where I am an adjunct professor of economics. In recent years, my colleagues and I have been studying certificate-of-need laws in healthcare. I am grateful for the opportunity to discuss our findings with you today.

More than four decades ago, Congress passed and President Ford signed the National Health Planning and Resources Development Act of 1974.[1] The statute enabled the federal government to withhold federal funds from states that failed to adopt certificate-of-need (CON) regulations in healthcare. CON laws require healthcare providers wishing to open or expand a healthcare facility to first prove to a regulatory body that the community needs the planned services. New York enacted the first CON program in 1964; a decade later the federal government began encouraging other states to follow suit, and by the early 1980s every state except Louisiana had implemented some version of a CON program.[2] Policymakers hoped these programs would restrain healthcare costs, increase healthcare quality, and improve access to care for poor and underserved communities.

In 1986—as evidence mounted that CON laws were failing to achieve their stated goals—Congress repealed the federal act, eliminating federal incentives for states to maintain their CON programs.[3] Since then, 15 states have done away with their CON regulations.[4] A majority of states still maintain CON programs, however, and vestiges of the National Health Planning and Resources Development Act can be seen in the justifications that state legislatures offer in support of these regulations.[5]

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[1] National Health Planning and Resources Development Act of 1974, Pub. L. No. 93-641, 88 Stat. 2225 (1975) (codified at 42 U.S.C. §§ 300k–300n-5), repealed by Pub. L. No. 99-660, § 701, 100 Stat. 3799 (1986).
[2] Matthew D. Mitchell and Christopher Koopman, "40 Years of Certificate-of-Need Laws across America," Mercatus Center at George Mason University, September 27, 2016.
[3] Patrick John McGinley, "Beyond Health Care Reform: Reconsidering Certificate of Need Laws in a 'Managed Competition' System," *Florida State University Law Review* 23, no. 1 (1995).
[4] New Hampshire is the state that most recently repealed its CON program, which it did in the summer of 2016. Mitchell and Koopman, "40 Years of Certificate-of-Need Laws across America."
[5] According to Alaska's CON website, "The Certificate of Need (CON) program is a review process used to promote responsive health facility and service development, rational health planning, health care quality, access to health care, and health care cost containment." Alaska Department of Health and Social Services, Division of Health Care Services, "Certificate of Need (CON) Program Summary," accessed January 31, 2018, http://dhss.alaska.gov/dhcs/Pages/CertificateOfNeed/default.aspx.

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Unfortunately, by limiting supply and undermining competition, CON laws may undercut each of the laudable aims that policymakers desire to achieve with CON regulation. Research shows that CON laws fail to achieve the goals most often given when enacting such laws. These goals include

1. ensuring an adequate supply of healthcare resources,
2. ensuring access to healthcare for rural communities,
3. promoting high-quality healthcare,
4. ensuring charity care for those unable to pay or for otherwise underserved communities,
5. encouraging appropriate levels of hospital substitutes and healthcare alternatives, and
6. restraining the cost of healthcare services.[6]

Because 15 states have repealed their CON programs, we have quite a bit of information to help us predict what would happen if other states such as Alaska were to repeal their CON laws. Economists have been able to use modern statistical methods to compare outcomes in CON and non-CON states to estimate the effects of the regulation. These methods control for factors such as socioeconomic conditions that might confound the estimates. Table 1 summarizes some of this research. It is organized around the stated goals of CON laws.

TABLE 1. SUMMARY OF RESEARCH ADDRESSING THE GOALS OF CERTIFICATE-OF-NEED (CON) LAWS IN HEALTHCARE

Question	Answer	Research
1. Do CON programs help ensure an adequate supply of healthcare resources?	No. CON regulation explicitly limits the establishment and expansion of healthcare facilities and is associated with fewer hospitals, ambulatory surgical centers, dialysis clinics, and hospice care facilities. It is also associated with fewer hospital beds and decreased access to medical imaging technologies. Residents of CON states are more likely than residents of non-CON states to leave their counties in search of medical services. Regression analysis by Stratmann and Koopman (2016) suggests that an Alaska without CON would have 42 percent more hospitals than it currently has.	Ford and Kaserman (1993); Carlson et al. (2010); Stratmann and Russ (2014); Stratmann and Baker (2017); and Stratmann and Koopman (2016)
2. Do CON programs help ensure access to healthcare for rural communities?	No. CON programs are associated with fewer hospitals overall, but also with fewer rural hospitals, rural hospital substitutes, and rural hospice care facilities. Residents of CON states must drive farther to obtain care than residents of non-CON states. Stratmann and Koopman's research suggests that an Alaska without CON would have 45 percent more rural hospitals than it currently has.	Cutler, Huckman, and Kolstad (2010); Carlson et al. (2010); and Stratmann and Koopman (2016)
3. Do CON programs promote high-quality healthcare?	Most likely not. While early research was mixed, more recent research suggests that deaths from treatable complications following surgery and mortality rates from heart failure, pneumonia, and heart attacks are all statistically significantly higher among hospitals in CON states than hospitals in non-CON states. Also, in states with especially comprehensive CON programs such as Alaska, patients are less likely to rate hospitals highly.	Stratmann and Wille (2016)

[6] Each of these goals was first articulated in the National Health Planning and Resources Development Act of 1974.

4. Do CON programs help ensure charity care for those unable to pay or for otherwise underserved communities?	No. There is no difference in the provision of charity care between states with CON programs and states without them, and CON regulation is associated with greater racial disparities in access to care.	DeLia et al. (2009) and Stratmann and Russ (2014)
5. Do CON programs encourage appropriate levels of hospital substitutes and healthcare alternatives?	No. CON regulations have a disproportionate effect on new hospitals and nonhospital providers of medical imaging services. Research also finds that states such as Alaska that have an ambulatory surgical center–specific CON have, on average, 14 percent fewer total ambulatory surgical centers.	Stratmann and Baker (2017) and Stratmann and Koopman (2016)
6. Do CON programs help restrain the cost of healthcare services?	No. By limiting supply, CON regulations increase per-service and per-procedure healthcare costs. Even though CON regulations might reduce overall healthcare spending by reducing the quantity of services that patients consume, the balance of evidence suggests that CON laws actually increase total healthcare spending.	Mitchell (2016) and Bailey (2016)

Sources: James Bailey, "Can Health Spending Be Reined In through Supply Constraints? An Evaluation of Certificate-of-Need Laws" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, August 2016); Melissa D. A. Carlson et al., "Geographic Access to Hospice in the United States," *Journal of Palliative Medicine* 13, no. 11 (2010); David M. Cutler, Robert S. Huckman, and Jonathan T. Kolstad, "Input Constraints and the Efficiency of Entry: Lessons from Cardiac Surgery," *American Economic Journal: Economic Policy* 2, no. 1 (2010); Derek DeLia et al., "Effects of Regulation and Competition on Health Care Disparities: The Case of Cardiac Angiography in New Jersey," *Journal of Health Politics, Policy and Law* 34, no. 1 (2009); Jon M. Ford and David L. Kaserman, "Certificate-of-Need Regulation and Entry: Evidence from the Dialysis Industry," *Southern Economic Journal* 59, no. 4 (1993); Matthew D. Mitchell, "Do Certificate-of-Need Laws Limit Spending?" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, September 2016); Thomas Stratmann and Matthew C. Baker, "Barriers to Entry in the Healthcare Markets: Winners and Losers from Certificate-of-Need Laws" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, August 2017); Thomas Stratmann and Christopher Koopman, "Entry Regulation and Rural Health Care: Certificate-of-Need Laws, Ambulatory Surgical Centers, and Community Hospitals" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, February 2016); Thomas Stratmann and Jacob W. Russ, "Do Certificate-of-Need Laws Increase Indigent Care?" (Working Paper No. 14-20, Mercatus Center at George Mason University, Arlington, VA, July 2014); Thomas Stratmann and David Wille, "Certificate-of-Need Laws and Hospital Quality" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, September 2016).

I have also attached two working papers: my own, "Do Certificate-of-Need Laws Limit Spending?," and Thomas Stratmann and Christopher Koopman's paper, "Entry Regulation and Rural Healthcare." These papers, like all Mercatus Center research, have been through a rigorous double-blind peer review process. I believe their implications should be of particular interest to your state.

Given the substantial evidence that CON laws do not achieve their stated goals, one may wonder why these laws continue to exist in so much of the country. The explanation seems to lie in the special-interest theory of regulation.[7] Namely, CON laws perform a valuable function for incumbent providers of healthcare services by limiting their exposure to new competition. Indeed, recent evidence suggests that special interests are able to use political donations to increase the odds that their CON requests will be granted.[8] This aspect of CON laws helps explain why antitrust authorities at the Federal

[7] This theory holds that regulations exist as a way to limit competition or raise rivals' costs, or both. See George J. Stigler, "The Theory of Economic Regulation," *Bell Journal of Economics and Management Science* 2, no. 1 (April 1, 1971): 3–21; Ernesto Dal Bó, "Regulatory Capture: A Review," *Oxford Review of Economic Policy* 22, no. 2 (June 20, 2006): 203–25; Matthew D. Mitchell, *The Pathology of Privilege: The Economic Consequences of Government Favoritism* (Arlington, VA: Mercatus Center at George Mason University, 2014).

[8] Thomas Stratmann and Steven Monaghan, "The Effect of Interest Group Pressure on Favorable Regulatory Decisions: The Case of Certificate-of-Need Laws" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, 2017).

Department of Justice and the Federal Trade Commission have long argued that these regulations are anticompetitive and harmful to consumers.[9]

Thank you again for the opportunity to share my research with you. I look forward to answering any questions you may have.

Sincerely,

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ATTACHMENTS (2)

"Do Certificate-of-Need Laws Limit Spending?" (Mercatus Working Paper)
"Entry Regulation and Rural Healthcare: Certificate-of-Need Laws, Ambulatory Surgical Centers, and Community Hospitals" (Mercatus Working Paper)

[9] See, for example, *Competition in Healthcare and Certificates of Need, Hearing before a Joint Session of the Health and Human Services Committee of the State Senate and the CON Special Committee of the State House of Representatives of the General Assembly of the State of Georgia*, 149th Gen. Assemb. (2007) (statement of Mark J. Botti, Chief, Litigation I Section, US Department of Justice, Antitrust Division); Federal Trade Commission and US Department of Justice, *Joint Statement of the Federal Trade Commission and the Antitrust Division of the U.S. Department of Justice on Certificate-of-Need Laws and South Carolina House Bill 3250*, 2016.

Do Certificate-of-Need Laws Limit Spending?

Matthew D. Mitchell

September 2016

MERCATUS WORKING PAPER

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Matthew D. Mitchell. "Do Certificate-of-Need Laws Limit Spending?" Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, September 2016.

Abstract

In 35 states, certificate-of-need (CON) laws in health care restrict the supply of medical services. These regulations require providers hoping to open a new healthcare facility, expand an existing facility, or purchase certain medical equipment such as an MRI machine or a hospital bed to first prove to a regulatory body that their community needs the service in question. The approval process can be time consuming and expensive, and it offers incumbent providers an opportunity to oppose the entrance of new competitors. However, it was originally hoped that these laws would, among other things, reduce healthcare price inflation. In this brief, I review the basic economic theory of a supply restriction like CON, then summarize four decades of empirical research on the effect of CON on healthcare spending. There is no evidence that CON regulations limit healthcare price inflation and little evidence that they reduce healthcare spending. In fact, the balance of evidence suggests that CON laws are associated with higher per unit costs and higher total healthcare spending.

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Do Certificate-of-Need Laws Limit Spending?

Matthew D. Mitchell

Economic Theory and the Original Rationale for Certificate of Need

Thirty-five states and the District of Columbia currently impose certificate-of-need (CON) restrictions on the provision of health care.[1] These rules require those hoping to open or expand specific types of healthcare facilities to first prove to a state regulator that their community "needs" the particular service. For example, Virginia providers wishing to open a neonatal intensive care unit, start a rehabilitation center, or even purchase a new CT scanner for an existing practice must first prove to the state health commissioner that their community needs the service in question.[2] Providers wait years and spend tens or even hundreds of thousands of dollars convincing CON authorities to approve their projects.[3] In the process, incumbent providers are often invited to testify against their would-be competitors. It was originally hoped that the CON process would reduce healthcare price inflation, though over the years, the rationale in favor of CON has shifted a number of times.

In 1964, New York implemented the first CON program.[4] A decade later, Congress enacted the National Health Planning and Resources Development Act, thereby withholding

[1] In some states, such as Virginia, these restrictions are known as a Certificate of Public Convenience and Necessity. In July 2016, New Hampshire eliminated its CON program. For more details about the history of CON programs in the states, see Matthew Mitchell and Christopher Koopman, "40 Years of Certificate-of-Need Laws across America," Mercatus Center at George Mason University, Arlington, VA, October 14, 2014.
[2] "CON—Certificate of Need State Laws" (Washington, DC: National Conference of State Legislatures, August 2016), http://www.ncsl.org/research/health/con-certificate-of-need-state-laws.aspx.
[3] Virginia's Dr. Mark Monteferrante spent five years and $175,000 seeking permission to add a second MRI machine to his practice. Kent Hoover, "Doctors Challenge Virginia's Certificate-of-Need Requirement," *Washington Bureau*, *Business Journals*, June 5, 2012.
[4] Mitchell and Koopman, "40 Years of Certificate-of-Need Laws across America."

federal healthcare dollars from any state that failed to implement its own CON program.[5] By 1979, every state except Louisiana had responded to this incentive and implemented a CON program.[6] The federal incentive was repealed in 1987 following a change in Medicare reimbursement practices, and more than a dozen states have since repealed their CON programs. But in 35 states and the District of Columbia, CON laws still restrict the supply of some healthcare services.

The rationale behind the 1974 federal legislation was clear. Under a section titled "Findings and Purpose," Congress declared,

> The massive infusion of Federal funds into the existing health care system has contributed to inflationary increases in the *cost* of health care and failed to produce an adequate supply or distribution of health resources, and consequently has not made possible equal access for everyone to such resources.[7]

Note the emphasis on cost. From the beginning, a primary goal of CON programs was to rein in the excessive growth of healthcare costs.[8] Then, as now, healthcare price inflation was a perennial concern. Note also that the authors of this legislation believed healthcare price inflation to be a result of other federal policies. In what way might a law restricting supply reduce cost? I begin with a simple economic model of supply and demand and then consider three slightly more elaborate models.

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[5] National Health Planning and Resources Development Act of 1974*,* Pub. L. No. 93-641 (1975).
[6] Mitchell and Koopman, "40 Years of Certificate-of-Need Laws across America."
[7] Pub. L. No. 93-641, emphasis added.
[8] For research testing CON's ability to meet the other goals of the National Health Planning and Resources Development Act, see Thomas Stratmann and Jacob Russ, "Do Certificate-of-Need Laws Increase Indigent Care?," Mercatus Working Paper No. 14-20, Mercatus Center at George Mason University, Arlington, VA, July 2014; Thomas Stratmann and Matthew C. Baker, "Are Certificate-of-Need Laws Barriers to Entry? How They Affect Access to MRI, CT, and PET Scans," Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, January 2016; Thomas Stratmann and Christopher Koopman, "Entry Regulation and Rural Health Care: Certificate-of-Need Laws, Ambulatory Surgical Centers, and Community Hospitals," Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, February 2016.

The Simple Model of Supply and Demand

In everyday language, we speak of cost in *per unit* terms: How much does one slice of pizza cost? What is the going rate for a gallon of unleaded gasoline? Simple economic theory offers a straightforward answer to the question of how a supply restriction might reduce this sort of cost: it can't. In a supply-and-demand model, there is no way that a supply restriction can reduce per unit cost. It *might* reduce overall healthcare expenditures—the total amount that people spend on health care in a given time period. But although reducing per unit cost is a worthy goal, it is far from obvious that reducing overall expenditures is desirable. Figure 1 explains why.

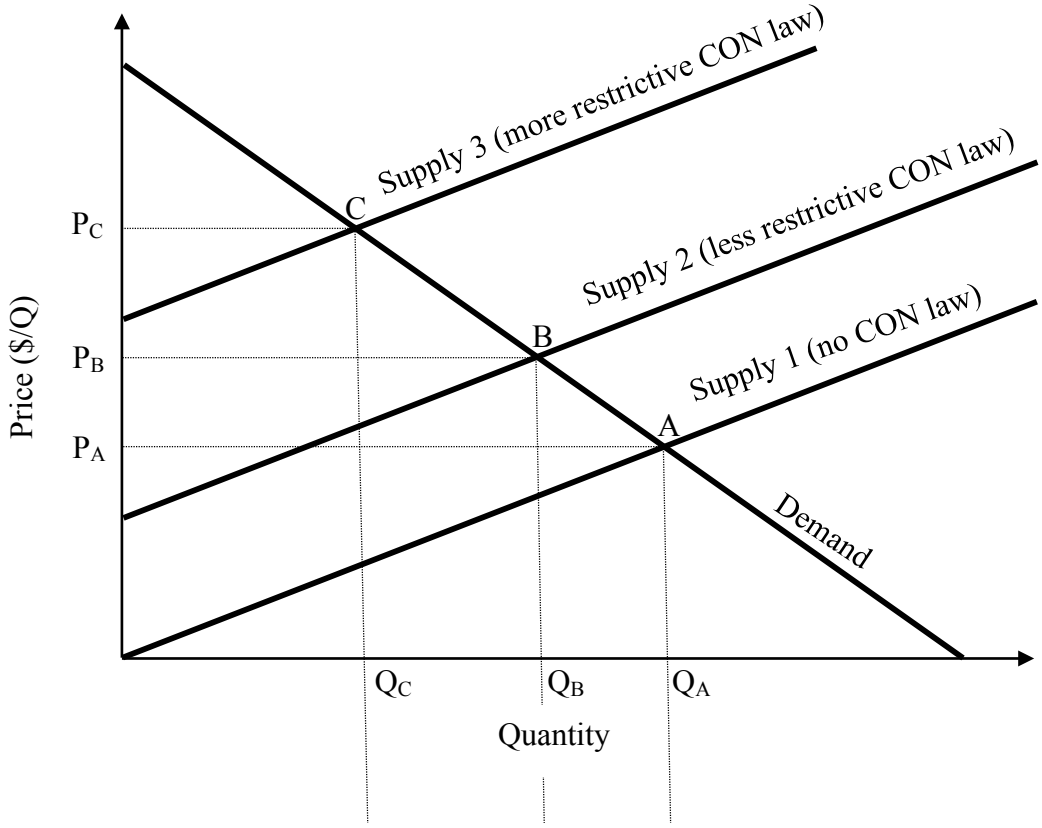
Panel A of figure 1 shows a demand curve intersected by three different supply curves. The market supply of health care without a CON law is indicated by Supply 1. The restricted supply of health care with a CON law is indicated by *either* Supply 2 or Supply 3, with the difference depending on how restrictive the CON process is. Consistent with standard practice, the supply restriction is modeled as a leftward shift in the supply curve; by limiting entry, CON laws ensure that a smaller quantity of services is available at any given price.

Note that as supply is restricted, the per unit price unambiguously rises, and the quantity consumed unambiguously falls. Because the supply restriction causes consumers to pay more and consume less, it unambiguously reduces what economists call "consumer surplus," which is the value that consumers derive from a product in excess of its price.[9]

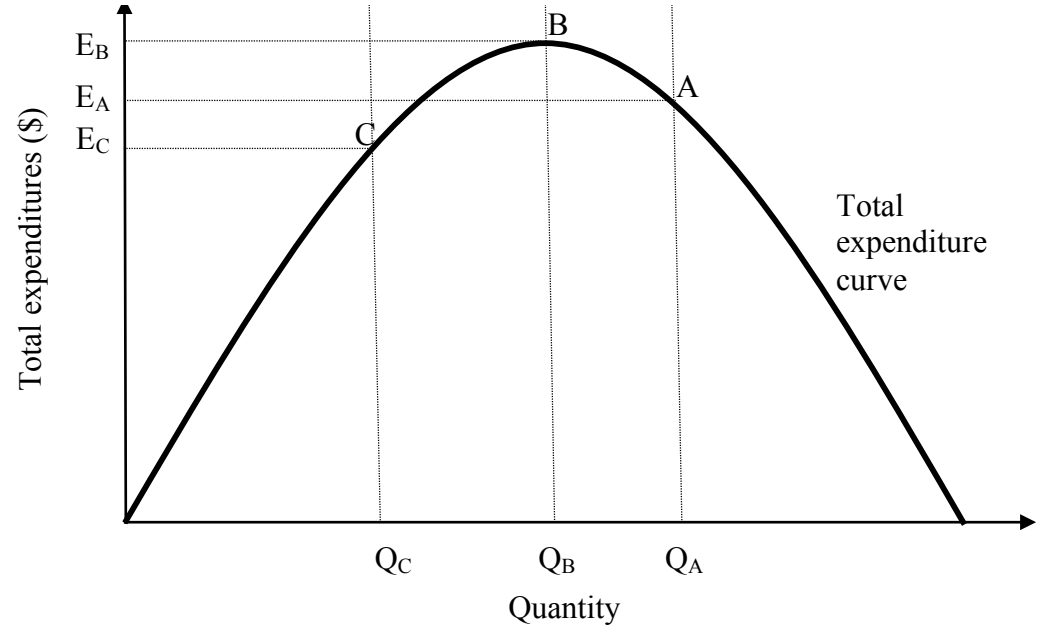
[9] Consumer surplus is measured by the area above the price line and below the demand curve. It gets smaller as supply decreases (shifts leftward). Total producer surplus, measured by the area below the price line and above the supply curve, is also reduced. However, a supply restriction may make a few firms better off by allowing them to capture a larger *portion* of the producer surplus at the expense of other producers. This artificially large portion of producer surplus is known as rent.

Figure 1. A Supply Restriction

Panel A. The Effect of a Supply Restriction on Price



Panel B. The Effect of a Supply Restriction on Total Expenditures



However, because of the third-party-payer problem in health care, patients may not directly pay the higher prices. They and others will indirectly pay higher prices through higher insurance premiums, higher taxes, or both. Patients will, of course, be directly affected by the diminished quantity of healthcare services available to them. That is, they will experience a reduction in welfare resulting from the leftward shift in the quantity of services.

Note, however, that the supply restriction has an *ambiguous* effect on total expenditures. This is because total expenditures—depicted in panel B of figure 1—are equal to the price per unit multiplied by the number of units sold. Because the supply restriction raises the price per unit but lowers the number of units sold, it has an ambiguous effect on total expenditure.

As shown in panel B, total expenditures might rise to E_B or fall to E_C, depending on whether the price increase or the quantity decrease dominates.[10] Note also that if consumers are less price sensitive and the demand curve is steeper (less elastic), the price-increasing effect is likely to dominate, and the supply restriction is likely to increase total expenditures.

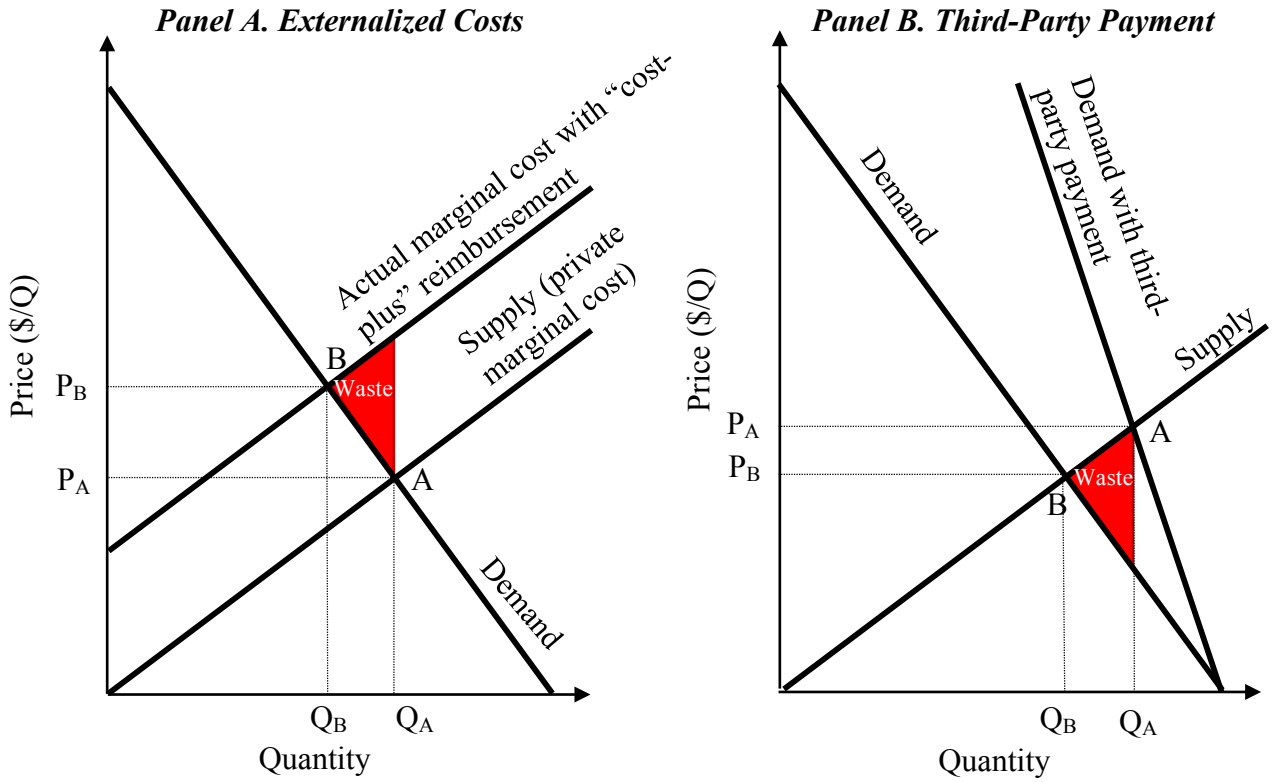
Despite the stated objective of the federal legislation promoting CON, this simple model suggests that CON laws cannot reduce cost in the per unit sense in which most people think of it. Instead, CON laws are expected to increase the per unit cost of healthcare services, although they *might* reduce total expenditures if they restrict consumption enough to outweigh the higher per unit cost. It is important to note, however, that if CON laws do succeed in reducing overall expenditures, they do so only by restricting the availability of services, limiting consumer choice, and reducing consumer welfare.

[10] The answer depends on whether the original, nonrestricted supply curve intersects the demand curve in the elastic portion, above and to the left of B, or in the inelastic portion, below and to the right of B.

Externalities

A more complex model might account for the fact that other public policies have distorted the healthcare market so that market participants are divorced from the true marginal costs of their decisions. In this case, a CON regulation might counteract the harm of such policies, but as we will see, it is hardly the most efficient means of doing so. Figure 2 depicts two ways that public policies might distort the healthcare market by creating an externality. I will consider each in turn.

Figure 2. Externalities



Cost-plus reimbursement. In panel A of figure 2, the equilibrium is at point A, where supply and demand intersect. If providers internalized all their costs, this equilibrium would be efficient because marginal cost would equal marginal benefit. But at the time that many states adopted

CON, Medicare reimbursed hospitals for their costs on a "retrospective" basis. Healthcare researchers Stuart Guterman and Allen Dobson described this reimbursement practice in 1986: "Under this system, hospitals were paid whatever they spent; there was little incentive to control costs, because higher costs brought about higher levels of reimbursement."[11]

This reimbursement method was often referred to as a "cost-plus" system because it encouraged hospitals to overinvest in certain inputs. In other words, hospitals were able to externalize some of their costs of care and to pass them on to taxpayers. As a result, *actual* marginal costs were higher than the private marginal costs of hospitals.

These actual marginal costs are indicated by the marginal cost curve that sits above the supply curve in the left panel of figure 2. With this sort of reimbursement system, the efficient production point would be at point B, where true marginal cost equals marginal benefit. But because firms fail to internalize all costs, the actual equilibrium is at point A, resulting in what economists call a "deadweight loss." This deadweight loss is depicted by the red triangle and is labeled "Waste." It indicates that for the quantity of units of health care between Q_B and Q_A, marginal cost exceeds marginal benefit.

Under this type of reimbursement system, CON laws—by restricting supply—might be one way to move the market toward the more efficient outcome (Q_B). A more straightforward solution, however, would be to change the way Medicare reimburses hospitals. Indeed, Congress pursued this straightforward solution more than 30 years ago with the adoption of Public Law 98-21.[12]

[11] Stuart Guterman and Allen Dobson, "Impact of the Medicare Prospective Payment System for Hospitals," *Health Care Financing Review* 7, no. 3 (Spring 1986): 97–114.
[12] Social Security Amendments of 1983, Pub. L. No. 98-21, 97 Stat. 65 (1983).

That legislation phased in Medicare's Prospective Payment System, thus ending retrospective, cost-plus reimbursement. Therefore, the externalized-costs rationale for CON has not been relevant for decades. As Mark Botti, an official in the Antitrust Division of the Department of Justice, noted in 2007 testimony before the Georgia State Assembly,

> We [antitrust officials at the Department of Justice and the Federal Trade Commission] made that recommendation [that states rethink their CON laws] in part because the original reason for the adoption of CON laws is no longer valid. Many CON programs trace their origins to a repealed federal mandate, the National Health Planning and Resources Development Act of 1974, which offered incentives for states to implement CON programs. At the time, the federal government and private insurance reimbursed healthcare expenses predominantly on a "cost-plus basis." This is a very important point. The original reason for CON laws was not, as some have argued, that competition inherently does not work in healthcare or that market forces promote over-investment. Instead, CON laws were desired because the reimbursement mechanism, i.e., cost-plus reimbursement, incentivized over-investment. The hope was that CON laws would compensate for that skewed incentive. . . . CON laws appear not to have served well even their intended purpose of containing costs. Several studies examined the effectiveness of CONs in controlling costs. The empirical evidence on the economic effects of CON programs demonstrated near-universal agreement among health economists that CON laws were unsuccessful in containing healthcare costs.
>
> In addition to the fact that CON laws have been ineffective in serving their original purpose, CON laws should be reexamined because the reimbursement methodologies that may in theory have justified them initially have changed significantly since the 1970s. The federal government no longer reimburses on a cost-plus basis.[13]

Indeed, it is instructive to note that Congress eliminated the incentive for states to implement CON regulations in 1987, one year after Medicare's new reimbursement practice was fully phased in.

[13] Mark J. Botti, "Competition in Healthcare and Certificates of Need" (Testimony before a Joint Session of the Health and Human Services Committee of the State Senate and the CON Special Committee of the State House of Representatives of the General Assembly of the State of Georgia, US Department of Justice Antitrust Division, Washington, DC, February 23, 2007). In support of his claim that economists were in "near-universal agreement" that CON laws failed to contain healthcare costs, Botti cites David S. Salkever, "Regulation of Prices and Investment in Hospitals in the United States," in *Handbook of Health Economics*, ed. A. J. Culyer and J. P. Newhouse, vol. 1B (New York: Elsevier, 2000), 1489–1535.

The third-party-payer problem. Although policymakers long ago addressed the problem of externalized costs by abandoning cost-plus reimbursement, market participants might be divorced from true marginal cost in another way. Third parties such as governments and insurance companies cover some or all of the costs of decisions made by patients and their providers, and because patients fail to pay the full costs of their decisions, their demand for healthcare services is greater and less price sensitive than it otherwise would be.

Governments currently pay about 64 cents out of every healthcare dollar spent in the United States.[14] But even when taxpayers don't pick up the bill, public policy encourages third-party payment through private insurance. During World War II, wage and price controls prevented employers from paying their employees the prevailing market wage. To attract talented workers, some employers offered fringe benefits such as health insurance because those benefits were not limited by the wage controls. After the controls were lifted, Congress found it difficult to remove the favorable tax treatment of health insurance, and it has remained untaxed ever since.[15]

This favorable tax treatment of health insurance encourages employers to compensate their employees with more (untaxed) benefits and less (taxed) cash. And this arrangement has long been blamed for introducing various distortions to the healthcare market.[16] Among other things, this policy has exacerbated the third-party-payer problem by changing the nature of health insurance. Traditionally, insurance covers low-probability, high-cost events such as death,

[14] David U. Himmelstein and Steffie Woolhandler, "The Current and Projected Taxpayer Shares of US Health Costs," *American Journal of Public Health* 106, no. 3 (March 1, 2016): 449–52.
[15] Rexford E. Santerre and Stephen P. Neun, *Health Economics: Theory, Insights, and Industry Studies*, 5th ed. (Mason, OH: South-Western Publishing, 2010), 316; Milton Friedman, "Pricing Health Care: The Folly of Buying Health Care at the Company Store," *Wall Street Journal*, February 3, 1993.
[16] Martin Feldstein and Bernard Friedman, "Tax Subsidies, the Rational Demand for Insurance and the Health Care Crisis," *Journal of Public Economics* 7, no. 2 (April 1, 1977): 155–78; Jonathan Gruber, "The Tax Exclusion for Employer-Sponsored Health Insurance," *National Tax Journal* 64, no. 2 (2011): 511–30; Jeremy Horpedahl and Harrison Searles, "The Tax Exemption of Employer-Provided Health Insurance," Mercatus on Policy, Mercatus Center at George Mason University, Arlington, VA, September 2013.

accidents, or disease. But in the case of health insurance, favorable tax treatment and various regulatory mandates have caused health insurers to cover entirely predictable expenses such as checkups, screenings, immunizations, diet counseling, breastfeeding consultation, nutritional supplements, and much more.[17]

As a result, patients are able to purchase routine and entirely foreseeable health services while pushing some portion of the cost off onto others who pay insurance premiums. This arrangement has caused the effective demand for healthcare services to be greater and less price sensitive than it otherwise would be, thereby pivoting the demand curve out to the right.[18] This situation is depicted in panel B of figure 2. Here, the equilibrium is at point A, where the "Supply" curve intersects the "Demand with Third-Party Payment" curve. As in the case of externalized costs, the equilibrium is inefficient because marginal cost exceeds the marginal benefit, as indicated by the demand curve.

As in the case of externalized costs, policymakers *might* be able to correct this problem by restricting supply through CON programs, thus raising the price and getting consumers to internalize more of the cost. Note, however, that if this is the goal of CON regulation, it contradicts the *named* goal of reducing cost. Moreover, to do this properly, policymakers would need to estimate how much of the cost is externalized, as well as the degree to which private arrangements such as cost-sharing already correct for this problem.[19] Then they would need to shift the supply curve up by the exact amount of the externalized cost; if the shift were too little or too great, wasteful inefficiencies would remain.

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[17] Maureen Buff and Timothy Terrell, "The Role of Third-Party Payers in Medical Cost Increases," *Journal of American Physicians and Surgeons* 19, no. 2 (Summer 2014): 75–79.
[18] Santerre and Neun, *Health Economics: Theory, Insights, and Industry Studies*, 115–35.
[19] John V. C. Nye, "The Pigou Problem: It Is Difficult to Calculate the Right Tax in a World of Imperfect Coasian Bargains," *Regulation* 31, no. 2 (Summer 2008).

It is not clear that policymakers have the knowledge or the expertise to make this assessment—especially because their decisions are unguided by market signals.[20] Nor is it clear that CON is a precise enough tool to allow them to shift the supply curve the proper amount.

Those considerations aside, CON is hardly the most efficient or equitable way to address the third-party-payer problem. A far more direct approach would be to address the policies that encourage third-party payment in the first place, just as Congress once addressed the externalized cost problem by changing Medicare reimbursement practices.

If, for example, policymakers are concerned that patients are spending too much on health care, a straightforward approach would be to eliminate the tax privilege for employer-provided health insurance and to repeal the insurance mandates that require insurers to cover routine and foreseeable procedures. Doing so would cause the effective demand for health care to more closely resemble patients' actual marginal benefits.

In contrast, CON regulations restrict the ability of everybody to access medical services such as psychiatric care (regulated by CON procedures in 26 states), neonatal intensive care (regulated by 23 states), and MRI scans (regulated by 16 states).[21] This restriction means that all patients—even those who pay out of pocket and don't push costs onto third parties—have less access to valuable medical services.

Before I move on to the third theoretical model, one more point is worth emphasizing. Recall that in the previous section, I noted that a supply restriction would be more likely to increase total expenditures when demand was less elastic. Because the third-party-payer problem

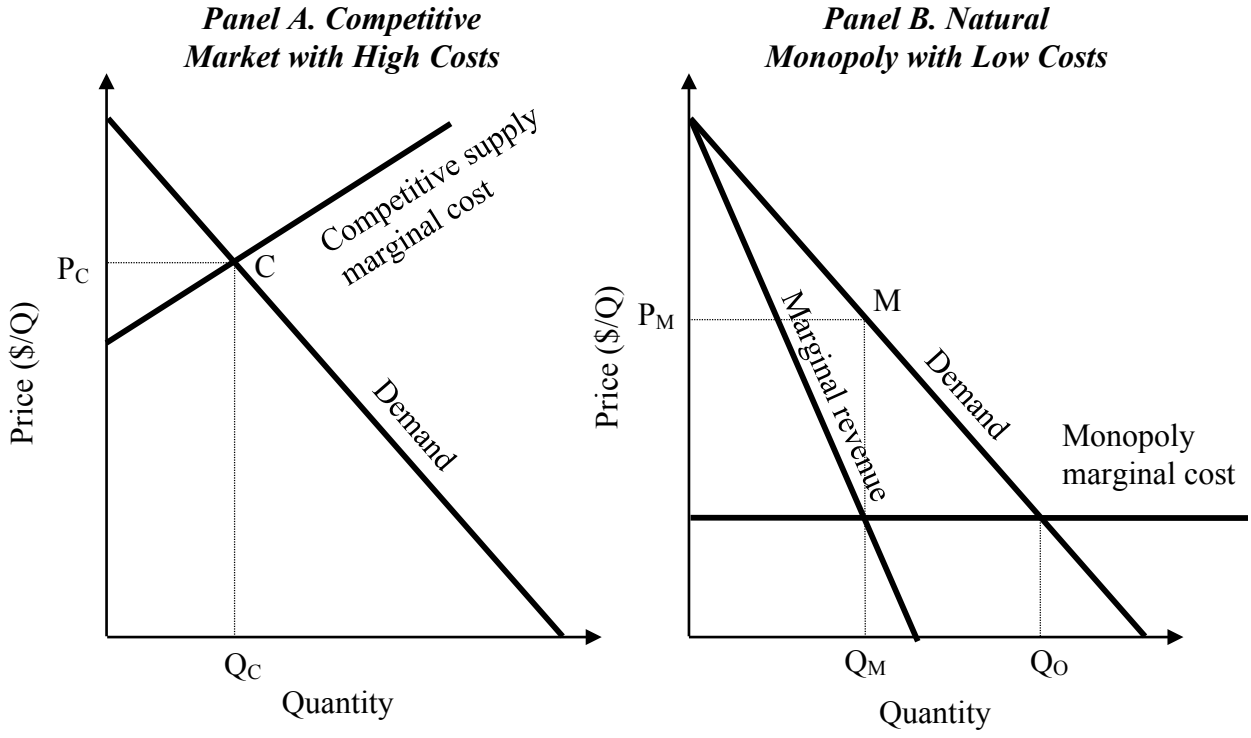
[20] F. A. Hayek, "The Use of Knowledge in Society," *American Economic Review* 35, no. 4 (September 1, 1945): 519–30; F. A. Hayek, "Competition as a Discovery Procedure," trans. Marcellus Snow, *Quarterly Journal of Austrian Economics* 5, no. 3 (Fall 2002): 9–23.
[21] For state CON regulations, see "CON—Certificate of Need State Laws."

tends to cause the effective demand curve to be less elastic than it otherwise would be, this model suggests that CON is likely to increase rather than decrease total expenditures.

Economies of Scale

Another slightly more complex model might posit that there are economies of scale in the provision of medical services and that a few hospitals or even one large hospital might be able to deliver care with a lower cost than can many smaller ones. This situation is depicted in figure 3.

Figure 3. Competition vs. Natural Monopoly



Panel A shows a competitive industry with comparatively high production costs. Because the industry is competitive, firms are unable to mark up the price. Therefore, they set the price at marginal cost P_C.

Panel B shows a monopolist with comparatively low production costs. The monopolist uses its pricing power to set price above marginal cost, at P_M, but even this marked-up price is lower than that charged by the competitive firms, because the monopolist enjoys economies of scale in production.

It is possible that policymakers have this sort of model in mind. Perhaps by channeling more patients to a few hospitals, regulators may allow these individual hospitals to achieve some economies of scale. Relatedly, some policymakers have recently begun to argue that CON might allow these hospitals to increase the quality of their care by becoming more proficient in certain procedures.[22]

As health economists Robert Ohsfeldt and John Schneider observe, however, CON "is an unacceptably blunt instrument for quality enhancement in a sector as innovative and dynamic as health care," especially when there are more direct and effective ways to achieve the same end.[23] In any case, the most recent evidence suggests that, if anything, CON is associated with lower, not higher, quality.[24]

This natural monopoly theory has problems. For one thing, the model is most appropriate in industries such as power production that require large fixed-cost investments in plant but have low marginal costs of operation. This model is only somewhat descriptive of the healthcare

[22] Mary S. Vaughan-Sarrazin et al., "Mortality in Medicare Beneficiaries Following Coronary Artery Bypass Graft Surgery in States with and without Certificate of Need Regulation," *Journal of the American Medical Association* 288, no. 15 (October 16, 2002): 1859–66.
[23] Robert L. Ohsfeldt and John E. Schneider, *The Business of Health: The Role of Competition, Markets, and Regulation* (Washington, DC: AEI Press, 2006), 39.
[24] More recent work, using better data and methods, fails to find a link between CON and quality. See Iona Popescu, Mary S. Vaughan-Sarrazin, and Gary E. Rosenthal, "Certificate of Need Regulations and Use of Coronary Revascularization after Acute Myocardial Infarction," *Journal of the American Medical Association* 295, no. 18 (May 10, 2006): 2141–47. For an overview, see Vivian Ho, Meei-Hsiang Ku-Goto, and James G. Jollis, "Certificate of Need (CON) for Cardiac Care: Controversy over the Contributions of CON," *Health Services Research* 44, no. 2, pt. 1 (April 2009): 483–500. Finally, for one of the best attempts to get at causation, see Thomas Stratmann and David Wille, "Certificate-of-Need Laws and Hospital Quality," Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, September 2016. They find that CON is associated with lower-quality care.

industry, where the marginal cost of healthcare providers' salaries is significant. Additionally, there is reason to believe that when firms are protected from competition, they will have higher, not lower, production costs because administrators will tend to be less disciplined about cost minimization.[25] These factors explain why hospital prices in monopoly markets are more than 15 percent higher than those in markets with four or more competitors.[26]

Most important, however, even if the natural monopoly model did describe the healthcare market, artificial restrictions on entry would be unlikely to improve conditions. The economist David Henderson explains why:

> Economists tend to oppose regulating entry. The reason is as follows: If the industry really is a natural monopoly, then preventing new competitors from entering is unnecessary because no competitor would want to enter anyway. If, on the other hand, the industry is not a natural monopoly, then preventing competition is undesirable. Either way, preventing entry does not make sense.[27]

In other words, as the name implies, a natural monopoly occurs naturally. If the market will bear only one firm, then policymakers need not artificially restrict entry.

The Interest-Group Model for CON

The preceding models have all been normative: they've focused on whether or not CON laws are desirable in the sense that they increase consumer welfare and efficiency. But perhaps the most informative models of CON are positive in the sense that they explain why CON programs exist irrespective of their desirability.

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[25] This finding is known as x-inefficiency. For more details, see Harvey Leibenstein, "Allocative Efficiency vs. 'X-Efficiency,'" *American Economic Review* 56, no. 3 (June 1, 1966): 392–415.
[26] Zack Cooper, Stuart V. Craig, Martin Gaynor, and John Van Reenen, "The Price Ain't Right? Hospital Prices and Health Spending on the Privately Insured," NBER working paper, National Bureau of Economic Research, Cambridge, MA, December 2015.
[27] David R. Henderson, "Natural Monopoly," ed. David R. Henderson, *The Concise Encyclopedia of Economics* (Indianapolis, IN: Liberty Fund Inc., 2008).

Positive models stress that a CON law is a special privilege afforded to a particular interest group, namely the incumbent provider who benefits from a lack of competition. A large body of literature suggests that interest groups seeking special privileges through the political process have an advantage over the consumers and taxpayers who bear the costs of those privileges.

First, it takes time, money, and effort to get politically engaged. But, being few in number, the members of a special interest group typically find it easier than large, diffuse interests to organize for political action.[28]

Second, such groups tend to be well informed about their industry. Often, they are able to capitalize on voter ignorance and irrationality[29] or to use their superior knowledge of the industry to dominate the regulatory process, or both.[30]

Third, concentrated interest groups are often able to control the agenda, thus allowing them to steer committee outcomes to their benefit.[31]

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[28] Mancur Olson, *The Logic of Collective Action: Public Goods and the Theory of Groups,* Second Printing with New Preface and Appendix, Revised (Cambridge, MA: Harvard University Press, 1965); Jonathan Rauch, *Government's End: Why Washington Stopped Working* (New York: PublicAffairs, 1999).

[29] On voter ignorance, see Anthony Downs, *An Economic Theory of Democracy* (New York: Harper & Row, 1957); Geoffrey Brennan and Loren E. Lomasky, *Democracy and Decision: The Pure Theory of Electoral Preference* (Cambridge, UK: Cambridge University Press, 1997). On voter irrationality, see Bryan Caplan, *The Myth of the Rational Voter: Why Democracies Choose Bad Policies* (Princeton, NJ: Princeton University Press, 2008).

[30] George J. Stigler, "The Theory of Economic Regulation," *Bell Journal of Economics and Management Science* 2, no. 1 (April 1, 1971): 3–21; Richard A. Posner, "Theories of Economic Regulation," *Bell Journal of Economics and Management Science* 5, no. 2 (October 1, 1974): 335–58; Sam Peltzman, "Toward a More General Theory of Regulation," *Journal of Law and Economics* 19, no. 2 (August 1, 1976): 211–40; Ernesto Dal Bó, "Regulatory Capture: A Review," *Oxford Review of Economic Policy* 22, no. 2 (June 20, 2006): 203–25; Patrick A. McLaughlin, Matthew Mitchell, and Ethan Roberts, "When Regulation Becomes Privilege," Mercatus Center at George Mason University, Arlington, VA, forthcoming.

[31] On using control of the agenda to determine the outcome, see Duncan Black, "On the Rationale of Group Decision-Making," *Journal of Political Economy* 56, no. 1 (February 1, 1948): 23–34; Kenneth Joseph Arrow, *Social Choice and Individual Values* (New Haven: Yale University Press, 1951); Richard D McKelvey, "Intransitivities in Multidimensional Voting Models and Some Implications for Agenda Control," *Journal of Economic Theory* 12, no. 3 (June 1976): 472–82. On keeping certain items off the agenda, see Peter Bachrach and Morton S. Baratz, "Two Faces of Power," *American Political Science Review* 56, no. 4 (December 1, 1962): 947–52.

Fourth and finally, firms tend to get better at political activity the more they engage in it, giving incumbents a marked advantage over new entrants.[32]

All these factors explain why the CON process seems to favor incumbent firms through features such as steep application fees, long wait periods, and a notice-and-comment process that allows incumbents to argue against competition. They also explain why hospital lobbies typically support CON laws while federal antitrust authorities at the Justice Department and the Federal Trade Commission have long opposed them.[33]

If, as the interest group models imply, CON laws exist to serve special interests rather than the general interest, then those laws are especially costly. Figure 4 demonstrates why. The model assumes, for simplicity, that marginal costs are identical under competitive and monopolistic conditions. (This assumption is made for ease of explanation; it does not drive the analysis.)

Without CON, the market equilibrium would be at A, where marginal cost equals marginal benefit. If an incumbent provider is able to obtain a monopoly privilege through CON, however, then the provider will limit the quantity supplied and will charge a higher price. Standard economic theory predicts that the monopolist will charge price P_B because at that price, marginal revenue is equal to marginal cost, thus maximizing profit. This pricing results in a traditional monopoly deadweight loss, indicated by the red triangle.[34]

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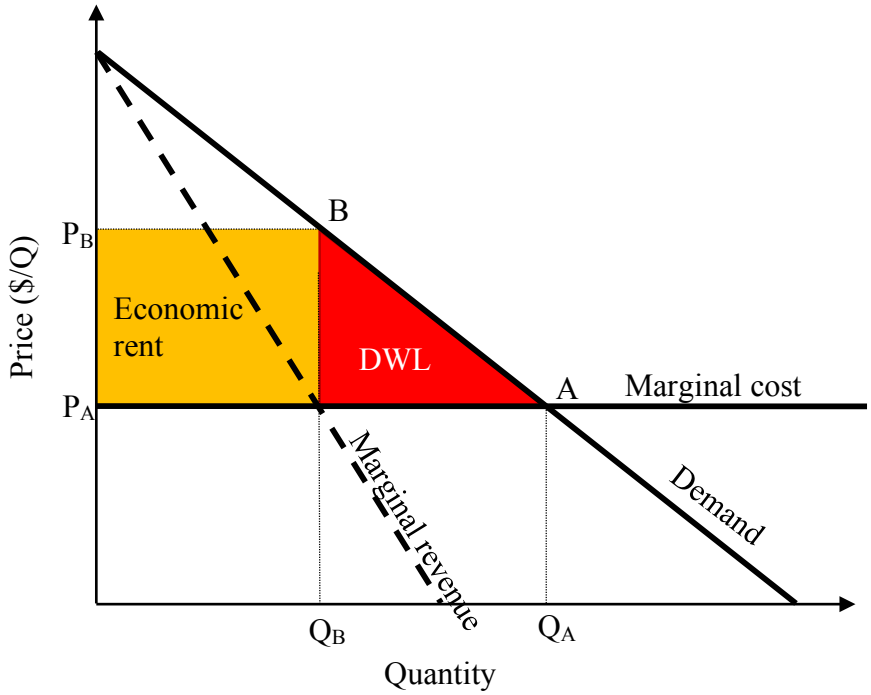
[32] Lee Drutman, *The Business of America Is Lobbying: How Corporations Became Politicized and Politics Became More Corporate* (New York: Oxford University Press, 2015).

[33] For one recent example, see Federal Trade Commission and US Department of Justice, "Joint Statement of the Federal Trade Commission and the Antitrust Division of the U.S. Department of Justice on Certificate-of-Need Laws and South Carolina House Bill 3250," January 2016, https://www.ftc.gov/policy/policy-actions/advocacy-filings/2016/01/joint-statement-federal-trade-commission-antitrust.

[34] Economists consider this an economic loss because consumers and would-be competitors lose more than the monopolist gains. For more details, see James R. Hines, "Three Sides of Harberger Triangles," NBER Working Paper 6852, National Bureau of Economic Research, Cambridge, MA, December 1998.

Figure 4. CON as a Special Interest



But there is a potential for further social losses. The monopolist's profit—which comes at the expense of consumers and would-be competitors—is indicated by the yellow rectangle and is known as "economic rent." Because this rent can represent a substantial economic profit, firms will be willing to invest scarce resources seeking it.[35] They will lobby, donate to political action committees, and alter their business models to satisfy political preferences. Not all those activities are legal. For example, according to federal prosecutors, former HealthSouth CEO Richard Scrushy paid former Alabama Governor Don Siegelman more than $500,000 for a seat

[35] Gordon Tullock, "The Welfare Costs of Tariffs, Monopolies, and Theft," *Western Economic Journal [Economic Inquiry]* 5, no. 3 (June 1, 1967): 224–32; Anne O. Krueger, "The Political Economy of the Rent-Seeking Society," *American Economic Review* 64, no. 3 (1974): 291–303.

on the state's certificate-of-need board. Both men were convicted of bribery (among other crimes) in June 2006.[36]

Illegal or not, this activity has an opportunity cost. This cost is known as "rent-seeking," and it can be enormously wasteful. Indeed, under the right circumstances, firms might be willing to invest more resources in rent-seeking than the rent is even worth.[37]

But this is only one of several costs of special-interest privilege.[38] For example, when firms can obtain anticompetitive privileges, entrepreneurial talents will be directed at seeking those privileges rather than developing new ways to please customers, resulting in what economists call "unproductive entrepreneurship."[39] This practice is especially costly over the long run because it robs an industry of the sort of entrepreneurial dynamism that characterizes healthy growth and because it locks in outdated business models.[40]

For these reasons, the special-interest theory of CON regulation suggests that CON laws will result in higher costs, lower quality, and less innovation.

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[36] Kyle Whitmire, "Ex-Governor and Executive Convicted of Bribery," *New York Times*, June 30, 2006.
[37] Known as "overdissipation," this outcome is possible when there are many rent-seekers and when there are increasing returns to political activity. Gordon Tullock, "Efficient Rent Seeking," in *Toward a Theory of the Rent-Seeking Society*, ed. James M. Buchanan, Robert D. Tollison, and Gordon Tullock (College Station: Texas A&M University Press, 1980), 97–112; Dennis C. Mueller, *Public Choice III,* 3rd ed. (Cambridge, UK: Cambridge University Press, 2003), 331–37. For evidence that there are increasing returns to political activity, see Drutman, *The Business of America Is Lobbying*; Matthew Mitchell, "Of Rent-Seekers and Rent-Givers," review of *The Business of America Is Lobbying*, by Lee Drutman, Library of Law and Liberty, December 14, 2015.
[38] Matthew Mitchell, *The Pathology of Privilege: The Economic Consequences of Government Favoritism* (Arlington, VA: Mercatus Center at George Mason University, 2012).
[39] William J. Baumol, "Entrepreneurship: Productive, Unproductive, and Destructive," *Journal of Political Economy* 98, no. 5 (October 1, 1990): 893–921.
[40] Kevin M. Murphy, Andrei Shleifer, and Robert W. Vishny, "The Allocation of Talent: Implications for Growth," *Quarterly Journal of Economics* 106, no. 2 (May 1, 1991): 503–30; Kevin Murphy, Andrei Shleifer, and Robert Vishny, "Why Is Rent-Seeking So Costly to Growth?," *American Economic Review Papers and Proceedings* 83, no. 2 (1993): 409–14; Stephen L. Parente and Edward C. Prescott, *Barriers to Riches*, repr. ed. (Cambridge, MA: MIT Press, 2002); Adam Thierer, *Permissionless Innovation: The Continuing Case for Comprehensive Technological Freedom* (Arlington, VA: Mercatus Center at George Mason University, 2014).

Summary of the Economic Theory

In this section, I have reviewed several economic models of a supply restriction such as CON. None of those theories suggest that a CON regulation will decrease healthcare prices. Instead, theory predicts that a CON regulation will raise per unit cost, limit the supply of healthcare services, reduce consumer welfare, and lead to the misallocation of resources in rent-seeking activity.

Theory suggests that CON laws might reduce healthcare expenditures if the effects of the quantity reduction outweigh the effects of the price increases. But this theory would only hold if the demand for health care were relatively elastic, which is unlikely given the third-party-payer problem. CON regulations might mitigate a policy-induced externality, but they are hardly the most efficient or equitable means of doing so.

In the next section, I turn to the data and examine 40 years of empirical studies on the effects of CON on spending.

What Do the Data Show?

Table 1 reports the empirical literature assessing the effect of CON on various spending outcomes. For ease of reference, the studies are divided into four categories: (1) the effect of CON on cost per procedure, price, or charge; (2) the effect of CON on total expenditures; (3) the effect of CON on efficiency; and (4) the effect of CON on investment. Studies that assess CON along multiple spending outcomes appear more than once in the table. The scope of the analysis is limited to only published, peer-reviewed papers, and it encompasses 20 studies spanning the course of 40 years.[41]

[41] Being focused on published, peer-reviewed papers, the table omits some high-quality government reports that were prepared by academics. Those reports are consistent with the findings reported in the table. See, for example, Daniel Sherman, "The Effect of State Certificate-of-Need Laws on Hospital Costs: An Economic Policy Analysis," Staff Report of the Bureau of Economics, Federal Trade Commission, Washington, DC, January 1988; Christopher J. Conover and Frank A. Sloan, "Evaluation of Certificate of Need in Michigan," Report to the Michigan Department of Community Health (Durham, NC: Duke University Center for Health Policy, Law, and Management, May 2003), http://ushealthpolicygateway.com/wp-content/uploads/2009/07/mi-con-intro-iii.pdf.

Table 1. Empirical Studies of CON and Spending

Author(s)	Year	Title	Publication	Effect of CON on cost/price/investment/efficiency	Quotes
Effect of CON on per unit costs, prices, or charges					
Noether	1988	"Competition among Hospitals"	*Journal of Health Economics*	CON increases the average price for specific disease categories such as congestive heart failure and pneumonia.	"CON's strongest effect is that it creates cost-raising inefficiencies which are passed on in higher prices."
Grabowski, Ohsfeldt, and Morrisey	2003	"The Effects of CON Repeal on Medicaid Nursing Home and Long-Term Care Expenditures"	*Inquiry: The Journal of Medical Care Organization, Provision, and Financing*	CON repeal has no statistically significant effect on per diem Medicaid nursing home charges or per diem Medicaid long-term-care charges.	"The results . . . show that regulatory change did not have a statistically significant effect on either Medicaid payment rates or overall days."
Ho and Ku-Goto	2013	"State Deregulation and Medicare Costs for Acute Cardiac Care"	*Medical Care Research and Review*	Removing CON decreases the cost of some procedures.	"We found that states that dropped CON experienced lower costs per patient for coronary artery bypass grafts (CABG) but not for percutaneous coronary intervention (PCI)."
Bailey	2016	"Can Health Spending Be Reined In through Supply Constraints? An Evaluation of Certificate of Need Laws"	Mercatus Working Paper, Mercatus Center at George Mason University	Removing CON reduces hospital charges by 5.5% five years after repeal.	"CON repeal . . . is associated with . . . a statistically significant 1.1% reduction in average hospital charges per year (a 5.5% reduction for a mature CON repeal)."
Effect of CON on expenditures					
Sloan and Steinwald	1980	"Effects of Regulation on Hospital Costs and Input Use"	*Journal of Law and Economics*	Comprehensive CON programs have no effect on hospital expenditures per patient day, while noncomprehensive programs increase hospital expenditures per patient day.	"The short-run effect of a mature, noncomprehensive program is to raise total expense per adjusted patient day by nearly 5 percent; the long-run effect is over twice this."
Sloan	1981	"Regulation and the Rising Cost of Hospital Care"	*Review of Economics and Statistics*	CON has no effect on hospital expenditures per admission, per patient day, or per adjusted patient day.	"The certificate-of-need coefficients imply CON has had no impact on costs."
Lanning, Morrisey, and Ohsfeldt	1991	"Endogenous Hospital Regulation and Its Effects on Hospital and Non-Hospital Expenditures"	*Journal of Regulatory Economics*	CON increases per capita hospital, nonhospital, and total health expenditures.	". . . the coefficient of CON is positive and statistically significant in all three expenditure equations. The most pronounced effect is on hospital expenditures, where CON appears to add 20.6 percent to per capita hospital expenditures in the long run. This is consistent with the view that CON programs act to protect inefficient hospitals from competition."

Antel, Ohsfeldt, and Becker	1995	"State Regulation and Hospital Costs"	*Review of Economics and Statistics*	CON increases per-day and per-admission hospital expenditures but has no relationship to per capita hospital expenditures.	"CON investment controls imply higher per day and per admission costs, but have no statistically significant effect on per capita cost."
Conover and Sloan	1998	"Does Removing Certificate-of-Need Regulations Lead to a Surge in Health Care Spending?"	*Journal of Health Politics, Policy, and Law*	CON has no effect on total per capita health expenditures; there is no evidence of a surge in spending after repeal.	"Mature CON programs are associated with a modest (5 percent) long-term reduction in acute care spending per capita, but not with a significant reduction in total per capita spending. There is no evidence of a surge in acquisition of facilities or in costs following removal of CON regulations."
Miller, Harrington, and Goldstein	2002	"Access to Community-Based Long-Term Care: Medicaid's Role"	*Journal of Aging and Health*	CON increases per capita Medicaid community-based care expenditures.	"Use of a nursing home CON or combined CON/moratorium was associated with increased community-based care expenditures."
Grabowski, Ohsfeldt, and Morrisey	2003	"The Effects of CON Repeal on Medicaid Nursing Home and Long-Term Care Expenditures"	*Inquiry: The Journal of Medical Care Organization, Provision, and Financing*	CON repeal has no statistically significant effect on either aggregate Medicaid nursing-home or aggregate Medicaid long-term-care expenditures.	"Using aggregate state-level data from 1981 through 1998, this study found that states that repealed their CON and moratorium laws had no significant growth in either nursing home or long-term care Medicaid expenditures"
Rivers, Fottler, and Younis	2007	"Does Certificate of Need Really Contain Hospital Costs in the United States?"	*Health Education Journal*	CON laws increase hospital expenditures per adjusted admission.	"The results indicate that CON laws had a positive, statistically significant relationship to hospital costs per adjusted admission. . . .These findings suggest not only that CON do not really contain hospital costs, but may actually increase them by reducing competition."
Hellinger	2009	"The Effect of Certificate-of-Need Laws on Hospital Beds and Healthcare Expenditures: An Empirical Analysis"	*American Journal of Managed Care*	CON is associated with fewer hospital beds, which in turn are associated with slower growth in aggregate health expenditures per capita. But there is no direct relationship between CON and health expenditures per capita.	"Certificate-of-need programs did not have a direct effect on healthcare expenditures. . . . Certificate-of-need programs have limited the growth in the supply of hospital beds, and this has led to a slight reduction in the growth of healthcare expenditures."
Rivers, Fottler, and Frimpong	2010	"The Effects of Certificate of Need Regulation on Hospital Costs"	*Journal of Health Care Finance*	Stringent CON programs increase hospital expenditures per admission.	"Implications from these results include the inability of CNR [CON] to contain HC [hospital costs] as assumed or expected, and the possibility that CNR [CON] may actually increase HC [hospital costs], while reducing competition."
Rahman et al.	2016	"The Impact of Certificate-of-Need Laws on Nursing Home and Home Health Care Expenditures"	*Medical Care Research and Review: MCRR*	CON increases the growth in Medicare and Medicaid expenditures on nursing home care but decreases growth in home healthcare expenditures.	"Compared with states without CON laws, Medicare and Medicaid spending in states with CON laws grew faster for nursing home care and more slowly for home health care."

Bailey	2016	"Can Health Spending Be Reined In through Supply Constraints? An Evaluation of Certificate of Need Laws"	Mercatus Working Paper, Mercatus Center at George Mason University	CON is associated with higher overall per capita healthcare expenditures and with higher per capita Medicare expenditures.	"CON increases total health spending [per capita] by a statistically significant 3.1%. Increases are especially high for spending on physician care—a statistically significant 5.0%. . . . CON is estimated to increase overall Medicare spending [per capita] by a statistically significant 6.9%."
Effect of CON on Hospital Efficiency					
Eakin	1991	"Allocative Inefficiency in the Production of Hospital Services"	*Southern Economic Journal*	CON hospitals are less efficient than non-CON hospitals.	". . . hospitals subject to CON regulations have a greater measure of allocative inefficiency by .88 to 1.03 percentage points."
Bates, Mukherjee, and Santerre	2006	"Market Structure and Technical Efficiency in the Hospital Services Industry: A DEA Approach"	*Medical Care Research and Review*	CON hospitals are not any less efficient than non-CON hospitals.	"Evidence also implies that the presence of a state certificate-of-need law was not associated with a greater degree of inefficiency in the typical metropolitan hospital services industry."
Ferrier, Leleu, and Valdmanis	2010	"The Impact of CON Regulation on Hospital Efficiency"	*Health Care Management Science*	CON hospitals are more efficient than non-CON hospitals.	"In general, we found that the hospital sector in states with active CON regulations performed better in terms of aggregate technical and mix efficiency, irrespective of the stringency or laxness of this oversight."
Rosko and Mutter	2014	"The Association of Hospital Cost-Inefficiency with Certificate-of-Need Regulation"	*Medical Care Research and Review*	CON hospitals are more efficient than non-CON hospitals.	"Average estimated cost-inefficiency was less in CON states (8.10%) than in non-CON states (12.46%)."
Effect of CON on Investment					
Salkever and Bice	1976	"The Impact of Certificate of Need Controls on Hospital Investment"	*Milbank Memorial Fund Quarterly: Health and Society*	CON does not decrease investment but does change its composition.	"CON did not reduce the total dollar volume of investment but altered its composition, retarding expansion in bed supplies but increasing investment in new services and equipment."
Hellinger	1976	"The Effect of Certificate-of-Need Legislation on Hospital Investment"	*Inquiry: The Journal of Medical Care Organization, Provision, and Financing*	CON legislation induced hospitals to increase investments.	"The empirical results support the hypotheses that [CON] legislation has not significantly lowered hospital investment and that hospitals anticipated the effect of [CON] legislation by increasing investment in the period preceding the enactment of the legislation."

Per Unit Costs, Prices, and Charges

The first four studies summarized in table 1 address the idea of cost as it is commonly used in everyday language.[42] Those studies assess the effect of CON on *per unit* costs, prices, or charges (a charge is the initial amount that the payer is billed, whereas a price is the amount that the payer actually pays after negotiation).[43]

As noted in the previous section, economic theory suggests that a supply restriction is likely to increase per unit costs and prices. And, indeed, the empirical evidence is consistent with this prediction. Three of these four studies found CON to be associated with higher per unit prices, costs, or charges, while the fourth—which focused only on per diem Medicaid charges for nursing-home and long-term care—found that repeal of CON had no statistically significant effect on those charges.[44]

One study found that "CON's strongest effect is that it creates cost-raising inefficiencies which are passed on in higher prices."[45] Another found that removing CON decreased the per unit cost of coronary artery bypass grafts, though not the cost of percutaneous coronary intervention.[46] The most recent study found that average hospital charges fell 1.1 percent per

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[42] Monica Noether, "Competition among Hospitals," *Journal of Health Economics* 7, no. 3 (September 1988): 259–84; David C. Grabowski, Robert L. Ohsfeldt, and Michael A. Morrisey, "The Effects of CON Repeal on Medicaid Nursing Home and Long-Term Care Expenditures," *Inquiry: The Journal of Medical Care Organization, Provision, and Financing* 40, no. 2 (2003): 146–57; Vivian Ho and Meei-Hsiang Ku-Goto, "State Deregulation and Medicare Costs for Acute Cardiac Care," *Medical Care Research and Review* 70, no. 2 (April 2013): 185–205; James Bailey, "Can Health Spending Be Reined In through Supply Constraints? An Evaluation of Certificate-of-Need Laws," Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, July 2016.

[43] Although prices are more important, economically, charges are easier to observe. For more details, see Bailey, "Can Health Spending Be Reined In through Supply Constraints?"

[44] The three studies that found CON increases prices, charges, or per unit costs were Noether, "Competition among Hospitals"; Ho and Ku-Goto, "State Deregulation and Medicare Costs for Acute Cardiac Care"; and Bailey, "Can Health Spending Be Reined In through Supply Constraints?" The study that failed to find any statistically significant effect was Grabowski, Ohsfeldt, and Morrisey, "The Effects of CON Repeal on Medicaid Nursing Home and Long-Term Care Expenditures."

[45] Noether, "Competition among Hospitals."

[46] Ho and Ku-Goto, "State Deregulation and Medicare Costs for Acute Cardiac Care."

year for each of the five years following repeal of CON; in other words, five years following repeal, the charges were 5.5 percent lower than they would otherwise have been.[47]

Expenditures

The next 12 studies in table 1 assess the effect of CON on healthcare expenditures or on the growth of those expenditures, usually measured on a per capita basis.[48] In other words, the studies assess the effect of CON on the total amount that is spent on a patient or state resident, rather than on the price per unit of service. In this sense, those studies are comparable to the effect described in panel B of figure 1.[49] As noted previously, that theoretical framework shows that a supply restriction such as CON might lead to either more spending or less spending, depending on whether the price-raising effect or quantity-reducing effect of the supply restriction dominates.

[47] Bailey, "Can Health Spending Be Reined In through Supply Constraints?"

[48] Frank A. Sloan and Bruce Steinwald, "Effects of Regulation on Hospital Costs and Input Use," *Journal of Law and Economics* 23, no. 1 (1980): 81–109; Frank A. Sloan, "Regulation and the Rising Cost of Hospital Care," *Review of Economics and Statistics* 63, no. 4 (1981): 479–87; Joyce A. Lanning, Michael A. Morrisey, and Robert L. Ohsfeldt, "Endogenous Hospital Regulation and Its Effects on Hospital and Non-Hospital Expenditures," *Journal of Regulatory Economics* 3, no. 2 (June 1991): 137–54; John J. Antel, Robert L. Ohsfeldt, and Edmund R. Becker, "State Regulation and Hospital Costs," *Review of Economics and Statistics* 77, no. 3 (1995): 416–22; Christopher J. Conover and Frank A. Sloan, "Does Removing Certificate-of-Need Regulations Lead to a Surge in Health Care Spending?," *Journal of Health Politics, Policy, and Law* 23, no. 3 (June 1, 1998): 455–81; Nancy A. Miller, Charlene Harrington, and Elizabeth Goldstein, "Access to Community-Based Long-Term Care: Medicaid's Role," *Journal of Aging and Health* 14, no. 1 (February 2002): 138–59; Grabowski, Ohsfeldt, and Morrisey, "The Effects of CON Repeal on Medicaid Nursing Home and Long-Term Care Expenditures"; Patrick A. Rivers, Myron D. Fottler, and Mustafa Zeedan Younis, "Does Certificate of Need Really Contain Hospital Costs in the United States?," *Health Education Journal* 66, no. 3 (September 1, 2007): 229–44; Fred J. Hellinger, "The Effect of Certificate-of-Need Laws on Hospital Beds and Healthcare Expenditures: An Empirical Analysis," *American Journal of Managed Care* 15, no. 10 (October 2009): 737–44; Patrick A. Rivers, Myron D. Fottler, and Jemima A. Frimpong, "The Effects of Certificate of Need Regulation on Hospital Costs," *Journal of Health Care Finance* 36, no. 4 (2010): 1–16; Momotazur Rahman et al., "The Impact of Certificate-of-Need Laws on Nursing Home and Home Health Care Expenditures," *Medical Care Research and Review: MCRR* 73, no. 1 (February 2016): 85–105; Bailey, "Can Health Spending Be Reined In through Supply Constraints?"

[49] It is not uncommon for such papers to use the term *cost*, but their focus is on expenditure in the sense that they are looking at total spending and not at the cost per service.

Of those 12 studies, only one suggests that CON is associated with reduced expenditures.[50] And even in that case, the connection was tenuous. The author found CON to be associated with fewer hospital beds, and he found that fewer hospital beds were associated with slightly slower growth in aggregate healthcare expenditures per capita. Importantly, however, he found that "certificate-of-need programs did not have a direct effect on healthcare expenditures."[51]

Of the remaining 11 studies that assess the effect of CON on expenditures, 7 found evidence that CON increases expenditures,[52] 2 found no statistically significant effect,[53] and 2 found that CON increased some expenditures while reducing others.[54]

Hospital Efficiency

The next four studies in table 1 assess the effect of CON on hospital efficiency.[55] Essentially, those studies examine how cost-effectively hospitals transform inputs into outputs.[56] Economic theory offers no clear prediction for how CON might affect an individual hospital's efficiency.

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[50] Hellinger, "The Effect of Certificate-of-Need Laws on Hospital Beds and Healthcare Expenditures."
[51] Ibid., 737.
[52] Sloan and Steinwald, "Effects of Regulation on Hospital Costs and Input Use"; Lanning, Morrisey, and Ohsfeldt, "Endogenous Hospital Regulation and Its Effects on Hospital and Non-Hospital Expenditures"; Antel, Ohsfeldt, and Becker, "State Regulation and Hospital Costs"; Miller, Harrington, and Goldstein, "Access to Community-Based Long-Term Care"; Rivers, Fottler, and Younis, "Does Certificate of Need Really Contain Hospital Costs in the United States?"; Rivers, Fottler, and Frimpong, "The Effects of Certificate of Need Regulation on Hospital Costs"; Bailey, "Can Health Spending Be Reined In through Supply Constraints?"
[53] Sloan, "Regulation and the Rising Cost of Hospital Care"; Grabowski, Ohsfeldt, and Morrisey, "The Effects of CON Repeal on Medicaid Nursing Home and Long-Term Care Expenditures."
[54] Conover and Sloan, "Does Removing Certificate-of-Need Regulations Lead to a Surge in Health Care Spending?"; Rahman et al., "The Impact of Certificate-of-Need Laws on Nursing Home and Home Health Care Expenditures."
[55] B. Kelly Eakin, "Allocative Inefficiency in the Production of Hospital Services," *Southern Economic Journal* 58, no. 1 (1991): 240–48; Laurie J. Bates, Kankana Mukherjee, and Rexford E. Santerre, "Market Structure and Technical Efficiency in the Hospital Services Industry: A DEA Approach," *Medical Care Research and Review* 63, no. 4 (August 2006): 499–524; Gary D. Ferrier, Hervé Leleu, and Vivian Valdmanis, "The Impact of CON Regulation on Hospital Efficiency," *Health Care Management Science* 13, no. 1 (March 2010): 84–100; Michael D. Rosko and Ryan L. Mutter, "The Association of Hospital Cost-Inefficiency with Certificate-of-Need Regulation," *Medical Care Research and Review* 71, no. 3 (January 22, 2014): 280–298.
[56] For more details see Bates, Mukherjee, and Santerre, "Market Structure and Technical Efficiency in the Hospital Services Industry."

Although most of the theoretical models reviewed in the previous section suggest that CON will increase per unit prices and reduce the quantity of healthcare services, it is possible that by forcing more services to take place in a few large hospitals, CON might allow those hospitals to achieve economies of scale, even if this reduction comes at the price of reduced services elsewhere. Indeed, the empirical literature is mixed on CON and particular hospital efficiency. Two studies find that CON increases some measures of hospital efficiency,[57] one study finds no effect,[58] and one study finds that CON reduces hospital efficiency.[59]

Hospital Investment

Two early studies assessed the effect of CON on investment. Those studies reflect the goal of reducing unnecessary capital expenditures. One of the studies found that CON failed to reduce investment, though it did change the composition of the investment.[60] The other study found that CON backfired, causing hospitals to increase investment immediately before CON was implemented in anticipation that it would make future investments more difficult.[61]

Conclusion

In most industries, the economic viability of a new product or service is determined by the market signals of prices, profit, and loss. These signals are governed by the values of consumers and producers. If market participants do not deem a product or service to be worth

[57] Ferrier, Leleu, and Valdmanis, "The Impact of CON Regulation on Hospital Efficiency"; Rosko and Mutter, "The Association of Hospital Cost-Inefficiency with Certificate-of-Need Regulation."
[58] Bates, Mukherjee, and Santerre, "Market Structure and Technical Efficiency in the Hospital Services Industry."
[59] Eakin, "Allocative Inefficiency in the Production of Hospital Services."
[60] David S. Salkever and Thomas W. Bice, "The Impact of Certificate-of-Need Controls on Hospital Investment," *Milbank Memorial Fund Quarterly: Health and Society* 54, no. 2 (1976): 185–214.
[61] Fred J. Hellinger, "The Effect of Certificate-of-Need Legislation on Hospital Investment," *Inquiry: The Journal of Medical Care Organization, Provision, and Financing* 13, no. 2 (1976): 187–93.

the opportunity cost of producing it, the product or service will not be economically viable and will soon disappear.

In the healthcare markets of 35 states and the District of Columbia, however, many of the decisions are not left to market participants. Instead, they are governed by regulators empowered to permit—or refuse to permit—new and expanded services. Those laws are called certificate-of-need laws because regulators are supposed to determine whether or not consumers need the services in question.

Providers seeking permission to operate can spend years and tens or even thousands of dollars attempting to obtain permission. During this process, incumbent providers are often invited to offer their own opinion about the desirability of competition.

Although CON regulations were once promoted by the federal government as a way to limit healthcare costs, economic theory offers little reason to suppose they work as intended. Instead, economic theory predicts that a supply restriction such as CON will increase per unit costs and decrease the quantity of services. Furthermore, it predicts that CON laws may lead to either increases or decreases in total healthcare spending, depending on whether the price-increasing or the quantity-reducing effects of CON dominate.

Although CON laws may help internalize externalities created by other public policies such as insurance mandates and public funding, a more efficient and equitable way to address these externalities would be to reform the policies that cause them. Even though CON laws might allow individual hospitals to increase efficiency by channeling more patients to one location, thus achieving economies of scale, these laws might alternatively decrease hospital efficiency by making administrators less cost conscious. Finally, economic theory predicts that

CON laws will allow small but concentrated special interests to profit at the expense of consumers and other providers.

A review of 20 peer-reviewed academic studies finds that CON laws have worked largely as economic theory predicts and that they have failed to achieve their stated goal of cost reduction. The overwhelming weight of evidence suggests that CON laws are associated with both higher per unit costs and higher total expenditures. The evidence is mixed on whether CON laws have increased the efficiency of particular hospitals by channeling more patients through fewer facilities, and there is no evidence that CON decreased overall investment as its proponents had hoped. The weight of evidence suggests that CON regulations persist because they protect politically potent special interests from competition.

Entry Regulation and Rural Health Care

Certificate-of-Need Laws, Ambulatory Surgical Centers, and Community Hospitals

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Abstract

Certificate-of-need (CON) laws disallow hospitals, nursing homes, ambulatory surgical centers (ASCs), and other healthcare providers from entering new markets, expanding their practice, or making certain capital investments without first receiving approval from state regulators. These laws are currently in effect in 36 states. Over the past 40 years, CON laws have been justified as a way to achieve numerous public policy goals, such as controlling costs, increasing charity care, and protecting access to health care in rural communities by shielding hospitals from increased competition. However, the effects of CON laws on rural health care are not well understood. We examine the effect of entry regulation on ASCs and community hospitals and find that there are both more rural hospitals and more rural ambulatory surgical centers per capita in states without a CON program regulating the opening of an ASC. This finding indicates that CON laws may not be protecting access to rural health care, but are instead correlated with decreases in rural access.

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Entry Regulation and Rural Health Care:

Certificate-of-Need Laws, Ambulatory Surgical Centers, and Community Hospitals

Thomas Stratmann and Christopher Koopman

I. Introduction

Certificate-of-need (CON) laws currently restrict the entry or expansion of healthcare facilities in 36 states.[1] These laws prohibit hospitals, nursing homes, ambulatory surgical centers, and other healthcare providers from expanding their practice in the same area, from creating new facilities in a different location in the state, or from making certain capital investments without first receiving approval from state regulators. These programs are implemented with the expressed purpose of achieving a number of public policy goals. Three primary goals are consistent across most certificate-of-need programs: controlling cost, increasing charity care, and providing medical access in rural healthcare markets.

In order to achieve the third goal—protecting medical access in rural markets (as well as other geographical areas that are deemed underserved)—many states have sought to regulate the entry and expansion of "hospital substitutes,"[2] which include ambulatory surgical centers (ASCs) (Cimasi 2005). The theory is that allowing competition between general hospitals and ASCs will

[1] While 36 states have CON programs, they vary significantly in both the stringency of the review process and the services and equipment covered. For example, Ohio regulates only one service (long-term acute care) while Vermont regulates 30 categories of medical services and equipment (AHPA 2012).

[2] To understand the theoretical underpinnings for using CON programs to protect access, see Colon Health Centers of America v. Hazel et al., No. 14-2283, slip op. at 23 (4th Cir. 2016), which notes,

> A related purpose of the CON program is geographical in nature. For reasons not difficult to discern, medical services tend to gravitate toward more affluent communities. The CON program aims to mitigate that trend by incentivizing healthcare providers willing to set up shop in underserved or disadvantaged areas such as Virginia's Eastern Shore and far Southwest. "In determining whether" to issue a certificate, for example, Virginia considers "the effects that the proposed service or facility will have on access to needed services in areas having distinct and unique geographic, socioeconomic, cultural, transportation, or other barriers to access to care." Va. Code Ann. § 32.1-102.3(B)(1).

The CON program may also aid underserved consumers in a more indirect fashion. By reducing competition in highly profitable operations, the program may provide existing hospitals with the revenue they need not only to provide indigents with care, but also to support money-losing but nonetheless important operations like trauma centers and neonatal intensive care units.

result in "cream skimming," meaning that ASCs will accept only the more profitable, less complicated, and well-insured patients while hospitals will be left to treat the less profitable, more complicated, and uninsured patients (Tynan et al. 2009). Some raise the concern that allowing free entry by ASCs will increase cream-skimming, which may harm the financial sustainability of hospitals and in addition adversely affect access to health care in rural areas (Piper 2004; Tynan 2009). As a result, states have chosen to regulate how these providers enter a market, with the goal of protecting access to health care by protecting community hospitals. Currently, 26 states regulate the entry of ASCs through their CON programs. Moreover, Piper (2004) notes that a number of states have considered creating additional, special criteria for these providers in an effort to further protect against cream-skimming and to protect access to hospitals in rural areas.

But are these programs achieving their intended goals? There have already been studies on cost control (Sloan and Steinwald 1980; Sloan 1981; Joskow 1980; Joskow 1981) and on charity care (Stratmann and Russ 2014). However, little is known about the effects that specific entry regulations for ASCs have on healthcare access in rural, or otherwise traditionally underserved, communities.

In this paper, we analyze whether CON programs, by regulating entry of nonhospital providers, have affected competition between nonhospitals and hospitals, as measured by the number of these respective providers. We find that, contrary to the intended goal of protecting access, the presence of a CON program in a state is correlated with both fewer community hospitals per capita and fewer ASCs per capita across an entire state and specifically within its rural areas. Our finding that non-CON states have both more community hospitals and more ASCs per capita is not consistent with the hypothesis that ASCs divert the most profitable

patients from community hospitals and are therefore a threat to their existence. If the presence of many ASCs drives community hospitals out of the market, then it is unlikely that they would both be more concentrated in the same areas.

Our paper is organized as follows: Section II provides a brief history of the healthcare certificate-of-need programs. Section III discusses the various justifications for CON programs since the 1960s and also surveys the research on CON laws. Section IV provides a brief discussion of the hypotheses we intend to test. Section V includes our description of the data used and outlines our empirical strategy. We present our results in section VI and discuss these results in section VII. The conclusion in section VIII outlines the implications of these findings for policymakers.

II. A Brief History of State Certificate-of-Need Programs

While CON laws were initially a creation of some state governments, their diffusion across the country is the result of policies created by the federal government. New York was the first state to adopt a CON program in 1964. The purpose was to strengthen regional health planning programs by creating a process for prior approval of certain capital investments (Simpson 1985). Between 1964 and 1974, 26 other states adopted CON programs. However, with the passage of the National Health Planning and Resources Development Act of 1974 (NHPRDA), the availability of certain federal funds was made contingent on enactment of CON programs. That is, if states wanted to remain eligible for federal funding, they had to enact CON programs. In the seven years following the passage of NHPRDA, nearly every state implemented some version of a CON program.

In the early 1980s, as the evidence accumulated that CON regulations were not achieving their goals, federal support for CON began to wane (Cimasi 2005). In particular, federal

legislators became increasingly concerned that CON programs "failed to reduce the nation's aggregate healthcare costs, and it was beginning to produce a detrimental effect in local communities" (McGinley 1995). In 1986, the NHPRDA was repealed,[3] and state CON programs were no longer subsidized by federal funding.

After the repeal of the NHPRDA, states began repealing their CON laws. Twelve states (Arizona, California, Colorado, Idaho, Kansas, Minnesota, New Mexico, South Dakota, Texas, Utah, Wisconsin, and Wyoming) repealed their CON programs during the 1980s. Between 1990 and 2000, three more states (Indiana, North Dakota, and Pennsylvania) repealed their CON programs. From 2000 to the present, Wisconsin has been the only state to repeal its program.[4]

III. Evolving Justifications for Certificate-of-Need Programs

Since their beginnings, CON laws have been justified on the basis that they achieve numerous public policy goals. In particular, policymakers have seen CON programs as a way for governments to control costs, regulate the level of capital investments, increase charity care, protect the quality of medical services, and protect access to services across geographic locations. However, some studies have called into question the success of CON laws at controlling costs and hospital investments.

After the passage of the National Health Planning and Resources Development Act of 1974 and the subsequent implementation of CON programs across the country, most early studies found no evidence that CON laws serve as a cost-control measure (Sloan and Steinwald 1980; Sloan 1981; Joskow 1980; Joskow 1981). However, more recent research has been mixed. For example, studies released by Chrysler, Ford, and General Motors find that healthcare costs in

[3] For a fuller discussion of the NHPRDA, see Madden (1999).
[4] Wisconsin has repealed its CON program twice.

non-CON states are higher than in states with CON laws (DaimlerChrysler Corporation 2002; Ford Motor Company 2000; General Motors Corporation 2002). Conover and Sloan (1998) find that CON laws have only modest cost-control effects and that the removal of CON is not associated with a surge in costs. Rosko and Mutter (2014) find that CON laws are associated with increased cost efficiency, while other studies return mixed results (Bates, Mukherjee, and Santerre 2006; Ferrier, Leleu, and Valdmanis 2010). Rivers, Fottler, and Frimpong (2010), however, find no evidence that CON laws are associated with reduced hospital costs; in fact, they find the opposite: that stringent CON programs increase costs by 5 percent.

The early studies on the effect of CON laws on hospital investments also find no evidence of success (Hellinger 1976; Salkever and Bice 1976). Salkever and Bice (1976) conclude that CON programs have had little effect on hospital investments, stating that there is "no empirical evidence to suggest that [certificate-of-need legislation] has decreased investment." Hellinger (1976) finds that CON laws do not reduce the volume of hospital investments but they are altering their composition. That is, restricting investments via a CON program does not reduce how much hospitals invest, but it does change what investments hospitals make. Instead of investing less, hospitals simply direct investments toward unregulated items.

Thus, researchers have studied the issues of cost control and hospital investment, but the effects of CON laws on the provision and quality of care—both charity and rural care—have not received as much attention. Stratmann and Russ (2014) were the first to empirically test the relationship between CON programs and charity care; they found no evidence associating CON programs with an increase in such care. Others have tried to measure the effect CON programs have on the overall quality of care (Robinson et al. 2001).

There has been little scholarly work that has focused on CON laws and the provision of rural care. A recent study finds evidence that the presence of a CON program may actually be correlated with decreased rural access to hospice care (Carlson et al. 2010). Others hypothesize that CON programs may explain the uniform geographic disbursement of renal services in CON states compared to non-CON states (Rodriguez, Hotchkiss, and O'Hare 2013), although this claim has yet to be the subject of empirical analysis.

While little is known about the effects of CON programs on rural care, access to health care in rural communities has remained a central focus of CON programs. Congress had explicitly made rural access a central goal of state-based CON legislation with the passage of the National Health Planning and Resources Development Act of 1974.[5] Many states continue to use rural access as a primary rationale for continued implementation of CON programs, explicitly including geographic considerations.[6] For example, North Carolina's CON statute states that "access to health care services and health care facilities is critical to the welfare of rural North Carolinians, and to the continued viability of rural communities, and that the needs of rural North Carolinians should be considered in the certificate of need review process."[7] Virginia also includes references to protecting rural health care through its CON program. For example, the stated goal of Virginia's CON program is to support the "geographical distribution of medical facilities and to promote the availability and accessibility of proven technologies."[8] Moreover, states have issued CON regulations—even beyond their CON statutes—that explicitly reference

[5] The NHPRDA included National Health Priorities, which begin with the goal of "the provision of primary care services for medically underserved populations, especially those which are located in rural or economically depressed areas."
[6] See, e.g., Arkansas (A.C.A. § 20-8-103(b)-(c)); Florida (Fla. Stat. Ann. § 408.034(3)); Georgia (Ga. Code Ann., § 31-6-1); Kentucky (KRS § 216B.010); North Carolina (N.C. Gen. Stat. Ann. § 131E-175(3a)); Tennessee (Tenn. Code Ann. § 68-11-1625(c)(7)); Virginia (12 Va. Admin. Code 5-230-30(2)).
[7] N.C. Gen. Stat. Ann. § 131E-175(3a) (2015).
[8] 12 Va. Admin. Code 5-230-30(2) (2015).

rural care as additional justification for CON programs. For example, the West Virginia Health Care Authority, which administers the state's CON program, has included in its regulations the justification for its program that CON is a way to provide "some protection for small rural hospitals . . . by ensuring the availability and accessibility of services and to some extent the financial viability of the facility."[9]

A mentioned above, a primary rationale for CON programs is to protect against cream-skimming by ASCs. The basic theory is that, in order to protect access to a wide array of services in rural areas, it is necessary to protect community hospitals from competition by nonhospital providers. Specifically, the fear is that, as the number of nonhospitals increase, they will accept only the most profitable patients and offer the most profitable procedures, leaving hospitals with the unprofitable procedures and the uninsured patients. (Schactman 2005). Moreover, as the more profitable, less complicated, well-insured patients seek care elsewhere, a hospital's ability to cross-subsidize charity care and other essential services will be reduced. This development threatens the financial sustainability of rural community hospitals and could lead to their closures. Given that there are perhaps only one or two hospitals in many rural areas, a hospital closure might have disproportionate negative effects on the rural population residing in that area. In this context, states justify CON programs as a way to protect the ability of community hospitals to cross-subsidize the less profitable services and patients by reducing competition from other providers, such as ASCs. (Tynan et al. 2009).

Some scholars have researched cream-skimming behavior by ASCs (Plotzke and Courtemance 2011; Munnich and Parente 2014) and others have researched cream-skimming arguments (Cimasi 2005; Piper 2004; Tynan et al. 2009). In this paper, we do not explicitly test

[9] West Virginia Health Care Authority, *Annual Report to the Legislature 1998*, http://www.hca.wv.gov/data/Reports/Documents/annualRpt98.pdf.

whether ASCs are cream-skimming; instead, we test for some of the implications of this hypothesis.

IV. Hypotheses

Our hypotheses test two claims—not based on textbook economics—made in support of CON laws: that CON programs protect hospitals from competition by regulating the entry and expansion of nonhospital providers and that they protect access to rural care by regulating the entry and expansion of nonhospital providers.

Hypothesis 1: *States that administer a CON program have more total community hospitals, and more community hospitals in rural areas, than states without a CON program.*

Our first hypothesis focuses on one of the primary goals of CON laws: providing hospital services by restricting competition. CON laws are intended to accomplish the goal by regulating the entry of new providers or the expansion of existing providers based on the current capacity of established providers.

Although the individual items covered by a particular state's CON program may target specific aspects of health care, the general goal of such a program is to reduce competition to community hospitals by regulating entry and expansion by nonhospital providers, thereby preventing cream-skimming. Therefore, we predict that states that regulate entry via CON laws have more hospitals than those that do not. In particular, CON laws are intended to assure survival of marginally profitable hospitals (such as those in rural areas) that would not otherwise survive in a competitive market with open entry. If CON laws are effective barriers to entry, we expect these hospitals to remain open, protected from cream-skimming by nonhospital providers.

Thus, we predict that we should find more total hospitals and more rural hospitals in states that have CON laws than in those that do not.

Hypothesis 2: *States with ASC-specific CON laws have fewer total ASCs, and fewer ASCs in rural areas, than states without ASC-specific CON laws.*

Ambulatory surgical centers are competitors to hospitals, and they tend to be charged with cream-skimming. Our second hypothesis focuses more specifically on a second intended goal of CON laws, that is, to protect access to medical services by regulating entry of nonhospital providers. If ASCs cannot open shop and engage in cream-skimming, existing hospitals will be more profitable and thus more likely to survive. Given that the stated goal of ASC-specific CON laws is to reduce the number of ASCs in a state, we predict that states that regulate ASC entry via CON laws have fewer ASCs. Second, we predict that there will be fewer ASCs in rural communities, given the focus of CON laws to regulate entry based on the current capacity of established providers, and for the reasons outlined in hypothesis 1.

V. Data and Empirical Strategy

We use two state-level annual measures of healthcare providers: the number of community hospitals per 100,000 state population and the number of ASCs per 100,000 state population, both from 1984 through 2011. We obtained these data series from the Centers for Medicare and Medicaid Services Provider of Services (POS) file. The POS file contains data collected by CMS regional offices on characteristics of hospitals and other types of healthcare facilities. This file includes the medical provider type, name, and address of each facility.

To determine whether providers were located in a rural or urban community, we used their zip codes in the POS file to see if they were within or outside a core-based statistical area (CBSA). A CBSA is a geographic designation defined by the Office of Management and Budget as having an urban center of at least 10,000 people. A CBSA includes both metropolitan and micropolitan areas. We classified providers as urban if they were located within a CBSA and rural if they were located outside a CBSA.

Data on state-level certificate-of-need laws from 1984 through 2011 come from two sources: the American Health Planning Association (AHPA) and HeinOnline's Digital Session Laws Library. The AHPA publishes its annual survey of state CON laws in annual national directories. From these directories we assembled a data set on state CON regulations from 1992 through 2011. As the AHPA did not publish directories before 1992, we obtained that data from HeinOnline's Digital Session Laws Library.

The source for our state-level socioeconomic control variables is the Census Bureau. These variables include population size, poverty level, percentages of white, black, and Hispanic citizens, and the population below age 18 and above age 65. Data on nominal per capita state income come from the Bureau of Economic Analysis. We converted this data to real income using the consumer price index from the Bureau of Labor Statistics, using 2011 as the base year. State-level unemployment data also come from the Bureau of Labor Statistics. To control for residents' health status in a given state, we collected mortality rates due to lung cancer or diabetes for state residents 18 years and older, both by year and by state. This last information comes from the Centers for Disease Control and Prevention.

Table 1A (page 23) shows summary statistics for each of our measures. Column 1 reports the number of observations per variable. In column 2, the mean for the CON indicator is

approximately 0.76, indicating that 76 percent of our annual state observations are associated with a CON law. The mean for the ASC CON indicator, measuring whether the CON law requires permission from state regulators to open an ASC, is approximately 0.50. In the last year of our data—as figure 1 (page 26) shows—approximately three-quarters of states (36 states) implemented a CON program, and—as figure 2 (page 27) shows—in the last year of our data approximately half of all states (26 states) have ASC-specific CON requirements.

Table 1B (page 24) provides summary statistics for states with a CON program, and table 1C (page 25) provides summary statistics for states that specifically regulate ASCs with a CON program.

We estimate the two models:

$$\text{Ln Hospital}_{it} = \alpha + \gamma \text{CON}_{it} + \boldsymbol{\beta}\mathbf{X}_{it} + \mu_t + \varepsilon_{it}, \quad (1)$$

$$\text{Ln ASC}_{it} = \nu + \lambda \text{ASC-CON}_{it} + \rho\mathbf{X}_{it} + \mu_t + \eta_{it}. \quad (2)$$

In the first model, we are interested in the impact of having any CON laws in the state on the number of hospitals. In this model, the CON variable is an indicator variable equal to 1 if there is a CON law in place in states *i* in year *t*. For equation (1) we estimate two specifications for our dependent variable. In one specification the dependent variable is the natural logarithm of the number of hospitals per 100,000 population in state *i* in year *t*. In the other specification, it is the corresponding natural logarithm of the number of rural hospitals per 100,000 rural state population.

In the second model, we consider the impact of CON laws that regulate ASCs on the number of ambulatory surgical centers. In equation (2), the ASC-CON variable is a binary indicator equal to 1 if the state has a CON law that regulates ASCs in a given year and 0 otherwise. Similarly to what we did for equation (1), for equation (2) we estimate two specifications for our dependent variable. In one case, the specification of the dependent variable

is the natural logarithm of the number of ambulatory surgical centers per 100,000 state population. In the other specification, it is the natural logarithm of the number of ambulatory surgical centers per 100,000 rural state population.

For both equation (1) and equation (2), we will estimate various versions of these regressions, starting with a simple bivariate model. In other version, we add different sets of control variables. This approach allows us to assess the sensitivity of the point estimate that is of most of interest to us, that is, the estimated coefficient on CON requirements, with respect to adding or dropping control variables.

The vector **X** includes the aforementioned control variables. We include variables for year fixed effects, μ_t, and cluster the standard errors by states.

VI. Results

Before estimating equations (1) and (2), we show the estimated relationship between the presence of a CON program and the number of total hospitals per 100,000 state population by year (figure 3, page 28). These estimates come from a bivariate regression with our hospital measure on the left hand side of the equation and a dummy variable for states with CON regulations on the right hand side, plus an intercept. We estimate this regression for each year, using all states in each year. We plot these results in figure 3 to test whether we observe the hypothesized negative relationship between CON laws and the number of hospitals, both when not including control variables and when considering each year separately. Examining estimates on a yearly basis also allows us to determine whether CON laws have any negative cumulative effects on the number of hospital providers.

The dots in figure 3 show the point estimates and the whiskers show the corresponding 95 percent confidence intervals. Figure 3 shows a slight negative relationship in the number of hospitals per 100,000 state population in a state with a CON program relative to states without a CON program, although the relationship is not statistically significant. Given that the confidence interval contains zero for all years included, without controlling for any other factors, this approach provides no evidence that the presence of a CON program is associated with a statistically significant lower number of hospitals. Nonetheless, all point estimates are negative, as hypothesized.

Figure 4 (page 28) presents point estimates and confidence intervals from a bivariate regression of CON programs and rural hospitals. The plots show a statistically significant negative correlation in the number of rural hospitals per 100,000 rural population and CON programs. This negative correlation is consistent across all years.

The sum of the evidence in figure 4 suggests that CON programs are not associated with more rural hospitals in rural areas. In fact, CON programs are associated with fewer rural hospitals in all states. Moreover, and interestingly, the point estimates in figure 4 are larger in absolute value than the point estimates in figure 3. This suggests that CON programs have an even more negative effect on the number of hospitals in rural areas in a state than they do on the overall number of hospitals in the same state.

Figures 5 and 6 (page 29) are based on the same methodology as the previous two figures. Now the dependent variable is the number of ASCs in a state (figure 5) and the number of ASCs in rural areas in the same state (figure 6). Both figures 5 and 6 show a negative correlation between ASC-specific CON programs and the total number of ASCs per 100,000 state population, as well as rural ASCs per 100,000 rural population. Further, absolute value of

these negative correlations increases over time. Moreover, toward the end of our sample period, this negative correlation appears to be about 20 percent larger for rural ASCs (figure 6) than for all ASCs (figure 5), suggesting that the reduction in ASCs in rural areas is larger than the reduction in ASCs in a state overall.

Table 2 (page 30) shows estimates for the effect of the presence of a CON program on the log of the number of hospitals per 100,000 population for an entire state. All specifications reported in table 2, as well as the subsequent tables, have standard errors clustered by state. The results show that the estimated coefficients on CON are negative and statistically significant across all specifications. This indicates that the presence of a CON program is correlated with fewer hospitals across a state. When controlling for demographics and year-specific effects, we find that the presence of a CON program is associated with 30 percent (1−exp(−.35)) fewer hospitals per capita across an entire state (table 2, column 4).

Table 3 (page 31) shows estimates for the effect of the presence of a CON program on the number of rural hospitals within a state. These point estimates on the CON variable are similar to those in table 2. Again, the estimated coefficients on the CON measures are negative across all specifications and are statistically significant. In particular, when controlling for demographics and year-specific effects, the presence of a CON program is associated with 30 percent (1−exp(−.36)) fewer rural hospitals per 100,000 rural population (table 3, column 4).

Tables 4 and 5 (pages 32–33) show estimates for the effect of ASC-specific CON requirements on the number of all ASCs per 100,000 state population, and rural ASCs per 100,000 rural population for an entire state. Table 4 shows estimates for the effect of ASC-specific CON requirements on the total number of ASCs in a state. Our findings are consistent with the findings reported above in that our coefficients of interest—state ASC CON laws—are

negative and statistically significant across all specifications. We estimate that the presence of an ASC-specific CON requirement within a state is associated with 14 percent (1−exp(−.156)) fewer total ASCs per capita when controlling for demographics and year-specific effects (table 4, column 4).

Table 5 shows estimates for the effect of ASC-specific CON requirements on the total number of rural ASCs per 100,000 rural population per state. As in table 4, the estimated coefficients for ASC-specific CON requirements are negative and statistically significant across all specifications. When controlling for demographics and year-specific effects, ASC-specific CON requirements are associated with 13 percent (1−exp(−.135)) fewer rural ASCs per 100,000 rural population.

Overall, these findings show that states with CON programs have fewer total hospitals and fewer rural hospitals. Further, these findings show that states with ASC-specific CON requirements have fewer total ASCs and fewer rural ASCs.

VII. Discussion

As we noted in our introduction, a number of states continue to implement CON programs with an expressed purpose of protecting access to health care in rural communities by protecting community hospitals from competition. If this is an effective tool, however, we predict that we would find more rural hospitals in those states that regulate entry of ASCs. Our findings demonstrate that is not the case.

Our findings do show that ASC CON programs are effective barriers to entry into rural communities for hospital substitutes. The data show that the presence of an ASC-specific CON requirement is correlated with approximately 14 percent fewer ASCs compared to states without

a CON program. This finding suggests that ASC CON programs act as a significant barrier for new alternatives to compete with established rural hospitals.

However, even though we find that CON requirements are associated with fewer ASCs in rural areas, this barrier to entry does not seem to protect rural access to health care as measured by the number of rural community hospitals. Specifically, while the presence of a CON program is associated with fewer "hospital substitutes" in rural communities, it is also associated with 30 percent fewer rural hospitals. This suggests that CON programs are limiting both hospitals and hospital substitutes.

The cream-skimming hypothesis predicts that the entry of new nonhospital providers, such as ASCs, and other hospital substitutes leads to fewer hospitals over time. According to this hypothesis, this happens because nonhospitals will siphon off the more profitable patients and procedures, and consequently hospitals will have lower revenues and less ability to cross-subsidize charity care and other essential services.

If the anti–cream-skimming justification for CON requirements is correct, then we expect to find a higher number of hospitals in states with a CON program versus those without. However, the data show that this is not the case. The regression results show that there are 30 percent fewer total hospitals per capita in states with a CON program when compared to those that do not have a CON program.

Moreover, our findings are also not consistent with the claim that CON programs protect access to health care in rural areas. In particular, as a tool for protecting rural health care, our findings suggest that these CON programs have failed. CON requirements are associated with fewer rural hospitals and rural ASCs. While CON programs may be viewed as a protective measure to ensure access in rural communities, the data show otherwise.

There are two limitations to this study. First, while we are able to present correlations, we do not have an identification strategy that would allow us to provide any causal interpretation to our results. Second, while we use community hospitals and ASCs per 100,000 population as the measure of access to health care, this may not fully capture all options available to those seeking care in rural communities.

VIII. Conclusion

Twenty-six states limit the entry of ASCs into their healthcare markets. These restrictions have been justified on a number of grounds, including protecting access to health care in rural communities by protecting hospitals from cream-skimming. If these claims are correct, then we expect to find both more hospitals per capita and more rural hospitals in states that restrict entry and competition through a CON program.

Our findings show that the opposite is true. We find that states with a CON program have fewer total and fewer rural hospitals per capita. We estimate that, when controlling for demographics and year-specific effects, the presence of a CON program is associated with 30 percent fewer total hospitals per 100,000 state population and 30 percent fewer rural hospitals per 100,000 rural population. Moreover, we find 14 percent fewer total ASCs per 100,000 state population and 13 percent fewer rural ASCs per 100,000 rural population. These findings suggest that CON programs do not protect access in rural healthcare markets. Policymakers looking to protect rural health care may want to look elsewhere.

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Table 1. Summary Statistics from State Annual Data, 1984–2011

Panel A. Summary Statistics for All States

Variables	(1) N	(2) Mean	(3) Std. dev.	(4) Min	(5) Max
State certificate-of-need regulation (yes = 1)	1,400	0.759	0.428	0	1
State ASC certificate-of-need regulation (yes = 1)	1,400	0.500	0.500	0	1
Black percentage	1,400	0.100	0.0939	0.00243	0.372
White percentage	1,400	0.809	0.133	0.227	1.005
Hispanic percentage	1,400	0.0729	0.0873	0.00472	0.467
Elderly percentage (65 and over)	1,400	0.119	0.0203	0.00651	0.187
Youth percentage (under 18)	1,400	0.256	0.0264	0.0707	0.379
Unemployment rate (seasonally adjusted)	1,400	5.739	1.945	2.300	14.77
Population (logged)	1,400	15.02	1.011	13.03	17.44
Adults diagnosed diabetes and lung cancer percentage (18+, age adjusted, logged)	1,400	4.326	0.237	3.296	4.877
Hospitals per 100,000 state population	1,400	3.112	1.728	1.045	10.39
Hospitals per 100,000 state population (logged)	1,400	1.008	0.490	0.0436	2.341
Rural hospitals per 100,000 rural population	1,400	4.850	4.167	0	17.00
Rural hospitals per 100,000 rural population (logged)	1,400	1.522	0.718	0	2.890
ASCs per 100,000 state population	1,400	1.018	0.905	0	6.312
ASCs per 100,000 state population (logged)	1,400	0.623	0.382	0	1.990
Rural ASCs per 100,000 rural population	1,400	0.488	0.671	0	5.107
Rural ASCs per 100,000 rural population (logged)	1,400	0.326	0.351	0	1.810

Panel B. Summary Statistics for States with and without a Certificate-of-Need Program

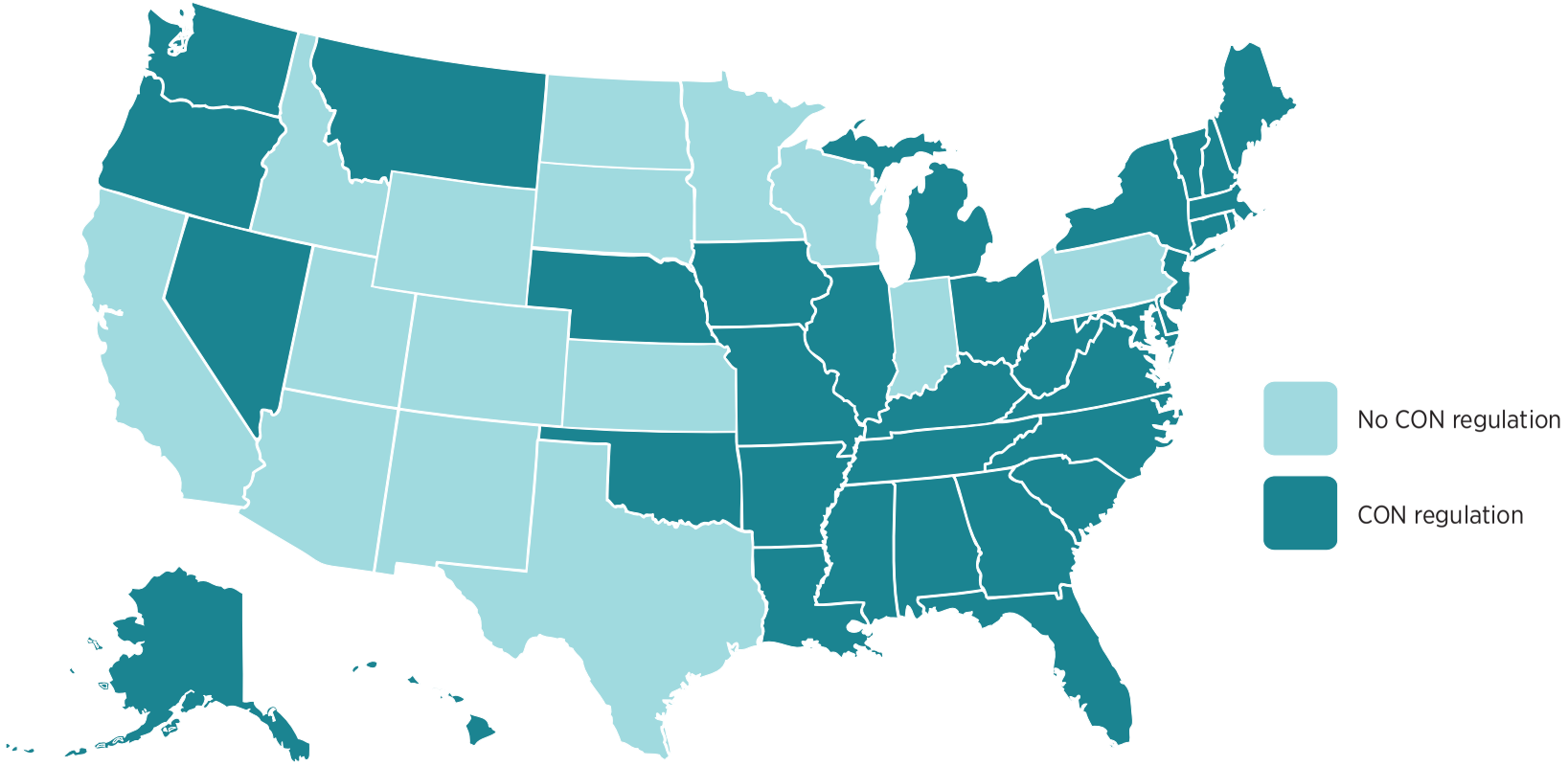
	CON law			No CON law		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	N	Mean	Std. dev.	N	Mean	Std. dev.
Black percentage	1,062	0.117	0.098	338	0.047	0.515
White percentage	1,062	0.803	0.133	338	0.825	0.132
Hispanic percentage	1,062	0.051	0.050	338	0.141	0.133
Elderly percentage (65 and over)	1,062	0.121	0.201	338	0.113	0.018
Youth percentage (under 18)	1,062	0.251	0.024	338	0.272	0.028
Unemployment rate (seasonally adjusted)	1,062	5.845	1.948	338	5.407	1.900
Population (logged)	1,062	15.03	0.946	338	14.99	1.195
Adults diagnosed diabetes and lung cancer percentage (18+, age adjusted, logged)	1,062	4.376	0.210	338	4.168	0.247
Hospitals per 100,000 state population	1,062	2.908	1.545	338	3.754	2.084
Hospitals per 100,000 state population (logged)	1,062	0.952	0.465	338	1.181	0.526
Rural hospitals per 100,000 rural population	1,062	4.069	3.724	338	7.307	4.520
Rural hospitals per 100,000 rural population (logged)	1,062	1.383	0.703	338	1.960	0.576
ASCs per 100,000 state population	1,062	0.912	0.901	338	1.348	0.836
ASCs per 100,000 state population (logged)	1,062	0.569	0.375	338	0.792	0.355
Rural ASCs per 100,000 rural population	1,062	0.378	0.556	338	0.832	0.859
Rural ASCs per 100,000 rural population (logged)	1,062	0.264	0.313	338	0.522	0.390

Panel C. Summary Statistics for States with and without an Ambulatory Surgical Center Certificate-of-Need Requirement

	ASC-CON law			No ASC-CON law		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	N	Mean	Std. dev.	N	Mean	Std. dev.
Black percentage	699	0.077	0.079	701	0.123	0.102
White percentage	699	0.819	0.129	701	0.798	0.137
Hispanic percentage	699	0.096	0.111	701	0.050	0.047
Elderly percentage (65 and over)	699	0.118	0.023	701	0.120	0.017
Youth percentage (under 18)	699	0.263	0.031	701	0.250	0.018
Unemployment rate (seasonally adjusted)	699	5.652	1.886	701	5.827	5.827
Population (logged)	699	15.01	1.064	701	15.03	0.957
Adults diagnosed diabetes and lung cancer percentage (18+, age adjusted, logged)	699	4.270	0.267	701	4.382	0.187
Hospitals per 100,000 state population	699	3.582	1.953	701	2.643	1.313
Hospitals per 100,000 state population (logged)	699	1.143	0.510	701	0.873	0.429
Rural hospitals per 100,000 rural population	699	6.131	4.590	701	3.574	3.229
Rural hospitals per 100,000 rural population (logged)	699	1.749	0.684	701	1.297	1.297
ASCs per 100,000 state population	699	1.115	0.784	701	0.921	1.003
ASCs per 100,000 state population (logged)	699	0.683	0.362	701	0.563	0.392
Rural ASCs per 100,000 rural population	699	0.597	0.739	701	0.378	0.575
Rural ASCs per 100,000 rural population (logged)	699	0.391	0.371	701	0.261	0.317

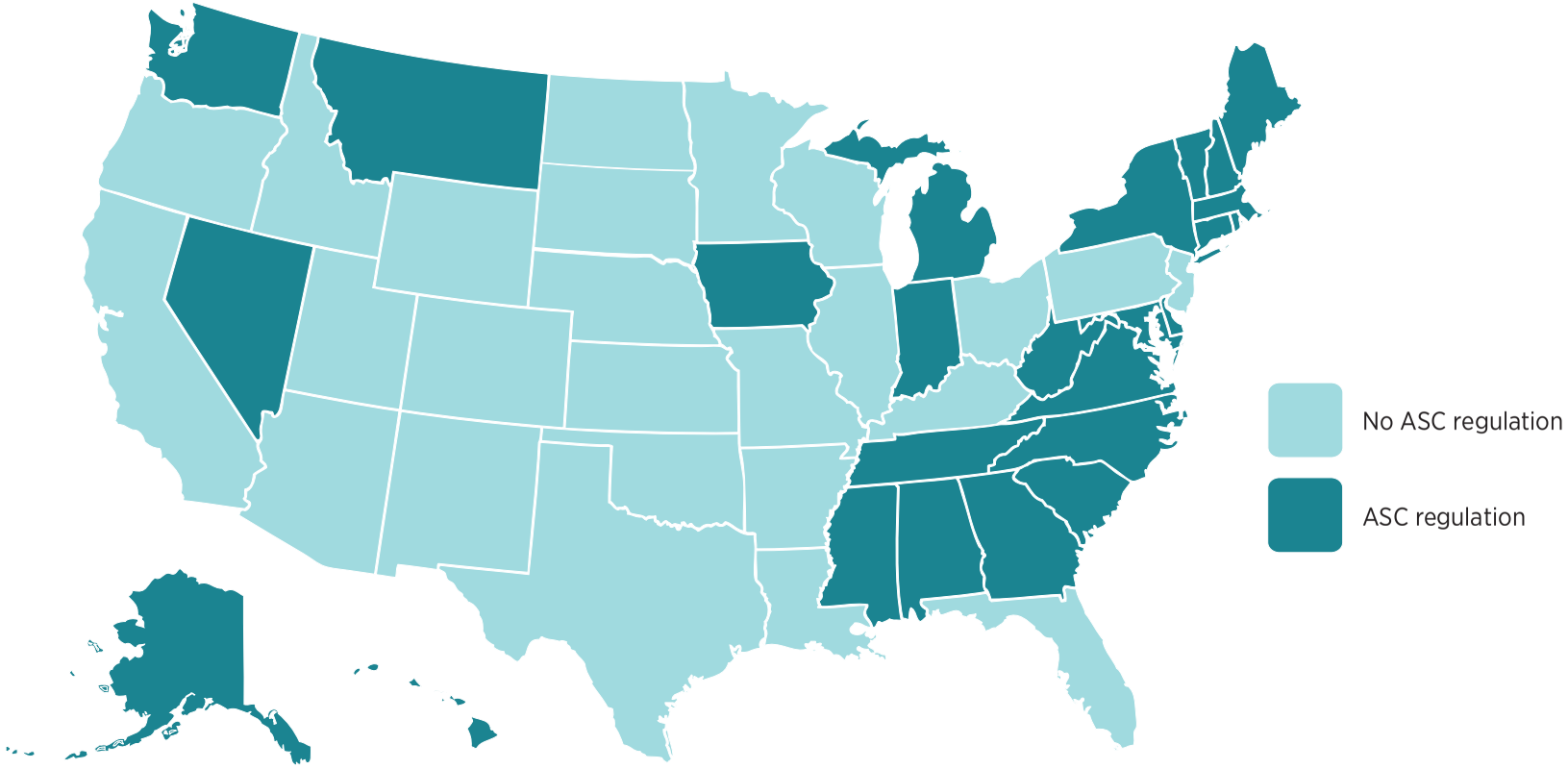
Note: ASC = ambulatory surgical center, CON = certificate of need.

Figure 1. Certificate-of-Need (CON) Regulation in the United States



Source: "Certificate of Need: State Health Laws and Programs," National Conference of State Legislatures, January 2016, http://www.ncsl.org/research/health/con-certificate-of-need-state-laws.aspx.

Figure 2. Certificate-of-Need Requirements for Ambulatory Surgical Centers (ASCs) by State



Source: "Certificate of Need: State Health Laws and Programs," National Conference of State Legislatures, January 2016, http://www.ncsl.org/research/health/con-certificate-of-need-state-laws.aspx.

Figure 3. Relationship between Certificate-of-Need (CON) Programs and Total Hospitals per 100,000 Population, by Year

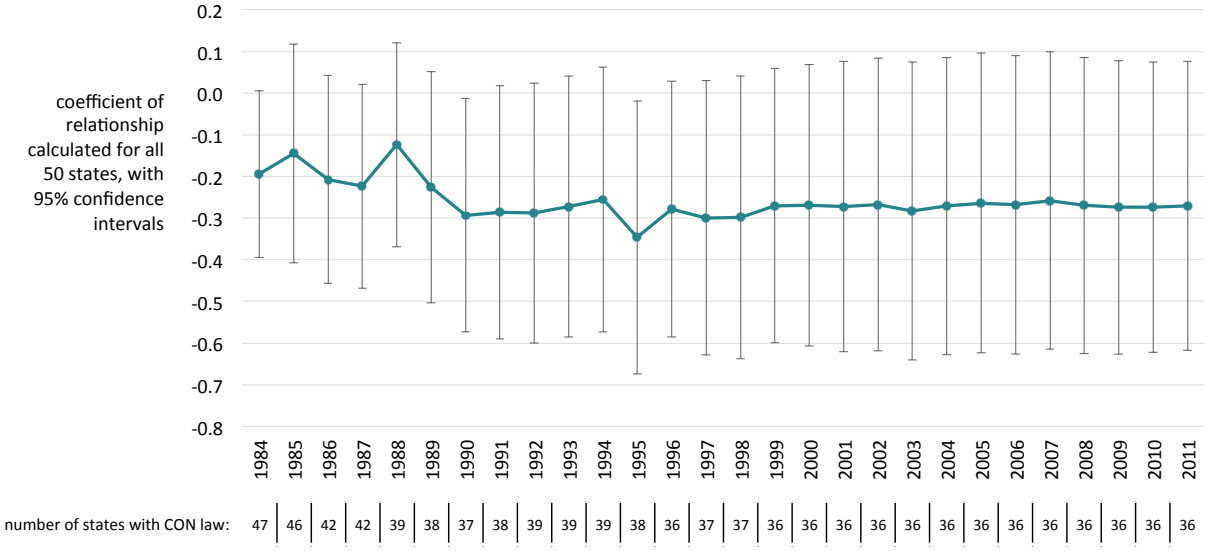


Figure 4. Relationship between Certificate-of-Need (CON) Programs and Rural Hospitals per 100,000 Rural Population, by Year

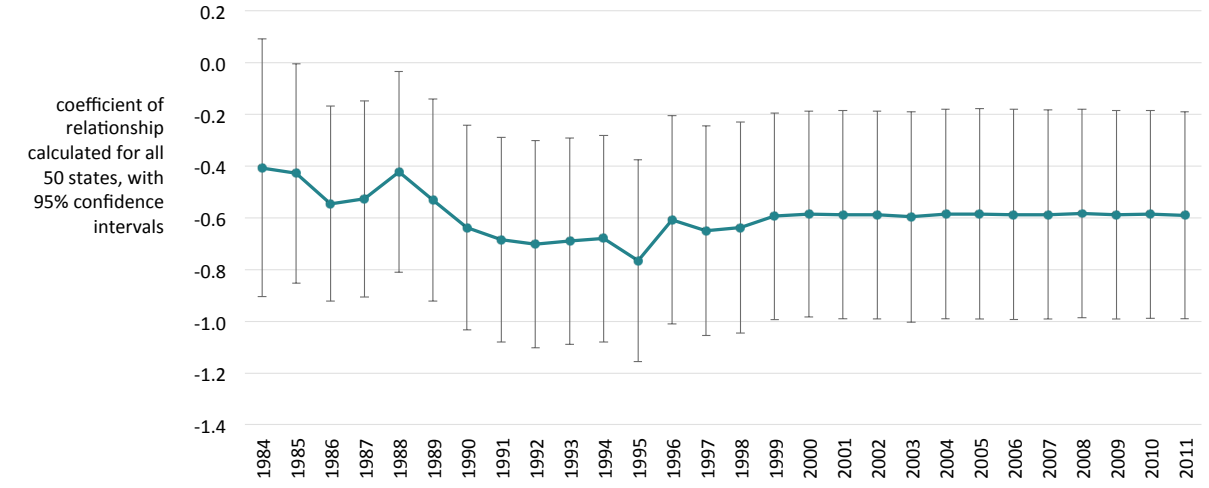


Figure 5. Relationship between Ambulatory Surgical Center Certificate-of-Need (CON) Requirements and Ambulatory Surgical Centers per 100,000 Population, by Year

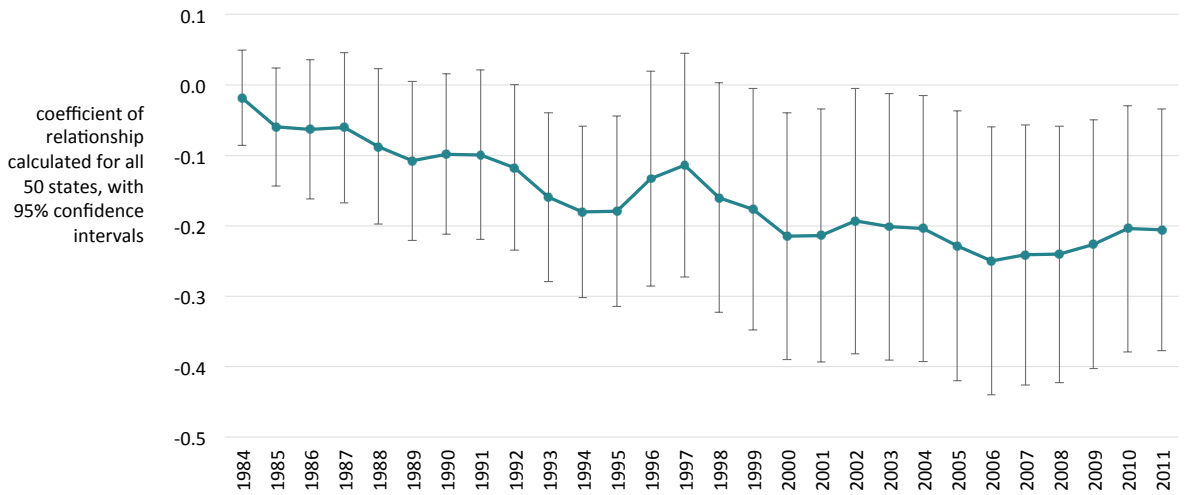


Figure 6. Relationship between Ambulatory Surgical Center Certificate-of-Need (CON) Requirements and Rural Ambulatory Surgical Centers per 100,000 Rural Population, by Year

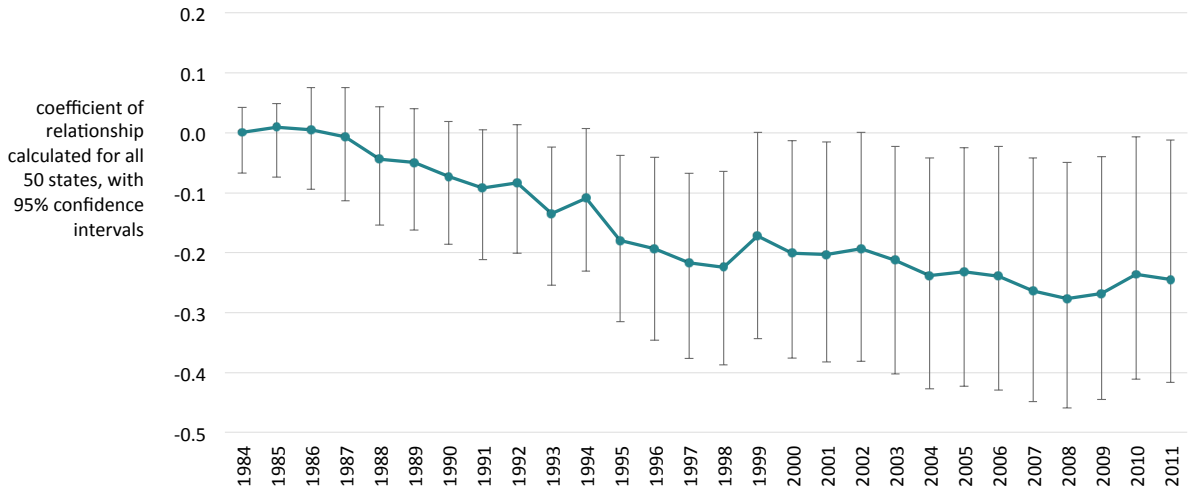


Table 2. Determinants of Number of Hospitals per 100,000 Population per State

	(1)	(2)	(3)	(4)
State certificate-of-need regulation (yes = 1)	−0.265*	−0.247**	−0.338***	−0.350***
	(0.146)	(0.108)	(0.110)	(0.106)
Population (logged)		−0.264***	−0.209***	−0.192**
		(0.054)	(0.075)	(0.074)
Elderly percentage (65 and over)			2.766	−2.594
			(2.722)	(3.341)
Youth percentage (under 18)			3.017	6.330**
			(3.243)	(2.850)
Unemployment rate (seasonally adjusted)			0.009	−0.018
			(0.026)	(0.027)
White percentage			0.188	−0.170
			(0.333)	(0.308)
Hispanic percentage			−1.623**	−1.466**
			(0.713)	(0.622)
Black percentage			−0.049	−0.977
			(0.798)	(0.771)
Adults diagnosed diabetes and lung cancer percentage (18+, age adjusted, logged)				0.929***
				(0.296)
Observations	1,400	1,400	1,400	1,400
R^2	0.110	0.404	0.493	0.537
Year fixed effects	yes	yes	yes	yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The dependent variable in these regressions is the log of the number of hospitals per 100,000 population per state. Clustered standard errors at the state level are in parentheses.

Table 3. Determinants of Number of Rural Hospitals per 100,000 Population per State

	(1)	(2)	(3)	(4)
State certificate-of-need regulation (yes = 1)	−0.600***	−0.579***	−0.355*	−0.363*
	(0.177)	(0.140)	(0.182)	(0.181)
Population (logged)		−0.314***	−0.143	−0.132
		(0.090)	(0.125)	(0.124)
Elderly percentage (65 and over)			−3.038	−6.464
			(4.238)	(5.435)
Youth percentage (under 18)			8.052*	10.169**
			(4.729)	(4.613)
Unemployment rate (seasonally adjusted)			−0.015	−0.033
			(0.039)	(0.041)
White percentage			−0.694**	−0.922**
			(0.335)	(0.411)
Hispanic percentage			−1.964*	−1.864*
			(1.126)	(1.084)
Black percentage			−2.789**	−3.382***
			(1.178)	(1.200)
Adults diagnosed diabetes and lung cancer percentage (18+, age adjusted, logged)				0.594
				(0.455)
Observations	1,400	1,400	1,400	1,400
R^2	0.129	0.322	0.448	0.457
Year fixed effects	yes	yes	yes	yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The dependent variable in these regressions is the log of the number of rural hospitals per 100,000 rural population per state. Clustered standard errors at the state level are in parentheses.

Table 4. Determinants of Number of Ambulatory Surgical Centers per 100,000 Population per State

	(1)	(2)	(3)	(4)
ASC-specific certificate-of-need requirement (yes = 1)	−0.159**	−0.159**	−0.158**	−0.156**
	(0.063)	(0.063)	(0.059)	(0.059)
Population (logged)		−0.023	−0.053	−0.051
		(0.029)	(0.041)	(0.041)
Elderly percentage (65 and over)			−0.242	−0.922
			(1.220)	(1.677)
Youth percentage (under 18)			0.899	1.336
			(0.679)	(0.991)
Unemployment rate (seasonally adjusted)			−0.001	−0.004
			(0.016)	(0.015)
White percentage			0.012	−0.032
			(0.167)	(0.160)
Hispanic percentage			0.339	0.366
			(0.587)	(0.615)
Black percentage			0.617	0.497
			(0.492)	(0.551)
Adults diagnosed diabetes and lung cancer percentage (18+, age adjusted, logged)				0.117
				(0.189)
Observations	1,400	1,400	1,400	1,400
R^2	0.503	0.507	0.530	0.531
Year fixed effects	yes	yes	yes	yes

** $p < 0.05$.

Note: The dependent variable in these regressions is the log of the number of ambulatory surgical centers (ASCs) per 100,000 population per state. Clustered standard errors at the state level are in parentheses.

Table 5. Determinants of Number of Rural Ambulatory Surgical Centers per 100,000 Population per State

	(1)	(2)	(3)	(4)
ASC-specific certificate-of-need requirement (yes=1)	−0.157**	−0.156***	−0.137**	−0.135**
	(0.060)	(0.053)	(0.057)	(0.056)
Population (logged)		−0.092***	−0.078*	−0.076*
		(0.034)	(0.043)	(0.044)
Elderly percentage (65 and over)			0.788	0.026
			(1.702)	(1.943)
Youth percentage (under 18)			0.445	0.934
			(1.065)	(1.267)
Unemployment rate (seasonally adjusted)			−0.009	−0.013
			(0.014)	(0.015)
White percentage			−0.468*	−0.516**
			(0.236)	(0.247)
Hispanic percentage			−0.130	−0.101
			(0.408)	(0.401)
Black percentage			−0.586	−0.720
			(0.495)	(0.529)
Adults diagnosed diabetes and lung cancer percentage (18+, age adjusted, logged)				0.131
				(0.164)
Observations	1,400	1,400	1,400	1,400
R^2	0.354	0.423	0.447	0.449
Year fixed effects	yes	yes	yes	yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Note: The dependent variable in these regressions is the log of the number of rural ambulatory surgical centers (ASCs) per 100,000 rural population per state. Clustered standard errors at the state level are in parentheses.