



HARVARD Kennedy School
JOHN F. KENNEDY SCHOOL OF GOVERNMENT

Health Care Spending Projections and Policy Changes: Recognizing the Limits of Existing Forecasts

Faculty Research Working Paper Series

Daniel Shoag

Harvard Kennedy School

June 2019

RWP19-022

Visit the **HKS Faculty Research Working Paper Series** at:

https://www.hks.harvard.edu/research-insights/publications?f%5B0%5D=publication_types%3A121

The views expressed in the **HKS Faculty Research Working Paper Series** are those of the author(s) and do not necessarily reflect those of the John F. Kennedy School of Government or of Harvard University. Faculty Research Working Papers have not undergone formal review and approval. Such papers are included in this series to elicit feedback and to encourage debate on important public policy challenges. Copyright belongs to the author(s). Papers may be downloaded for personal use only.

Health Care Spending Projections and Policy Changes:
Recognizing the Limitations of Existing Forecasts

Daniel Shoag¹
Harvard Kennedy School

DO NOT CITE WITHOUT PERMISSION

June 2019

Many projections for health care spending growth do not incorporate the impact of changing labor market regulations. In this paper, I show that changing one such regulation - raising the federal minimum wage -- would significantly increase the cost of several important types of care. I do this using data on the cost of long-term care from thousands of providers from 2012-2018. Using these data, I show that costs, which include home health aides and nursing home care, are highly correlated with changes in state level minimum wages. This relationship is statistically robust. Forecasts that ignore the risk of a federal minimum wage increase will understate this element of expected medical spending growth.

¹ Daniel Shoag can be contacted at dxs788@case.edu or at 11119 Bellflower Road, Cleveland OH 44106

I. INTRODUCTION

There are few forecasts more important for public finance and public policy than the projected growth in health expenditures. Health spending may grow because of price inflation or due to improvements in the quality of medical care, but the future rate of growth is unknown. Health spending is equal to roughly 18% of GDP², and federal spending on health care exceeded \$1 trillion in 2018.³ The sheer size of this sector means that forecasted growth rates have a significant impact on public planning. In addition to its impact on public budgeting, forecasts affect private sector planning and legal disputes, such as damages in personal injury cases.

The Office of the Actuary for the Centers (OACT) for Medicare and Medicaid Services produces one such forecast for medical care spending growth. The most recent forecast projected an average annual growth rate of 5.5 percent for the period 2018-2027 (Cuckler et al. 2018).

There are several reasons, however, why the true growth rate can exceed this forecast. For example, one important limitation of the OACT forecast is that it is restricted to current law and does not assume any potential legislative changes (CMS 2017). To the extent that there are potential policy changes on the horizon that might raise the cost of health care, this institutional limitation will create a downward forecast bias.

In this paper, I illustrate this problem by demonstrating the relationship between one such potential policy change and an important segment of medical expenses. Specifically, I show an extremely strong relationship between changes in state-level minimum wage and price increases in costly components of medical care like home health aides, homemaker services, adult day care, assisted living facility residency, and nursing home care. I do this using data collected from tens of thousands of providers, using a variety of statistical tests. The relationship is highly robust. While many people in these industries make more than the minimum wage, the minimum wage is still a significant component of the aggregate production costs for long-term care.

The sensitivity of long-term care costs to the minimum wage is crucial in part because the federal minimum wage has shrunk considerably relative to GDP in recent years. The results in this paper suggest that this erosion, demonstrated in Figure 1 below, has been a limiting factor in the growth rate of costs for these components.

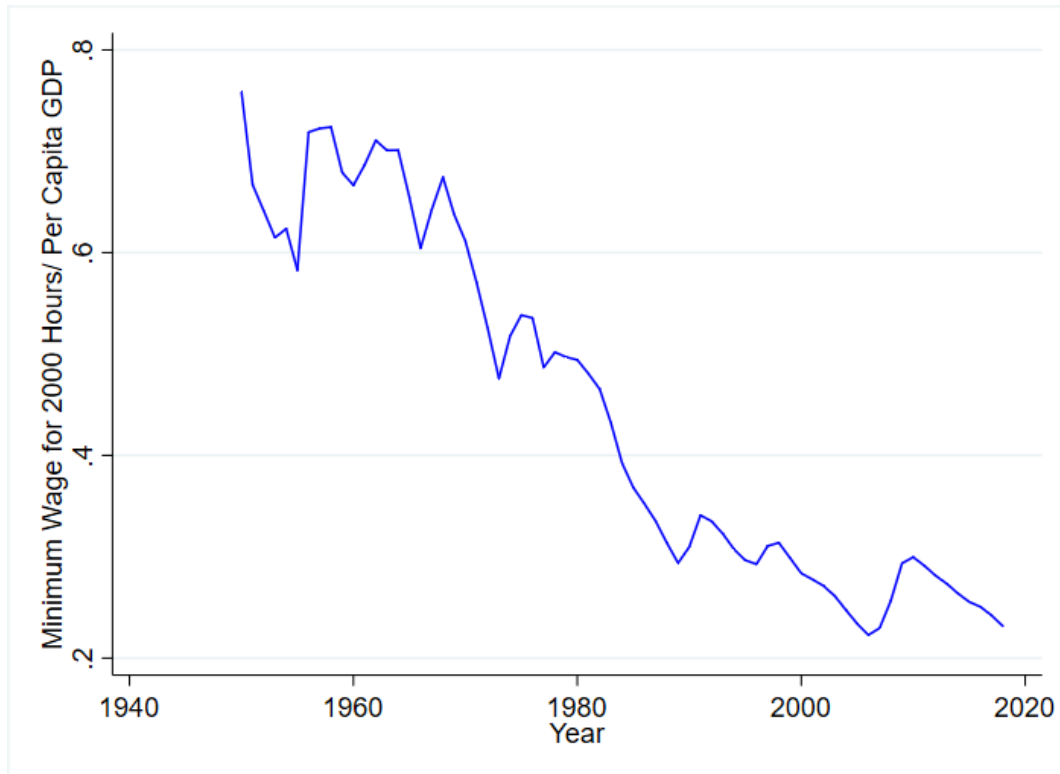
Perhaps as a result, there has been a recent push to raise the federal minimum wage. The Democratic Party platform calls for raising the federal minimum wage by more than 100%, from

²<https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata/nationalhealthaccountshistorical.html>

³ <https://www.taxpolicycenter.org/briefing-book/how-much-does-federal-government-spend-health-care>

the current level of \$7.25 to \$15.⁴ The majority of candidates running for the presidential nomination of the Democratic Party support this policy.⁵ The overwhelming majority of Americans -- both Republican and Democrat -- support increasing the minimum wage, and a clear majority desires an increase to \$15.⁶

Figure 1: The Federal Minimum Wage Relative to GDP Per Capita



Data on Federal Minimum Hourly Wage for Non-Farm Workers and Gross Domestic Product Per Capita from the Federal Reserve Economic Data FRED

<https://fred.stlouisfed.org>

The OACT projections for “Nursing Care Facilities and Continuing Care Retirement Communities” (5% in aggregate, 4.1% per capita) and “Other Health, Residential, and Personal Care Expenditures” (5.7% in aggregate, 4.8% per capita) ignore this major potential shock. While a \$15 minimum wage is not guaranteed, the most scientifically accurate forecast should incorporate the likelihood. The results in this paper suggest that this would have a dramatic impact on the cost of long-term care. Moreover, a rising minimum wage is just one of the potential policy changes on the horizon that raise the anticipated growth rate of health care costs.

⁴ https://democrats.org/wp-content/uploads/2018/10/2016_DNC_Platform.pdf

⁵ <https://www.vox.com/2019/4/30/18522505/candidates-position-15-dollar-minimum-wage>

⁶ <https://thehill.com/hilltv/what-americas-thinking/426780-poll-a-majority-of-voters-want-a-15-minimum-wage>

The paper proceeds as follows. In section two, I describe the data, and in section three, I present my analysis. I conclude the paper by discussing other possible policy sources of higher costs and discuss the implications for accurate private-sector projections.

II. DATA

Costs of Care

I collected data on the costs of nursing homes, assisted living, and home health care services from the Genworth Cost of Care Surveys.

Home care, as defined in the survey, includes services where a skilled nurse need not be present. This covers activities such as bathing, dressing, transferring and toileting, but not injections. Home care services may include companionship, assistance with shopping, laundry, errands, cooking, and transportation. Surveying was done by home care agencies.

Adult day care services provide social, therapeutic, and health activities to adults with impairments. Often times these programs provide meals, transportation, health related services such as medication management and blood pressure monitoring, and help with personal care. The National Adult Day Services Association estimates there are more than 4,600 adult day services centers in the US.⁷

Assisted living facilities fill the gap between home care and nursing homes. Residents may need help with activities of daily living and household chores, but do not need round-the-clock level of skilled nursing care found in nursing homes. Roughly, 800,000 people live in the nation's nearly 30,000 assisted living communities.⁸

Finally, nursing homes are facilities that provide room, meals, personal care, nursing care, and medical services. Typically, patients require help with multiple activities of daily living. Nursing

The Genworth Cost of Care survey contacts more than 49,000 providers to complete over 15,500 surveys. The survey has been run since 2004. In 2018, the survey conducted more than 4,000 interviews with home health care providers (representing approximately 18% of home care agencies), 1,300 surveys of adult day care facilities, and 4000 surveys of nursing homes (representing nearly 25% of certified and licensed institutions).

In Table 1, I report summary statistics for these cost measures across states.

⁷ <https://www.nadsa.org/research/metlife-national-study-2010/>

⁸ <https://www.ahcancal.org/ncal/facts/Pages/Residents.aspx>

Table 1 : Median Annual Costs Across States, 2012-2018

	Mean	Standard Deviation	Minimum	Maximum
Home-Maker Services	\$46,771	\$6,514	\$32,032	\$64,064
Home Health Aides	\$48,727	\$6,920	\$34,320	\$68,640
Adult Day Care	\$18,465	\$5,207	\$6,500	\$36,582
Assisted Living	\$45,042	\$9,532	\$29,025	\$75,600
Semi-Private Nursing Home	\$89,618	\$36,910	\$47,450	\$351,495
Private Nursing Home	\$97,575	\$35,267	\$53,597	\$330,873

Minimum Wages

Data on state level minimum wages from January 2011 to January 2018 were taken from Clemens, Hobbs, and Strain (2018).⁹ These data originate from the US Department of Labor, state labor departments, and Vaghul and Zipperer (2016). They were augmented with additional data from the National Conference of State Legislatures. The great advantage of these data is their precision in timing the implementation of minimum wage changes.

Twenty-six states raised their minimum wage between 2012 and 2018

⁹ <http://ftp.iza.org/dp11748.pdf>

Table 2: Minimum Wage Changes

State	Percentage Change in Min Wage (2012-18)	State	Percentage Change in Min Wage (2012-18)
Alaska	27	Minnesota	33.1
Arizona	37.3	Missouri	8.3
Arkansas	17.2	Montana	8.5
California	37.5	Nebraska	24.1
Colorado	33.5	New Jersey	15.6
Connecticut	16.4	New York	43.4
Delaware	13.8	Ohio	7.8
Florida	7.6	Oregon	16.5
Hawaii	39.3	Rhode Island	36.5
Maine	33.3	South Dakota	22.1
Maryland	27.6	Vermont	24.1
Massachusetts	37.5	Washington	27.2
Michigan	25	West Virginia	20.7

III. ANALYSIS

It is useful to examine the data visually before delving into more sophisticated regression models. In the figure below, I plot state level changes in the minimum wage from 2012-2018 against the annualized growth rate in home health aide costs. The relationship is extremely strong.

A common measure of the strength of a statistical relationship is the probability value, or the likelihood of seeing this result if indeed the minimum wage was not correlated with home health costs. The value in this test is 0.3%, meaning that it is extremely unlikely that this result could have appeared due to chance.

Another common measure of statistical strength is the R-squared. This measures the fraction of the variation in growth rate in costs across states that can be explained by variation in the minimum wage. In this case, the R-squared is nearly 18%. This means that changes to the minimum wage are a major driver of cross-state differences.

Figure 2: Growth Rate of Home Health Aide Costs vs. Changes in the State Level Minimum Wage



The magnitude of this relationship is also significant. A minimum wage increase of 25% is associated with a 0.92% higher growth rate. Again, the proposed increase in the federal minimum wage is more than 100%, or four times as large.

In addition to visual inspection, it is important to conduct direct statistical tests. To do this, I pool data from the Genworth Cost of Care survey for the year 2012-2018. I then run regressions of the form

$$y_{it} = \alpha_i + \alpha_t + \beta \times \text{min wage}_{it} + \varepsilon_{it}$$

where α_i represents state level fixed effects and α_t represents time fixed effects. The coefficient β represents the impact of the minimum wage. Table 3 below reports the results of these tests.

Panel A of Table 3 does not include state level fixed effects. These estimates compare the impact of the minimum wage on costs both within and across states. Panel B.

Table 3: Impact of Minimum Wages on Costs Across and Within States

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Home-Maker Services	Home Health Aide	Adult Day Care	Assisted Living	Nursing: Semi-Private	Nursing: Private
Panel A						
Minimum Wage	3,418*** (425.8)	3,684*** (464.1)	1,878*** (397.3)	4,605*** (674.6)	16,155*** (2,754)	16,910*** (2,566)
State Fixed Effects						
Year Fixed Effects	X	X	X	X	X	X
R-squared	0.374	0.341	0.147	0.266	0.185	0.225
Panel B						
Minimum Wage	1,317*** (269.1)	1,005*** (232.6)	-41.34 (306.1)	487.9 (395.5)	2,743** (1,070)	3,028*** (1,045)
State Fixed Effects	X	X	X	X	X	X
Year Fixed Effects	X	X	X	X	X	X
R-squared	0.94	0.96	0.88	0.94	0.97	0.97

Standard errors in parentheses. Sample is biennial from 2012-2018.

The results show that higher minimum wages are strongly associated with costs. When looking across states in Panel A, I find that a \$1 increase in the minimum wage predicts an increase in annual costs for homemaker and home health aide services of roughly 7.5%, adult day care services and assisted living services of 10.2%, and nursing home care of 17-18%. All of these results are statistically significant at the 1% level.

By controlling for time fixed effects, these results remove any bias from a national trend in costs or the minimum wage. This eliminates the possibility that the impacts in Panel A are driven by inflation or both series merely growing over time. Still, it is possible that the relationship in Panel A are confounded by permanent differences in costs of living across states.

To assess this, I add state level fixed effects in Panel B. These tests are significantly more demanding, as they eliminate any variation across states. This means they identify the impact of higher minimum wage solely using changes across time within state. These results are likely biased towards zero if some of the impact of regulatory changes is delayed.

Nevertheless, as seen in Panel B, there remains a strong relationship between changes in the minimum wage and most categories of cost. Annual homemaker and home health aide services increase by roughly 2-3% with a \$1 higher minimum wage, and annual nursing home services increase in cost by roughly 3%. These results remain statistically significant. Assisted living costs also increase with a rising minimum wage, but the increased noise in these tests makes this result and the result for adult day care imprecise. Again, the results strongly confirm that higher minimum wages have a significant impact on these costs of care.

I further assess the robustness of the result in two additional ways. First, I replicate the results in Panel A of Table 1 controlling for state-level Medicaid expansion. The Affordable Care Act revised and expanded Medicaid eligibility starting in 2014. Under the law, U.S. citizens and legal residents with income up to 133% of the poverty line (including adults without dependent children) would qualify for coverage in any state that participates in the Medicaid program. The Federal government would cover a significant portion of these costs. A Supreme Court ruling allowed states to decide not to participate in the expansion, and to date 14 states have not adopted the expansion. Using data from the Kaiser Family Foundation¹⁰, I control for state expansions to see whether this affects the results.

Second, to assess whether the result is being driven by only smaller states, I collect data on state level population from the US Census Bureau.¹¹ I then re-run Panel A of Table 1 for a third time, this time weighting the observation by state level population.

As is evident in Table 4 below, both tests suggest the results are unaffected by these changes. Again, this is strong evidence of a robust relationship between higher minimum wages and higher long-term care costs.

¹⁰ <https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/>

¹¹ <https://www.census.gov/newsroom/press-kits/2018/pop-estimates-national-state.html>

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Home-Maker Services	Home Health Aide	Adult Day Care	Assisted Living	Nursing Semi-Private	Nursing Private
Panel A						
Minimum Wage	3,127***	3,280***	1,639***	4,044***	12,879***	13,557***
	-478.4	-520	-446.9	-756.3	-3,066	-2,848
Medicaid Expansion	1,578	2,196*	1,301	3,049	17,813**	18,233**
	-1,195	-1,299	-1,116	-1,889	-7,658	-7,114
R-squared	0.38	0.351	0.153	0.276	0.207	0.25
Panel B: Population Weighted						
Minimum Wage	3,830***	3,915***	1,843***	3,570***	11,211***	12,432***
	-281.1	-319.1	-278.2	-505.5	-1,621	-1,516
R-squared	0.603	0.526	0.213	0.31	0.248	0.322
Standard errors in parentheses. Sample is biennial from 2012-2018.						
*** p<0.01, ** p<0.05, * p<0.1						

IV. CONCLUSION

The uncertain timing and magnitude of a federal minimum wage increase is not a valid argument for neglecting its impact on medical cost growth. The evidence presented here demonstrates that such an increase would significantly raise costs for elements of long-term care. As the likelihood of that policy change is non-trivial, it is essential for an accurate forecast to reflect this risk.

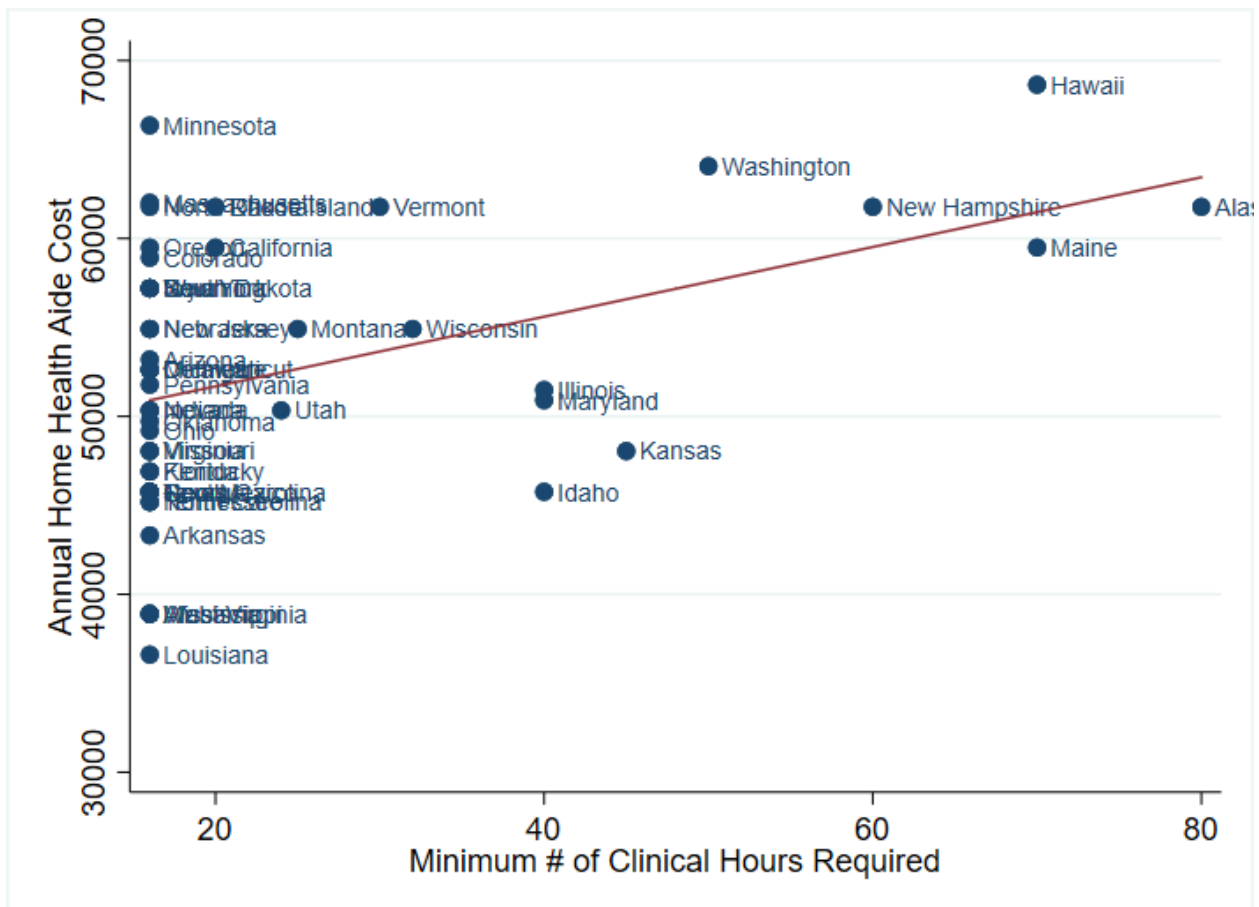
It is important to note, too, that long-term care is not the only segment of health care impacted by the federal minimum wage. The Bureau of Labor Statistics reported that, in 2017, 53,000 people work at or below the federal minimum wage in health care support occupations.¹² Moreover, many of the input industries used in the production of health care – food service, cleaning and maintenance occupations, protective services, etc. – feature a significant share of employees working at or below the federal minimum wage. There is evidence that wage regulation can influence not only prices but also the quality of care delivered (Propper and Van Reenen 2010).

¹² <https://www.bls.gov/opub/reports/minimum-wage/2017/home.htm>

Moreover, this is not the only likely policy impact on the horizon. The Paraprofessional HealthCare Institute (PHI) is a non-profit that works to improve long-term care. The note that roughly one in four direct care workers is an immigrant, and that these workers are disproportionately impacted by changes in federal immigration enforcement.¹³

PHI also collects data on requirements for home health aide licensing across states.¹⁴ These data show that training requirements are strongly correlated with costs across states, as can be seen in Figure 3 below.

Figure 3: Home Health Aide Costs vs. Clinical Hours Training Hours Required



PHI notes that these requirements have not been updated at the federal level for more than twenty years.¹⁵ An increase in these requirements could similarly have a large impact on the cost of long run care.

¹³ <https://phinational.org/resource/immigrants-and-the-direct-care-workforce/>

¹⁴ <https://phinational.org/advocacy/home-health-aide-training-requirements-state-2016/>

¹⁵ As of 2016, <https://phinational.org/advocacy/home-health-aide-training-requirements-state-2016/>

In most cases, the goal of forecasting is to construct the best estimate possible. All forecasts must take into account the possibility of uncertain events in the future. While it is not possible to account for every factor or hypothetical, neither is it scientifically reasonable to ignore an entire category of likely cost drivers. The most accurate forecast possible must account for risks like a minimum wage change, which have both a meaningful probability of occurring and significantly affect costs. This paper shows that neglecting likely and substantial policy changes can lead to understated or otherwise biased estimates of health care cost growth.

REFERENCES

Centers for Medicare and Medicaid Services. Projections of National Health Expenditures: methodology and model specification [Internet]. Baltimore (MD): CMS; 2017 Feb 9

Clemens, Jeffrey P., Duncan Hobbs, and Michael Strain. "A Database on the Passage and Enactment of Recent State Minimum Wage Increases." (2018).

Cuckler, Gigi A., et al. "National health expenditure projections, 2017–26: despite uncertainty, fundamentals primarily drive spending growth." *Health Affairs* 37.3 (2018): 482-492.

Financial, Genworth. "Genworth 2012 cost of care survey." *Richmond, VA: Genworth Financial* (2012).

Financial, Genworth. "Genworth 2014 cost of care survey." *Richmond, VA: Genworth Financial* (2014).

Financial, Genworth. "Genworth 2016 cost of care survey." *Richmond, VA: Genworth Financial* (2016).

Financial, Genworth. "Genworth 2018 cost of care survey." *Richmond, VA: Genworth Financial* (2018).

Propper, Carol, and John Van Reenen. "Can pay regulation kill? Panel data evidence on the effect of labor markets on hospital performance." *Journal of Political Economy* 118.2 (2010): 222-273.

Vaghul, Kavya, and Ben Zipperer. "Historical state and sub-state minimum wage data." *Washington Center for Equitable Growth* (2016).