



Published in final edited form as:

*Med Care Res Rev.* 2016 February ; 73(1): 85–105. doi:10.1177/1077558715597161.

## The Impact of Certificate-of-Need Laws on Nursing Home and Home Health Care Expenditures

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### Abstract

Over the past two decades, nursing homes and home health care agencies have been influenced by several Medicare and Medicaid policy changes including the adoption of prospective payment for Medicare-paid postacute care and Medicaid-paid long-term home and community-based care reforms. This article examines how spending growth in these sectors was affected by state certificate-of-need (CON) laws, which were designed to limit the growth of providers and have remained unchanged for several decades. 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. In particular, we observed the slowest growth in community-based care in states with CON for both the nursing home and home health industries. Thus, controlling for other factors, public postacute and long-term care expenditures in CON states have become dominated by nursing homes.

### Keywords

certificate of need; Medicare; Medicaid; nursing home care spending; home health care spending

### Introduction

In the past two decades, nursing homes and health agencies have played a growing role in Medicare-paid postacute care. Between 1994 and 2009, average spending for post-acute care more than doubled for most diagnoses (Chandra, Dalton, & Holmes, 2013). The share of total Medicare spending on skilled nursing facility care increased from 1% to 3% and the

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### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

share of total Medicare spending on home health care increased from 2% to 3%. During this period, the cost of institutional long term care continued to rise, consuming the bulk of Medicaid long-term care expenditures, while policy-makers faced mounting pressures to expand Medicaid home and community-based services (Kitchener, Ng, Miller, & Harrington, 2005; E. A. Miller, Allen, & Mor, 2009; N. A. Miller, Harrington, & Goldstein, 2002).

In addition to the federal policy changes, many states responded to the escalating cost of long-term care by limiting the number of nursing home and home health agencies. The most significant and earliest supply constraint based cost-control strategy was the certificate-of-need (CON) program, which requires state regulatory approval for the establishment or expansion of health facilities or services. The premise of enforcing a supply constraint is based on Roemer's Law, which holds that utilization increases when supply rises, irrespective of the population's need (Roemer, 1961; Wiener, Stevenson, & Goldenson, 1999). Rooted in cost control efforts focused on hospital expansion and the adoption of expensive new technologies, many states applied these rules to all health care providers (Wiener et al., 1999). Thirty-six states currently maintain some form of CON program and these CON laws have remained largely unchanged since late 1980s. However, there has been little research examining the response of these providers to major federal policy changes in states with and without CON.

The goal of this study is to examine how growth in nursing home and home health care spending by Medicare and Medicaid was affected by CON laws. We examined trends in state-level Medicare and Medicaid spending in 44 contiguous states that did not change their CON laws from 1992 to 2009. Under CON law, 19 states control only nursing home supply and 15 states control both nursing home and home health supply. The other 10 states had no CON laws in place since the late 1980s.

### New Contribution

This study makes several new contributions. First, we highlight the implications of CON policies on the growth of public health care spending over the last two decades, an era of tremendous growth in postacute nursing home and home health care. Second, this paper emphasizes the potential conflict between supply control-based policies and payment-based policies and highlights how state Medicaid policies and federal Medicare policies interact to affect the growth of the nursing home and home health industries. Third, this article underscores the substitutability between nursing home and home health care and demonstrates how the market structure of one care industry may affect the prospects for expansion of the other. Fourth, to the best of our knowledge, this is the first paper that examines the influences of home health CON requirements on Medicare spending on nursing home or home health care and Medicaid spending on nursing home care. Finally, our findings contribute to the longstanding debate among health policy researchers about the intended and unintended consequences of CON laws.

## Background

### Supply Control–Based Interventions in Health Care

CON legislation is one of the earliest efforts to address the escalating cost of health care services. CON laws require permission from a government-sponsored local health service planning agency and the state level agency equivalent to enter a market or to expand an existing facility, health care service providers (nursing homes, hospitals, etc.). The decision is based on a documented need for additional health care in the market that cannot be met with the available infrastructure (Feder & Scanlon, 1980). By 1980, all states except Louisiana had adopted a CON policy. Ten of these states (AZ, CA, CO, ID, KS, MN, NM, SD, TX and UT) repealed their CON policy during the 1980s and an additional three (IN, ND and PA) repealed theirs in the 1990s. Nevada repealed CON laws for two years (1997 and 1998) and reinstated them thereafter. The remaining states (including Louisiana, which adopted CON in 1991) still have CON legislation in effect. Today, CON programs focus mainly on outpatient facilities and long-term care.

A series of studies in the 1980s and 1990s showed that the presence of CON laws reduced growth in the number of nursing home beds (Harrington, Swan, Nyman, & Carrillo, 1997; J. Swan & Harrington, 1990; Zinn, 1994) resulting in “excess” demand (Nyman, 1988, 1989, 1994). However, relatively recent studies have not found excess demand in most markets (Grabowski, 2001; Nyman, 1993). The repeal of CON laws in 10 states during the 1980s did not result in an increase in Medicaid spending on nursing home care (Grabowski, Ohsfeldt, & Morrissey, 2003). Indeed, nursing home occupancy rates have dropped steadily since the late 1980s, and studies during the 1990s and 2000s generally concluded that CON policies may no longer be as important in constraining the growth of the nursing home market (Grabowski, 2001; Grabowski et al., 2003; Nyman, 1993).

There also have been few attempts to understand the impact of CON regulation for home health care on Medicaid home and community based spending. Miller and colleagues found that home health regulation had a negative impact on the share of home- and community-based service (HCBS) spending and that nursing home CON and moratoria increased overall HCBS spending (N. A. Miller et al., 2002). However, in a more recent study they noted that after controlling for the supply of long-term care providers, especially certified home health agencies per 1000 population, the effect was no longer observed (N. A. Miller et al., 2005). It is widely accepted that CON laws have been ineffective in controlling hospital costs (Antel, Ohsfeldt, & Becker, 1995; Conover & Sloan, 1998). During the past decade, CON legislation issues have received relatively little attention from researchers.

In addition to CON legislation, many states issued construction moratoria to control nursing home bed supply. In theory, a construction moratorium law is even more stringent than a CON law because it prohibits the addition of any new beds. However, compliance with moratoria was never clear; prior studies report continued expansion of nursing home bed capacity in the presence of construction moratoria (Grabowski et al., 2003).

## Growth in the Demand for Nursing Home and Home Health Care

The demand for Medicare paid postacute skilled nursing facility care and home health care has increased rapidly since the 1980s. The Center for Medicare and Medicaid Services (CMS) adopted the Prospective Payment System (PPS) for hospital care in 1983, which applied a fixed payment for a given type of hospitalization based on diagnosis and geography. Adoption of PPS for hospital care significantly reduced the average length of hospital stays (Fitzgerald, Moore, & Dittus, 1988; Freiman, Ellis, & McGuire, 1989). Hospitals were incentivized to discharge patients for postacute care to nursing home and home health, which were still reimbursed on a cost basis, presumably because patients continued to need care in light of shorter hospital stays (Sager, Easterling, Kindig, & Anderson, 1989). From 1985 to 1994, while hospital days per 1,000 Medicare recipients declined from 3,016 to 2,422 annually, nursing home post-acute care utilization rates tripled. Because of the increased volume of patients in skilled nursing facility care and the prevailing cost reimbursement payment rate, Medicare expenditures on skilled nursing facility care increased dramatically until 1997 (Grabowski, Afendulis, & McGuire, 2011). Similarly, between 1987 and 1997, the number of Medicare patients using home health services doubled, the number of visits per patient tripled, and Medicare spending on home health services grew from \$2 billion to \$17 billion (Grimaldi, 2002; Huckfeldt, Sood, Escarce, Grabowski, & Newhouse, 2014).

The Balanced Budget Act (BBA) of 1997 significantly changed Medicare reimbursement for skilled nursing facilities and home health care providers, by placing constraints on reimbursements along with the introduction of per diem case-mix reimbursement (Congressional Research Service, 2007). An interim payment system was applied in 1997 and resulted in declines in Medicare spending on postacute care until 2000, when the full prospective payment system was adopted for Medicare postacute care (Chen & Shea, 2002). Adjustments in the 2000 law reversed the trend; postacute care spending continued to grow at the pre-1997 rate (Grabowski et al., 2011; Huckfeldt et al., 2014).

During the 1990s roughly three quarters of state budgets for long-term care was spent on nursing home care (Mor, Zinn, Angelelli, Teno, & Miller, 2004). In response to growing budget deficits in many states and strong public demand, the 1999 Olmstead Supreme Court decision required that states expand alternative HCBS programs. Some research during that time period showed that higher HCBS spending was negatively related to the likelihood of nursing home admission (Burr, Mutchler, & Pilcher-Warren, 2002; Muramatsu et al., 2007), to the proportion of residents in nursing homes with low-care needs (Hahn, Thomas, Hyer, Andel, & Meng, 2011; Thomas & Mor, 2013) and positively related to the proportion of people able to die at home (Muramatsu, Hoyem, Yin, & Campbell, 2008). In response, many states adopted initiatives to expand community-based care as an alternative of institutional care.

## Conceptual Framework

There are two opposing views about the effect of CON laws on growth in nursing home and home health care spending. On the one hand, supporters of CON argue that there are many properties of the health care industry that lead to overutilization of care and the effect of

these can be limited by controlling supply. An inherent property of health care markets is asymmetric information, which leads to the problem of moral hazard (Grabowski & Gruber, 2007). CMS only knows the expected need for care of a beneficiary and does not know the actual need for care. In such a scenario, beneficiaries have an incentive to overutilize services if there is not enough cost sharing. Similarly, health care providers also have incentives to provide excess care if there is an excess capacity. This issue of moral hazard is expected to be more severe for nursing home and home health care for two reasons. First, unlike hospital care or pharmaceutical utilization that depend mostly on beneficiary's clinical characteristics, the duration of postacute and long-term care partially depends on beneficiary's family dynamics and financial condition, which are unobserved by the insurer. Second, roughly three quarters of nursing home and home health care providers are run as for-profit organizations and are likely to have a higher incentive to offer services to individuals who may not need them. In this context, over utilization of health care can potentially be restricted by controlling supply (Grabowski & Gruber, 2007).

In contrast, opponents of CON laws argue that CON imposes a barrier to entry and diminishes the threat of competition for incumbents, which may have long-term effects on quality and cost of care. While the causal effect of nursing home competition is unknown in current literature, market power of incumbents may be reflected by size since prior studies have shown that smaller nursing facilities have a higher likelihood of closure in response to a demand shock (Castle, Engberg, Lave, & Fisher, 2009; Netten, Darton, & Williams, 2003). If CON prevents certain care providers from entering the market, then states without CON would have more providers (due to free entry/exit) that are smaller in size than would be the case in states with a CON. In fact, based on our calculation, the average number of beds in a nursing home in 2010 was 110 in states without nursing home CON and 131 in states with nursing home CON. As a result, care providers in states with CON may acquire more market power and become less susceptible to competitive forces such as those brought about by payment changes.

If CON policies restrict the number and capacity of health care providers, growth in spending will be slower in states with CON laws. Additionally, since nursing home and home health care are, to some extent, substitutable (Buntin, 2007), controlling supply of one type of care by CON laws may help expansion of other types. Conversely, if CON laws only deter competition, they may offset and even reverse some of the effects of a payment based policy. Since CON laws have typically focused on nursing home care, greater economic power of nursing homes may deter expansion of home health industry. We empirically test these alternative hypotheses by examining how CON laws have affected the growth in nursing home and home health care spending by Medicare and Medicaid.

## Method

### Data

Data for this study include the years 1992 to 2009. We focused on 44 states in the contiguous United States (34 states with and 10 without CON policy) that *did not change* their CON policy during the study period (i.e., it excludes IN, ND, PA, and LA). Among the included 44 states, 10 states (AZ, CA, CO, ID, KS, MN, NM, SD, TX, UT) did not have

CON law, 19 states (CT, DE, FL, IA, IL, LA, MA, ME, MI, MO, NE, NH, OH, OK, OR, RI, VA, WI, WY) had only nursing home CON, and 15 states (AL, AR, GA, KY, MD, MS, MT, NC, NJ, NY, SC, TN, VT, WA, WV) had both nursing home and home health CON. We used longitudinal data from the following sources:

*Area Resource File (ARF):* ARF is a national, county-level health resource information database (<http://ahrf.hrsa.gov/>). It includes information about the availability of different types of health care services (including number of beds, facilities, and care providers) as well as population and economic data.

*Annual health care expenditures by state:* This is a publicly available data set from the CMS (<http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/index.html>) that includes Medicare and Medicaid spending (per enrollee) on different type of services like nursing home, home health, and so on.

*State policy data:* Data on long-term health care policy, including CON status in different states was collected by Harrington and colleagues for years up to 1998 (J. H. Swan et al., 2000) and researchers at Brown University for the remaining years (Feng, Grabowski, Intrator, Zinn, & Mor, 2008; Grabowski, Feng, Intrator, & Mor, 2010).

## Analysis

Since CON laws directly control the supply of care providers, we first explored the trend in the number of home health agencies and nursing homes in states without CON, with only nursing home CON, and with both nursing home and home health CON. We plotted growth in the number of home health agencies for years 1999 to 2009 only, because prior to 1999 data on the number of home health agencies were not available in the ARF.

We performed descriptive analyses on changes in spending on specific types of care between 1992 and 2009 in states without CON, with only nursing home CON and with both nursing home and home health CON. Following Kaye, LaPlante, and Harrington (2009), we examined four variables: (1) spending per enrollee on nursing home care, (2) spending per enrollee on home health care, (3) aggregated spending per enrollee on nursing home and home health care, and (4) nursing home expenditures as a proportion of aggregate nursing home and home health spending. All spending were measured annually. We analyzed spending by Medicare and Medicaid separately. To facilitate comparison across years, we adjusted per enrollee spending for inflation, using the consumer price index. Amounts shown are in 1992 dollars. Since we are interested in growth, we presented these trends by deflating values of a given outcome by the value of the corresponding outcome in 1992.

We used an ordinary least squares regression model with state and year fixed effects to examine adjusted differences in trends in states with nursing home CON only and states with both nursing home and home health CON as compared to states without CON laws. The difference in trend is estimated using interactions of dummy variables for each year with two dummy variables indicating states with only nursing home CON and states with both



nursing home and home health CON. We plotted these adjusted differential trends with confidence intervals based on robust standard error.

We used several time variant state characteristics as control variables in our multivariate analysis. Medicare and Medicaid spending per enrollee on hospital care were included to control for change in Medicare enrollee case-mix and the relative intensity of medical interventions over time. We included share of state's total population enrolled in Medicare and Medicaid. Finally, we used several time varying state policy variables related to long-term nursing home care, including Medicaid payment rates, whether the state employed case-mix reimbursement for nursing home payment and whether there were nursing home construction moratoria. The number of states with construction moratoria rose from 11 in 1990 to 20 in 2002, and then declined to 16 by 2009. Of 35 CON states, 11 had a construction moratorium in 2009 as did 5 out of 13 non-CON states. Of note, we did not include nursing home bed supply or home health agency supply in our model because the goal of this article is to show how a supply control policy (CON) altered trends in spending. Additionally, the observed number of nursing home beds or home health agencies in a state at a given point of time is determined by both demand and supply and there is no way to distinguish bed supply from demand. In our state fixed effect model, supply variables would reflect change in the number of nursing homes beds or home health agencies which is mostly determined by changes in demand for this care.

## Results

Figure 1 shows growth in the number of nursing homes (Panel A) and home health agencies (Panel B) in states without CON laws, with nursing home CON only and with both home health and nursing home CON. During the early 1990s, the number of nursing homes grew at a comparable rate in states with and without CON laws and reached a peak when BBA was enacted in 1997. After the BBA came into effect, the number of nursing homes dropped continuously, but at different rates in states with and without home health CON laws. Compared with 1992, the number of nursing homes in 2009 was 5% lower in states without any CON law and with nursing home CON laws only, and 5% higher in states with both nursing home and home health CON laws. Panel B of Figure 1 shows the change in number of home health agencies between 1999 and 2009. In states without home health CON laws, the number of home health agencies grew at the same rate after the implementation of PPS in 2000 and became 50% higher by 2009 compared with 1999 level. In stark contrast, the number of home health agencies declined steadily in states with home health CON, which had about 10% fewer home health agencies in 2009 relative to year 1999.

Figure 2 shows growth in inflation-adjusted nursing home and home health spending by Medicare and Medicaid relative to year 1992. As shown in panel A, Medicare spending on nursing home care increased at a faster rate in states with CON laws than states without CON laws, over the study period. Medicare spending per nursing home enrollee was 6-fold higher in 2009 than in 1992 in states with CON, while it was only 3.4-fold higher in states without CON. Table 1 shows the average inflation-adjusted spending per enrollee for states with different CON laws. In 1992, Medicare spending per enrollee on nursing home care in states without any CON law was 32% higher than in states with NH CON laws (\$87 vs. \$66)

and 53% higher than states with home health and nursing home CON laws (\$87 vs. \$57). As a result of faster growth of nursing home care in CON states, Medicare spending on nursing home care in states without CON became lower than states with CON (25% lower compared to states with NH CON laws and 15% per lower compared to states with both CON).

Panel B of Figure 2 shows that Medicaid spending per enrollee on nursing home care declined in all states during the study period; however, the rate of decline was higher in states without CON policies. As can be seen in Table 1, Medicaid spending per enrollee on nursing home care was fairly comparable across states in 1992. However, by 2009, compared to states without CON, Medicaid spending per enrollee on nursing home care was 1.8 times higher in states with nursing home CON and 1.6 times higher in states with both nursing home and home health CON (see Table 1).

Compared with spending on nursing home care, we observe opposite patterns in home health spending with the highest growth rate in states without any CON laws. Both Medicare and Medicaid spending per enrollee on home health care in states without CON laws was lower in 1992 and higher in 2009 than states with CON laws (Table 1). Another key finding is that growth in home health spending is the lowest in states with home health CON (Figure 2), which is consistent with the findings in Figure 1.

The aggregate home health and nursing home spending per enrollee grew at a slower rate in states where both were under CON. Compared with states with both CON laws, aggregate Medicare spending per enrollee in the states without CON laws was approximately 30% lower than in 1992 but equalized by 2009 (Table 1). On the other hand, aggregate Medicare spending in nursing home CON states was always higher than in states without CON and grew at same rate. Aggregate Medicaid spending on nursing home and home health care remained roughly same for all three types of states (Figure 2, Panel F).

Figure 3 exhibits how spending trends in states with CON are different from trends in states without CON, after adjusting for state fixed effects, other policies, time trends, population acuity, and so on. Clearly, CON states increased Medicare spending on nursing home care and decreased Medicare spending on home health care relative to the trends in states without CON. Medicaid spending on nursing home care increased at the highest rate in states with both nursing home and home health CON. The growth rate of Medicaid spending on home health care was significantly lower in the states with both type of CON compared with the states without CON. There is no difference in trends in aggregated Medicare or Medicaid spending per enrollee between these three types of states.

Figure 4 shows the trend in the proportion of nursing home spending as a share of overall HCBS spending. In 1992, Medicare postacute spending was more concentrated in nursing homes in states without CON when compared with states with CON. This pattern reversed by 2009. Similarly, the share of nursing home Medicaid spending dropped almost continuously during the study period but at an accelerated rate in states without CON. As a result, we observed that the relative importance of nursing home over home health increased gradually in states with CON laws compared with the states without any CON law (Figure 5). These patterns are almost identical for both Medicare and Medicaid spending.



## Discussion

In this article, we examined how CON laws affected growth in Medicare and Medicaid spending on nursing home and home health care. Medicare spending on postacute nursing home care grew at a faster rate in states with CON than states without CON. Similarly, Medicaid spending on long-term nursing home care declined at a slower rate in states with CON than in states without CON. Spending on home health care by both Medicare and Medicaid increased at a much faster rate in states without CON. States with CON laws covering both NH and home health experienced the slowest home health care growth. Nursing home spending dominated postacute and long-term care expenditures in CON states. Aggregate spending on nursing home and home health care either by Medicare or by Medicaid did not differ between states with different CON laws.

CON laws have remained unchanged in most states for the past two decades. Many states have continued to use CON for long-term services focusing largely on nursing home beds (Wiener et al., 1999). Although studies in the 1980s and early 1990s revealed that CON laws reduced bed supply growth (Harrington et al., 1997; J. Swan & Harrington, 1990; Zinn, 1994), more recent studies did not find any significant effects and concluded that the earlier studies of reduction in the effectiveness of CON laws are due to declining occupancy rates (Grabowski, 2001; Nyman, 1993). Our analyses reveal that CON policies have had a long-term impact on the number of health care providers and the direction of the effect varies by industry. To the best of our knowledge, ours is the first study to demonstrate that home health CON laws prohibited entry of new home health organizations and led to a decline in the number of home health agencies while states without home health agency CON laws experienced a dramatic increase in the number of home health agencies. On the other hand, we observed that in states with CON laws covering both nursing homes and home health, there was much less contraction in the nursing home industry.

Medicare and Medicaid are monopsonistic buyers of postacute and long-term care and have very large control over price and quantity of care. In such market structures, nursing homes and home health agencies should not have any market power and act as price takers. Wiener et al. (1999) concluded that nursing home industry representatives generally support CON laws because such measures help to reduce competition for residents in an era of falling occupancy rate. Our findings suggest that CON laws both protect nursing homes from new entrant competition and serve to impede expansion of the competing home health industry capacity. A possible explanation is that the presence of CON laws for about four decades allowed incumbent nursing homes to gain market power that protected them from the effects of payment-based policy change by Medicare or HCBS expansion policies by Medicaid. Additionally, the nursing home industry in CON states may be sufficiently politically powerful to affect the states' decisions to maintain CON laws and influence adoption of other Medicaid policies.

A major concern for policy makers is that CON laws for nursing homes can act as a barrier to increase home- and community-based care because both Medicare and Medicaid are promoting community-based long-term care to transition patients out of nursing homes faster (Kitchener et al., 2005; E. A. Miller et al., 2009; N. A. Miller et al., 2002). The

Affordable Care Act (ACA) legislation of 2010 has three important voluntary provisions for the expansion of HCBS under Medicaid. State can choose to (1) offer a community first choice option to provide attendant care services and supports, (2) amend its state plan to provide an optional HCBS benefit, and (3) rebalance its spending on long term services and supports to increase the proportion that is community based (Harrington, Ng, Laplante, & Kaye, 2012). Given that nursing homes have provided more postacute care and less long-term care over time, states' investments in the use of CON and construction moratorium laws for nursing homes may have to be rethought.

Our results have important implications for the future development of the postacute and long-term care industry. The demand for this type of care is expected to expand rapidly in the near future because of the aging of the baby boomer cohort. Early projections for the expansion required to meet this need suggests a 54% increase in nursing homes (i.e., about 8,000 additional nursing homes) by 2030 (Rivlin, Wiener, Hanley, & Spence, 1988). More recent studies project the nursing home population to be 10% to 25% higher than such estimates by a simple extrapolation of past declines in disability (Lakdawalla et al., 2003). Moreover, many nursing facilities were built in the 1950s and will need to be replaced in the near future. For example, the New York State Office for the Aging report in 2004 documented that 80% of facilities were built prior to 1980. During our study period, we observed an expansion of Medicare-paid postacute care which took place in the form of skilled nursing facility care in CON states and in the form of home health care in states without CON. In contrast, while total spending on Medicaid-paid long-term care was stable from 1992 to 2009, we observed less expansion of home based care and less contraction of nursing home care in CON states. This implies that if CON laws remain in place when demand for long-term and postacute care increases in the future, nursing home-based care will grow at a relatively faster rate than community-based care in CON states. This increase in nursing homes conflicts with federal home- and community-based care initiatives. Though we did not find any effect of CON on aggregate spending, since the cost of nursing home care is higher than the public cost of home-based care, persistence of CON laws may increase future aggregate spending.

Our findings demonstrate how a supply-based policy can offset and even reverse some of the effects of a payment-based policy. Policy makers and other stakeholders should be most concerned about the total effects of these policies, and not only the potentially very limited impact of isolated policy components. This study also shows how state Medicaid policies can conflict with federal Medicare policies. Previous studies demonstrated examples of misaligned incentives like Medicare's cost-sharing rules, cost shifting between different health care settings (Grabowski, 2007). Our findings imply that coordinated policy formulation is required to control costs incurred by both programs.

This study has several limitations. First, our study focused on CON laws related to nursing home and home health industry and ignored the role of CON laws related to hospital or other types postacute and long-term care. Further research is required to understand the implications of CON on hospice and other related services. Second, although we observed different patterns in nursing home and home health spending in states with different CON regulations, it was unclear whether excess spending on a given type of care was due to

higher utilization or higher payment rates for that care. Third, there are two ways to increase nursing home spending in CON states: Relatively more patients are discharged to nursing home for postacute care and, alternatively, nursing home length of stay increases. More research is required to assess how patients' transitions through different form of care are affected by CON legislation since length of stay has risen and fallen for select groups of nursing home users over the past two decades.

To conclude, states with CON laws experienced faster growth of Medicare and Medicaid spending on nursing home care and slower growth in spending on home health care than states without CON laws. At a minimum, CON laws related to home health care act as a direct impediment of expansion of home- and community-based care. CON laws provide nursing homes some degree of market power that does not allow the market to respond freely to price changes or federal policies.

## Acknowledgments

**Funding:** The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the National Institute on Aging Grants P01 AG027296-06 A1 (Principal Investigator: Vincent Mor).

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## Appendix

**Table A1**

Detailed Regression Results.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Medicare spending per enrollee on nursing home care	Medicaid spending per enrollee on nursing home care	Medicare spending per enrollee on home health care	Medicaid spending per enrollee on home health care	Medicare spending per enrollee on nursing home and home health care	Medicaid spending per enrollee on nursing home and home health care	Proportion of nursing home spending among aggregated nursing home and home health Medicare spending	Proportion of nursing home spending among aggregated nursing home and home health Medicaid spending
y1993	24.97 **	−38.75	35.18	9.146	60.15 *	−29.6	−0.196	−2.737
y1994	56.59 ***	−53.83	97.58 ***	15.86	154.2 ***	−37.97	−2.392	−4.699
y1995	71.70 ***	−90.91	135.0 ***	27.35	206.7 ***	−63.55	−4.295 **	−6.688
y1996	91.97 ***	−110.3	153.9 ***	37.72	245.9 ***	−72.6	−3.155	−7.736 *
y1997	104.1 ***	−162.0 **	143.9 ***	54.85 *	248.0 ***	−107.2	−0.308	−10.21 **
y1998	105.0 ***	−183.0 ***	39.91	67.39 **	144.9 ***	−115.6	10.32 ***	−12.23 ***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Medicare spending per enrollee on nursing home care	Medicaid spending per enrollee on nursing home care	Medicare spending per enrollee on home health care	Medicaid spending per enrollee on home health care	Medicare spending per enrollee on nursing home and home health care	Medicaid spending per enrollee on nursing home and home health care	Proportion of nursing home spending among aggregated nursing home and home health Medicare spending	Proportion of nursing home spending among aggregated nursing home and home health Medicaid spending
y1999	74.31 ***	-193.7 ***	4.064	81.53 **	78.37 **	-112.2	10.76 ***	-14.12 ***
y2000	80.01 ***	-177.6 **	2.787	87.86 **	82.80 **	-89.71	11.73 ***	-14.29 ***
y2001	105.8 ***	-233.4 ***	19.32	119.2 ***	125.2 ***	-114.2	11.04 ***	-18.93 ***
y2002	117.9 ***	-228.7 ***	40.48	133.2 ***	158.4 ***	-95.52	8.574 ***	-19.46 ***
y2003	128.9 ***	-255.4 ***	69.92 **	142.0 ***	198.8 ***	-113.4	5.871 ***	-21.55 ***
y2004	150.5 ***	-274.5 ***	102.0 ***	163.5 ***	252.5 ***	-111	4.062 *	-22.75 ***
y2005	162.2 ***	-308.9 ***	127.8 ***	180.2 ***	290.0 ***	-128.7	1.992	-25.37 ***
y2006	169.5 ***	-347.9 ***	156.6 ***	216.6 ***	326.1 ***	-131.3	0.737	-28.53 ***
y2007	189.9 ***	-361.6 ***	184.6 ***	243.7 ***	374.5 ***	-118	0.596	-29.79 ***
y2008	205.3 ***	-405.2 ***	192.1 ***	245.3 ***	397.4 ***	-159.9	1.113	-29.57 ***
y2009	221.4 ***	-414.3 ***	219.7 ***	198.3 ***	441.1 ***	-216.0 *	-0.511	-28.27 ***
CON_NH × y1993	1.273	-1.867	1.809	-7.7	3.081	-9.567	2.464	2.968
CON_NH × y1994	10.28	14.39	0.984	-12.89	11.26	1.5	7.062 **	5.108
CON_NH × y1995	20.06	16.3	1.876	-10.49	21.93	5.81	9.741 ***	5.758
CON_NH × y1996	29.08	37.84	4.093	-3.598	33.17	34.24	11.16 ***	5.054
CON_NH × y1997	43.60 **	100.5	-2.35	-11.4	41.25	89.08	12.35 ***	7.064
CON_NH × y1998	48.80 **	115.4	-9.058	-15.67	39.74	99.75	11.53 ***	8.530 *
CON_NH × y1999	50.61 **	116.2	-15.27	-32.68	35.34	83.52	11.84 ***	11.34 **
CON_NH × y2000	65.42 ***	94.9	-15.04	-36.05	50.38	58.84	13.72 ***	11.16 **
CON_NH × y2001	81.67 ***	150.8	-22.89	-53.43	58.77	97.33	15.32 ***	14.99 ***
CON_NH × y2002	93.86 ***	53.72	-30.86	-59.19	63	-5.475	17.50 ***	13.89 ***
CON_NH × y2003	86.27 ***	54.95	-47.21	-53.64	39.06	1.311	18.38 ***	15.87 ***
CON_NH × y2004	96.24 ***	77.19	-58.61 *	-73.92 *	37.63	3.269	19.55 ***	17.25 ***
CON_NH × y2005	106.2 ***	39.5	-61.54 *	-90.43 **	44.64	-50.93	20.26 ***	19.24 ***
CON_NH × y2006	111.4 ***	40.22	-59.77 *	-117.3 **	51.6	-77.11	20.03 ***	20.69 ***
CON_NH × y2007	113.0 ***	22.17	-52.76	-122.7 **	60.22	-100.5	18.80 ***	19.85 ***
CON_NH × y2008	118.2 ***	26	-36.89	-117.2 **	81.3	-91.23	17.57 ***	17.96 ***
CON_NH × y2009	124.4 ***	40.52	-36.77	-59.47	87.68	-18.95	17.55 ***	17.64 ***
CON_NH_HH × y1993	-3.748	40.83	7.954	-2.831	4.206	38	1.605	2.669
CON_NH_HH × y1994	-2.837	57.19	-18.22	-15.18	-21.06	42.01	6.780 **	5.685
CON_NH_HH × y1995	2.393	68.09	-55.16	-20.33	-52.76	47.77	10.64 ***	6.961
CON_NH_HH × y1996	10.16	78.68	-82.36 **	-29.71	-72.19	48.97	13.42 ***	7.495
CON_NH_HH × y1997	29.44	126.8 *	-97.92 **	-39.37	-68.48	87.38	16.00 ***	9.012 *
CON_NH_HH × y1998	33.60 *	141.2 *	-82.24 **	-47.68	-48.64	93.53	14.41 ***	11.16 **
CON_NH_HH × y1999	37.21 **	140.8 *	-62.75 *	-61.8	-25.53	79	11.85 ***	12.54 **



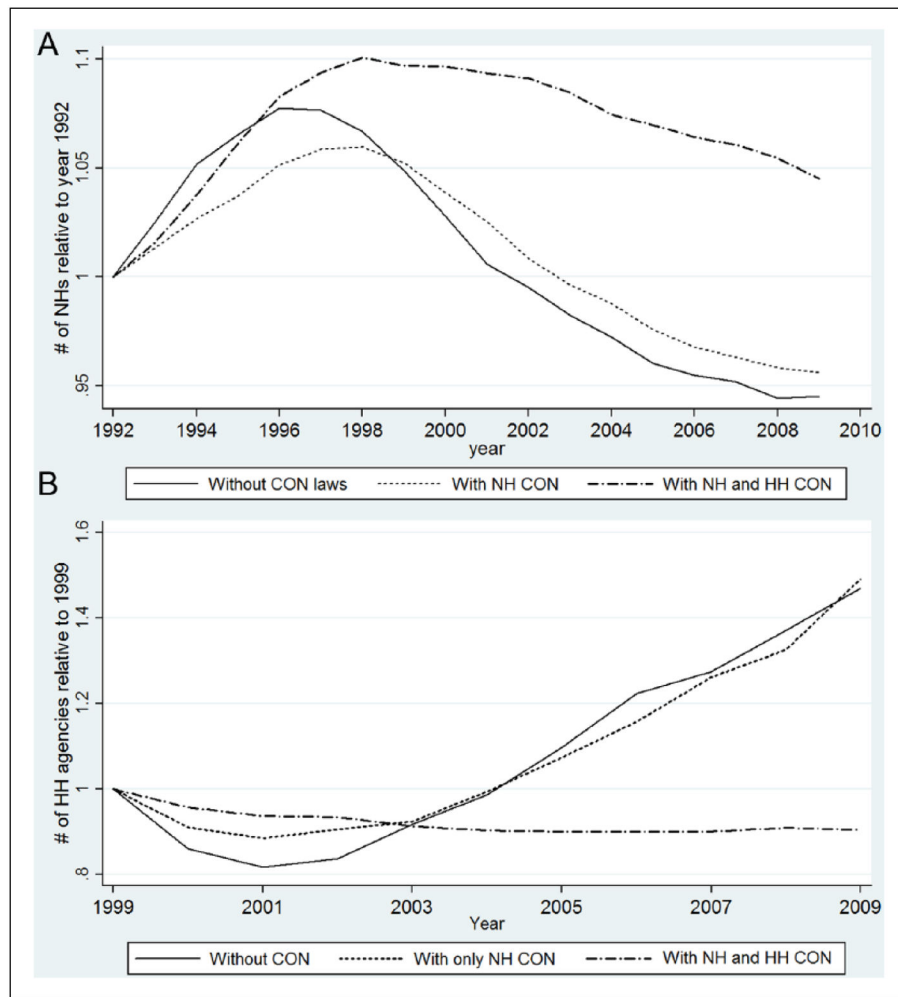
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Medicare spending per enrollee on nursing home care	Medicaid spending per enrollee on nursing home care	Medicare spending per enrollee on home health care	Medicaid spending per enrollee on home health care	Medicare spending per enrollee on nursing home and home health care	Medicaid spending per enrollee on nursing home and home health care	Proportion of nursing home spending among aggregated nursing home and home health Medicare spending	Proportion of nursing home spending among aggregated nursing home and home health Medicaid spending
CON_NH_HH × y2000	49.67***	149.4**	-69.35*	-73.23*	-19.68	76.19	14.86***	14.04***
CON_NH_HH × y2001	59.16***	164.9**	-73.81*	-90.60***	-14.65	74.27	16.84***	17.76***
CON_NH_HH × y2002	67.02***	166.1**	-88.74**	-104.3***	-21.72	61.78	19.37***	18.89***
CON_NH_HH × y2003	58.66***	194.9**	-101.9***	-98.09***	-43.28	96.85	20.24***	20.28***
CON_NH_HH × y2004	60.43***	205.1***	-119.3***	-100.9**	-58.89	104.2	21.36***	19.65***
CON_NH_HH × y2005	66.57***	233.9***	-126.2***	-111.7***	-59.61	122.2	22.06***	21.22***
CON_NH_HH × y2006	72.14***	208.6**	-129.2***	-135.6**	-57.11	73.02	22.01***	22.07***
CON_NH_HH × y2007	71.60***	198.0**	-137.0***	-138.1**	-65.44	59.87	21.41***	21.41***
CON_NH_HH × y2008	72.85***	218.4**	-129.2***	-130.2**	-56.32	88.22	20.46***	19.21***
CON_NH_HH × y2009	78.78***	226.1**	-130.4***	-87.6	-51.61	138.5	20.67***	18.55***
Hospital spending per enrollee	0.0231*	0.0717***	0.0740***	0.0366**	0.0971***	0.108***	0.00346**	-0.008***
% of state's population enrolled in Medicare	-8.560*	1.882	-18.41***	-0.367	-26.97***	1.515	2.768***	0.143
% of state's population enrolled in Medicaid	-2.971***	-33.05***	-1.428	2.408	-4.399**	-30.64***	-0.0576	-1.434***
Nursing home Medicaid per-diem rate	0.033	3.033***	0.26	-0.165	0.293	2.867***	-0.0275	0.0669***
Case-mix Medicaid nursing home payment	-10.89**	-55.24**	3.459	-16.05*	-7.427	-71.29***	0.403	-1.019
Presence of nursing home moratoria	-1.735	-41.43**	-20.16**	-17.64***	-21.90**	-59.06***	1.503***	1.110*
Constant	168.1**	863.2***	270.2***	27.01	438.3***	890.3***	-14.34*	112.0***
Observations	792	792	792	792	792	792	792	792
R <sup>2</sup>	0.905	0.906	0.864	0.852	0.902	0.92	0.918	0.86
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note.* Variables start with y indicates respective year dummies (e.g., y1993 implies indicator for year 1993). CON\_NH indicates states with only nursing home CON. CON\_NH\_HH indicates states with both nursing home and home health CON. *P* values based on robust standard error are indicated by asterisks. Coefficients of interactions (along with 95% confidence interval) in columns 1 to 6 are reported in Figure 3. Coefficients of last two columns are reported in Figure 5.

\*  $p < .1$ .

\*\*  $p < .05$ .

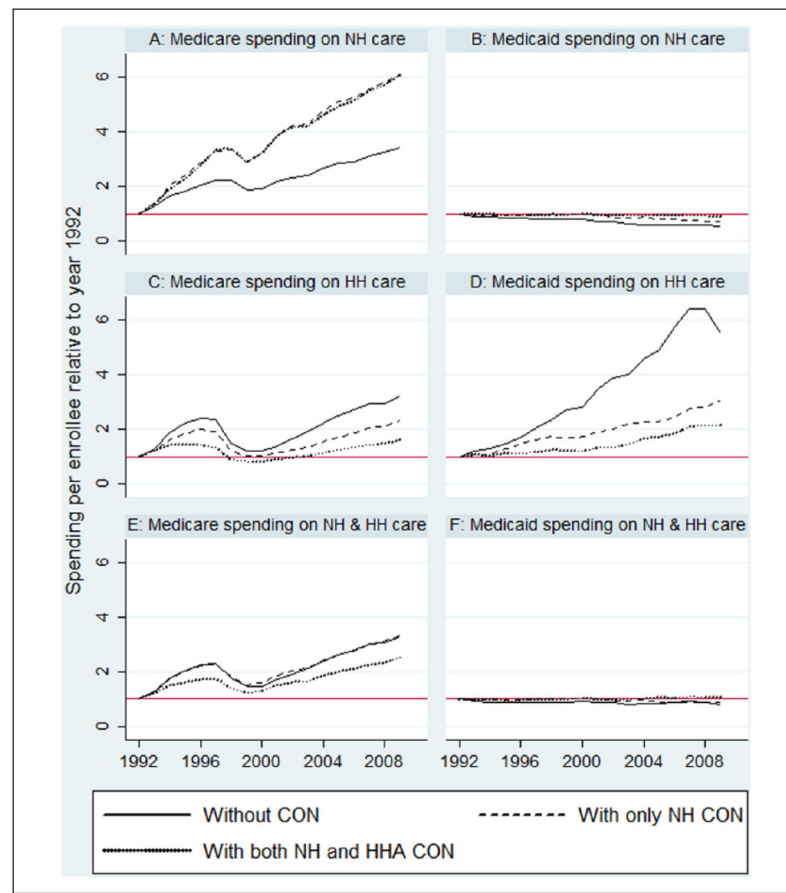
\*\*\*  $p < .01$ .



**Figure 1.**

Growth in number of home health (HH) agencies and nursing homes (NH) in states with different certificate-of-need (CON) laws. (Panel A) Number of nursing homes. (Panel B) Number of home health agencies.

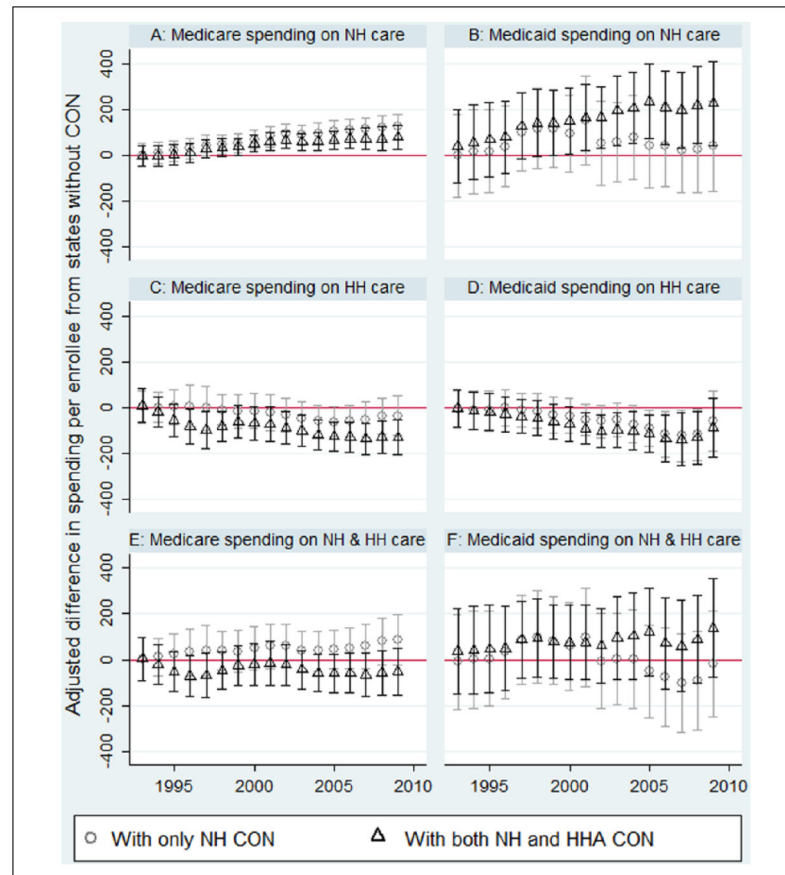
*Note.* All the plotted variables for each state were deflated by their value in first year of observation (1992 in Panel A and 1999 in Panel B). Thus, each plotted line shows growth relative to year the first year.



**Figure 2.**

Growth in inflation-adjusted spending per enrollee on home health (HH) and nursing home (NH) care in states with and without certificate-of-need (CON) laws.

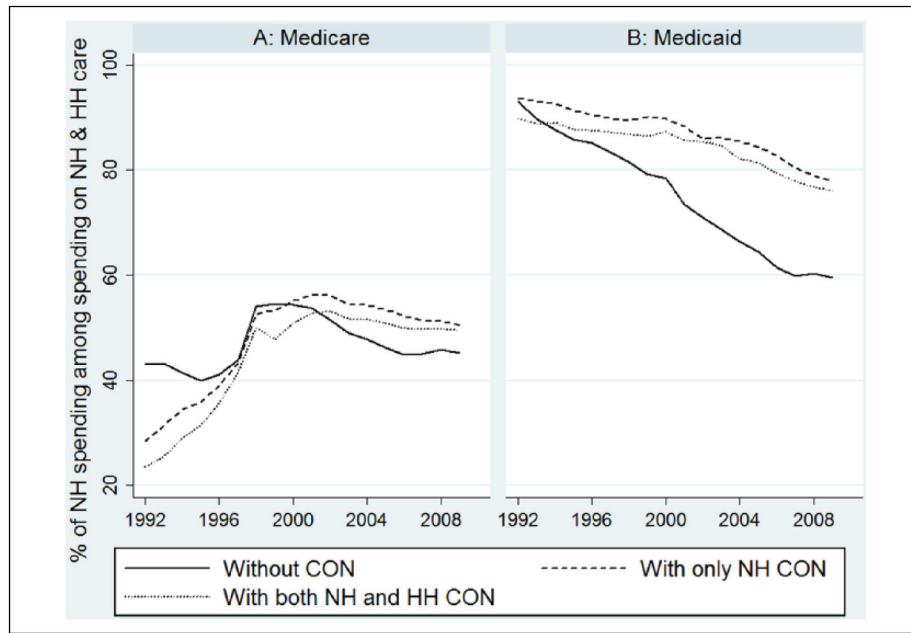
*Note.* All the plotted variables for each state were deflated by their value in 1992. Thus, each plotted line shows growth relative to year 1992. Values of these variables are reported in Table 1.



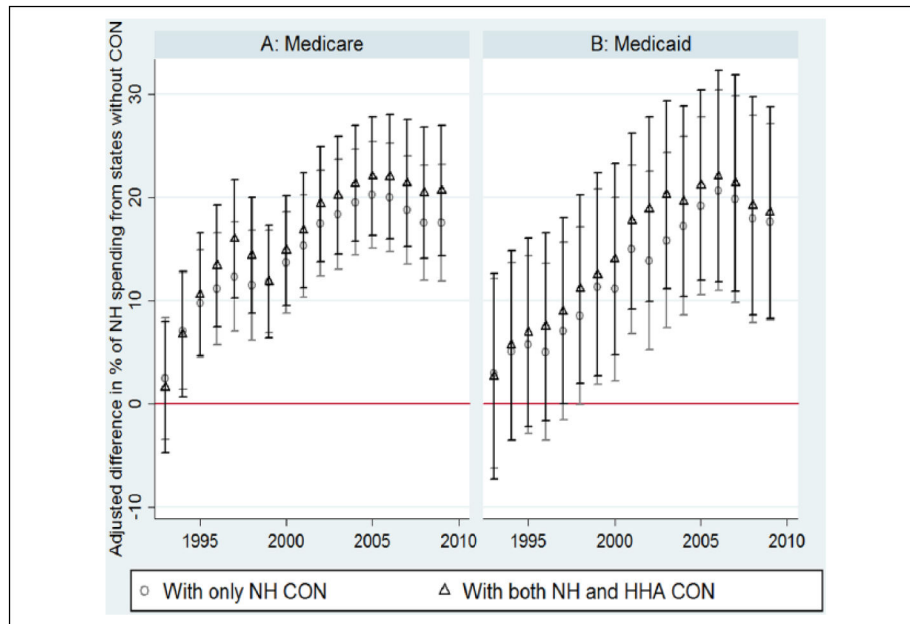
**Figure 3.**

Adjusted difference in inflation-adjusted nursing home (NH) and home health (HH) care spending per enrollee in states with and without certificate-of-need (CON) laws.

*Note.* Estimated differences are based on regressions that include year fixed effects, state fixed effects and few time variant state characteristics described in Table 1. Detailed regression results can be found in Appendix Table A1.



**Figure 4.** Trends in proportion of nursing home (NH) spending among aggregated nursing home and home health (HH) spending in states with and without certificate-of-need (CON) laws.



**Figure 5.**

Adjusted difference in proportion of nursing home (NCH) spending between states with and without certificate-of-need (CON) laws.

*Note.* Estimated differences are based on regressions that include year fixed effects, state fixed effects and few time variant state characteristics described in Table 1. Detailed regression results can be found in Appendix Table A1.



Table 1

Average Values of All the Variables in 1992 and 2009.

	Without CON laws		With NH CON laws		With NH and HHA CON laws	
	1992	2009	1992	2009	1992	2009
Medicare spending per enrollee						
Home health (HH)	125	399	176	406	221	353
Nursing home (NH)	87	298	66	402	57	344
Total postacute (HH + NH)	212	697	242	809	278	698
% of NH spending among total postacute spending	43.11	45.14	28.38	50.56	23.54	49.44
Hospital	2,108	2,830	2,286	3,157	2,324	3,165
Medicaid spending per enrollee						
Home health	45	248	72	217	104	220
Nursing home	747	400	986	703	712	636
Total long-term (HH + NH)	792	648	1057	920	816	856
% of NH spending among total long-term spending	93.13	59.47	93.77	77.93	89.74	76.09
Hospital	1,512	1,827	1,443	1,868	1,491	1,785
Population composition						
% enrolled in Medicare	12.6	13.53	14.48	16.06	14.12	16.15
% enrolled in Medicaid	8.89	14.39	10.11	15.37	11.5	16.78
Nursing home policy						
Medicaid payment rate	66.34	148.33	75	158.26	72.78	161.97
Case-mix payment	0.3	0.8	0.32	0.58	0.6	0.8
Construction moratoria	0.50	0.40	0.26	0.42	0.27	0.20

Note. Ten states without certificate-of-need (CON) law: AZ, CA, CO, ID, KS, MN, NM, SD, TX, UT. Nineteen states with only nursing home CON: CT, DE, FL, IA, IL, LA, MA, ME, MI, MO, NE, NH, OH, OK, OR, RI, VA, WI, WY. Fifteen states with nursing home and home health CON: AL, AR, GA, KY, MD, MS, MT, NC, NJ, NY, SC, TN, VT, WA, WY.