Does health insurance always increase medical spending? Evidence from the affordable care act dependent mandate*

Hyojin Han [i]
Hanyang University
Kanghyock Koh [ii]
Korea University

Abstract

The Affordable Care Act Dependent Mandate (ACA-DM) has increased young adults' health insurance coverage through parents' employer-sponsored health insurance. This could have increased employers' labor costs and thus reduced parents' wages. In this study, we examine the effects of the ACA-DM on family income and medical spending. Using a difference-in-differences approach, we find evidence that the ACA-DM decreased family income but did not increase young adults' medical spending. The results imply that expansion of health insurance coverage does not necessarily increase medical spending if it is achieved through labor markets and decreases family income.

Keywords: Affordable Care Act Dependent Mandate, Family income, Medical spending

JEL Classification: I13, I18

* Han is supported by a research fund from Hanyang University (HY-2020).
i) Corresponding author. College of Economics and Finance, Hanyang University. E-mail: hyojinhan@hanyang.ac.kr
ii) Department of Economics, Korea University. E-mail: kkoh@korea.ac.kr

First received, October 4 2022; Revision received, October 20, 2022; Accepted, October 27, 2022

1 Introduction

In the U.S., young adults are usually covered as dependents under their parents' health insurance. Before the expansion, the coverage lasted until their 19th birthday, exposing them to many medical and financial issues (Anderson, Dobkin, and Gross, 2012; Himmelstein et al., 2005). In order to increase young adults' health insurance coverage, in March 2010, the Affordable Care Act mandated that insurers offer dependent coverage until their 26th birthday. Thus, since 2011, the Affordable Care Act dependent mandate (ACA-DM) has significantly increased young adults' health insurance coverage mainly through parents' employer-sponsored health insurance (Antwi, Moriya, and Simon, 2013). The expansion of health insurance coverage usually increases the insurance premiums. Since employers pay significant shares of workers' health insurance premiums, the ACA-DM could have increased employers' labor costs and thus reduced parents' wages (Koh and Kim, 2022) resulting in negative consequences on family income.[1]

Although income is one of the key determinants of a family's welfare, there is little empirical research investigating its relationship with health insurance. To fill this gap in the literature, we estimate the effects of the ACA-DM on family income. We identify the causal effects of the ACA-DM by comparing changes in the family income of young adults aged 19 to 25 years, who are eligible under the ACA-DM, to that of young adults aged 16 to 18 years and 26 to 29 years, who are not eligible. Using a difference-in-differences (DID) framework, we find evidence that the ACA-DM decreased family income.

This study provides new insights on how the ACA-DM affects young adults' medical spending, which has not been much discussed in the literature. The ACA-DM was expected to increase young adults' medical spending (Anderson, Dobkin, and Gross, 2012). However, the empirical evidence on the medical spending impacts of the ACA-DM is mixed. For example, Antwi, Moriya, and Simon (2015) find that the ACA-DM increased hospital visits, while Hernandez-Boussard et al. (2014) and

[1] The effects might be neutralized if other family members increase labor supply in response to reductions in family income.

Antwi et al. (2015) show that it decreased emergency department use. To the best of our knowledge, there has been little discussion on the explanations for these mixed findings. We argue that the negative income shock of the ACA-DM might be one possible explanation. Patients with health insurance coverage should pay a certain share of their total medical bill. Given the positive income elasticity of medical spending (Acemoglu, Finkelstein, and Notowidigdo, 2013), a reduction in income induced by the ACA-DM could mitigate incentives to receive more medical care.

In order to examine the implications of a reduced family income, we also estimate the effects of the ACA-DM on young adults' medical spending, which is the key measure for the cost-side consequence of healthcare reforms (Finkelstein et al., 2012). Consistent with our conjecture, using the DID approach we find little evidence that the ACA-DM increased young adults' medical spending.

The remainder of this paper is structured as follows. Section 2 describes the data and the empirical strategy. Section 3 reports the regression results, and Section 4 concludes.

2 Method

2.1 Data

To investigate the effects of the ACA-DM on family income, we use the American Community Survey (ACS) for 2008–2016, which provides information on nationally representative individuals' family income as well as their demographics. Note that, as the ACS provides information on income in the previous year, we can examine changes in family income over the period 2007–2015. Since the ACA-DM can change family income through reductions in parents' wages (Koh and Kim, 2022), we use information on household relationships and consider the family income of young adults living with their parents. As control variables, we include parents' demographics, such as parents' average age and its square, joint probability of college-educated parents, race, and ethnicity.

To investigate the effects of the ACA-DM on medical spending, we use consolidated files of the Medical Expenditure Panel Survey (MEPS) for

2007–2015. The MEPS provides detailed information on nationally representative individuals' total medical spending as well as spending for doctors' office, outpatient department, emergency room, and hospital. For comparability with the ACS, we use information on household relationships to restrict the sample to young adults living with their parents.[2] As control variables, we use young adults' demographics such as age, age squared, race, gender, ethnicity, number of family members, and region fixed effects. We use the Consumer Price Index to convert all monetary values into real values in 2013. Table A1 in the Appendix presents the descriptive statistics for the period 2008–2010 that is before the ACA-DM.

2.2 Empirical Strategy

We estimate the effects of the ACA-DM by comparing changes in family income and medical spending between two groups: young adults aged 19 to 25 years (the treatment group) and those aged 16 to 18 and 26 to 29 years (the control group). To implement this research design, we consider the following difference-in-differences (DID) specification:

$$y_{i,a,t} = \alpha + \sum_{k \neq 2010} \beta_k \cdot Treat_a \cdot 1[t = k] + \mu_t + \theta_a + X'_{i,t}\theta + \epsilon_{i,a,t}, \tag{2.1}$$

where i, a, and t indicate a young adult, age, and calendar year, respectively; $y_{i,a,t}$ represents family income and medical spending; $Treat_a$ is 1 for the treatment group and 0 for the control group; $1[t = k]$ indicates whether a calendar year is k except for 2010;[3] μ_t and θ_a indicate the year-fixed effects and young adults' age fixed effects, respectively; and $X_{i,t}$ includes the control variables. The parameters of interest are β_ks, which show the yearly effects of the ACA-DM on the dependent variables compared to year 2010. For statistical inference, we estimate standard errors clustered at the age-level and corrected for heteroskedasticity.

[2] The results are robust when we use the whole sample of young adults.

[3] Although the ACA was introduced in March 2010, we define the years 2010 and before as pre-periods, because health insurance is generally renewed at the beginning of the year.

We then conduct additional analyses with the following simplified DID specification to summarize the main results:

$$y_{i,a,t} = \alpha + \beta_{DID} \cdot Treat_a \cdot Post_t + \mu_t + \theta_a + X'_{i,t}\gamma + \varepsilon_{i,a,t}, \quad (2.2)$$

where $Post$ is a binary variable that is equal to 1 if the calendar year is 2011 or after and 0 otherwise. As in the regression specification (2.1), μ_t and θ_a indicate the year-fixed effects and young adults' age fixed effects, respectively, and $X_{i,t}$ includes the control variables. β_{DID} is the coefficient of interest that captures the effects of the ACA-DM on the outcome variables that are family income and medical spending. We use standard errors clustered at the age-level and corrected for heteroskedasticity.

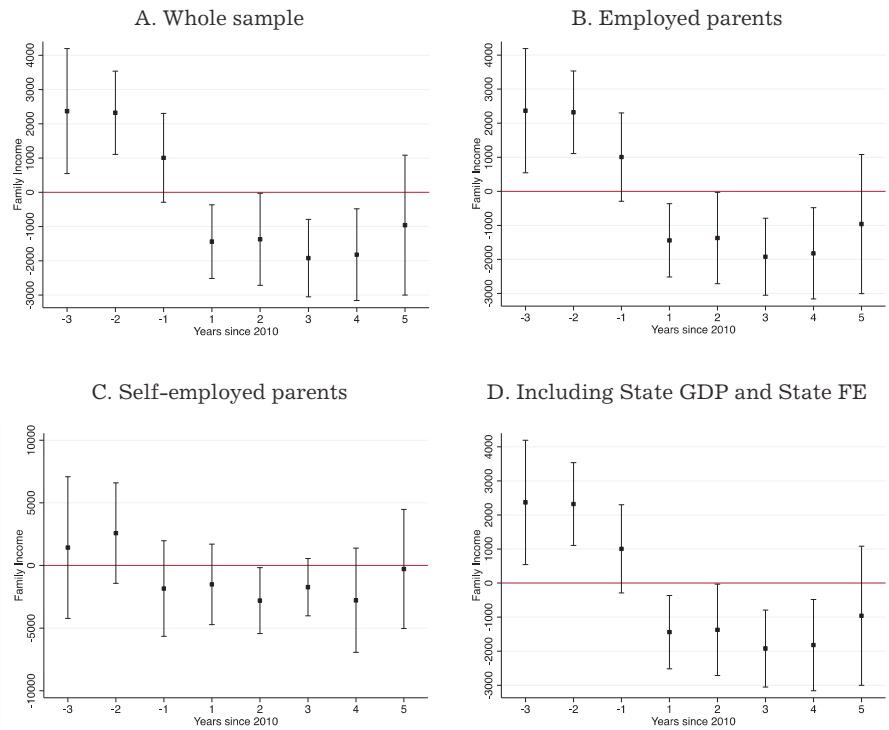
3 Empirical Results

Figure 1 presents the effects of the ACA-DM on family income compared to the effects in 2010, which are normalized to zero (horizontal line).

Panel A shows clear evidence that the ACA-DM reduced family income. The estimated β_ks from the equation (2.1) sharply decrease after the introduction of the ACA-DM and those estimates are statistically significant at the 5-percent level. Note, however, that β_ks before the ACA-DM are also statistically significant, suggesting that the parallel pre-period trends assumption may not hold. To alleviate this identification issue, we conduct several robustness checks, which are shown in panels B to D in Figure 1, Figures A1 and A2 in the Appendix. First, if the ACA-DM reduced parents' wages and thus, family income, then we should observe robust results when restricting the sample to employed parents only. Panel B plots β_ks with this restricted sample showing that our results are robust. Second, since the ACA-DM only affected hired workers, it should have little or no impact among self-employed parents. Panel C shows that the estimated β_k s from the sample of self-employed parents only are consistent with this conjecture. Third, the Great Recession between December 2007 and June 2009 is likely to have reduced family income. However, our results are robust after controlling for this potential bias with state Gross Domestic Product (GDP) and state fixed effects as panel D presents. Panel A and B in Figure A1 show that the results are robust when

using family as the unit of analysis and dropping families with both eligible and ineligible young adults, respectively. Finally, we calculate alternative standard errors clustered at different units that are age-year level (Panel A) and state level (Panel B), but our statistical inference is still robust to these changes (Figure A2).

Figure 1. Effects of the ACA-DM on Family Income



Data sources: The ACS, 2008-2016.
Note: To estimate the effects of the ACA dependent mandate, we use regression specification (2.1). For dependent variable, we use family income. For control variables, we use parents' demographics such as the average age and age squared, race, Hispanic status, and college education for panels A, B, and C, and add the log of state GDP and state fixed effects for panel D. We use the whole sample in panels A and D while restricting the sample to young adults with any limitations in daily activities in panel B and with self-employed parents in panel C. Standard errors are corrected for heteroscedasticity and clustered at the age level. The vertical bar represents 95 percent confidence interval.

Table 1. Effects of the ACA Dependent Mandates on Family Income

	(1)	(2)	(3)	(4)	(5)
Treat×Post	-2,901***	-2,901***	-2,925***	-3,715***	-2,573***
	(355.9)	(355.9)	(314.8)	(344.7)	(40.12)
Observations	2,085,039	2,085,039	1,566,805	1,523,177	442,363
R-squared	0.09	0.09	0.09	0.09	0.10

Data sources: The ACS, 2008-2016.
Note: To estimate the effects of the ACA dependent mandate, I use regression specification (2.2). For the dependent variable, we use family income. For control variables, we use parents' demographics such as the average age and age squared, race, Hispanic status, and college education in column (1). We add controls for state log of gross domestic product and state fixed effects in column (2), we aggregate the data at the family level in column (3), we exclude families with both eligible and ineligible young adults in column (4), and we restrict the sample to young adults whose age is between 18 and 19 years in column (5). Standard errors in parentheses are corrected for heteroscedasticity and clustered at young adults' age level. *** p<0.01, ** p<0.05, * p<0.1.

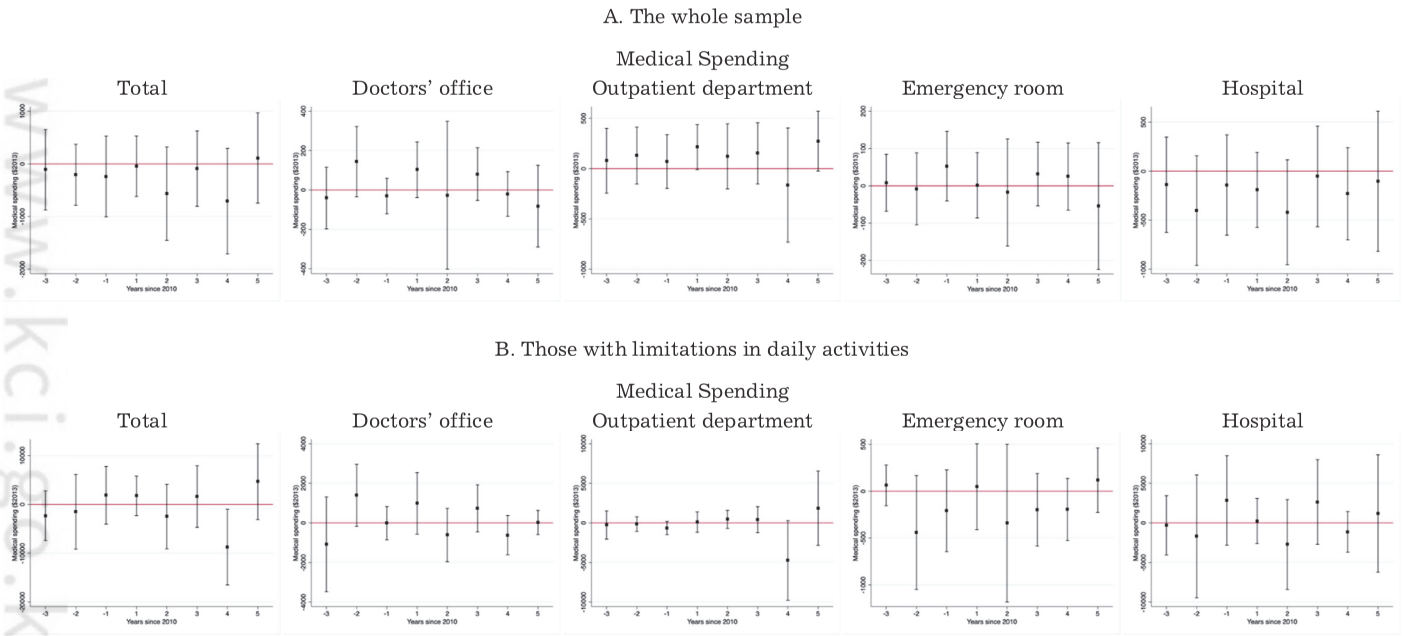
Table 1 shows the associations between the ACA dependent mandate and family income by using the regression specification (2.2) with family income used as the dependent variable.

Column (1) indicates that the ACA dependent mandate decreased family income by $2,900 when parents' demographics such as their average age and age squared, race, Hispanic status, and college education are included as control variables. The results are robust under other regression specifications. In column (2), we add the log of state GDP and state fixed effects as control variables. In column (3), we use the data aggregated at the family-level. In column (4) and (5), we exclude families with both eligible and ineligible young adults and restrict the sample to families with young adults aged between 18 and 19 years, respectively.

The effects of the ACA-DM on young adults' medical spending are presented in Figure 2 and Table 2. For medical spending, we consider young adults' total medical spending and spending for office, outpatient department, emergency room visits, and hospital stay.

Figure 2 shows the effects of the ACA-DM on young adults' various medical spending compared to the effects in 2010, which are normalized to zero (horizontal line), by plotting the estimated β_k s with 95 percent confidence intervals from the regression specification (2.1).

Figure 2. Effects of the ACA-DM on Young Adults' Medical Spending



Data sources: The MEPS, 2007–2015.
Note: To estimate the effects of the ACA dependent mandate, we use regression specification (2.1). We use the whole sample in panel A and restrict the sample to young adults with any limitations in daily activities in panel B. For dependent variables, we use young adults' medical spending such as total medical spending and spending for doctor's office, outpatient department, emergency room visits, and hospital stay. For control variables, we use children's gender, race, Hispanic origin, and regional fixed effects. Standard errors are corrected for heteroscedasticity and clustered at the age level. The vertical bar represents 95 percent confidence interval.

Panel A shows little evidence that the ACA-DM increased young adults' medical spending. The ACA-DM might not increase the medical spending because young adults are generally healthy, and thus their demand for medical care is low. We then restrict the sample to the young adults with limitations in daily activities due to any health conditions to check for potential larger impacts when the demand for medical care is higher. The estimates of β_ks with 95 percent confidence intervals are plotted in Panel B. The results still show little evidence that the ACA-DM increased medical spending even among young adults with higher demand for medical care.

Table 2 shows the effects of the ACA dependent mandate on medical spending of young adults by using the regression specification (2.2).

Table 2. Effects of the ACA Dependent Mandate on Medical Expenditure

	Young adults' Medical Expenditure					Parents' Medical Expenditure
Dep Vars.	Total	Doctor's office	Outpatient Department	Emergency Room	Hospital	Total
	(1)	(2)	(3)	(4)	(5)	(6)
A. All Young Adults						
Treat×Post	-120.3	-7.08	49.90	-16.11	-29.63	395.6
	(127.5)	(48.58)	(78.64)	(14.67)	(92.40)	(505.5)
Observations	28,158	28,158	28,158	28,158	28,158	21,868
R-squared	0.008	0.010	0.004	0.003	0.003	0.013
B. With Limitations in Daily Activities						
Treat×Post	-404.6	-26.82	-249.3	43.77	-176.5	1,318
	(1,301)	(405.5)	(693.2)	(134.0)	(1,010)	(1,641)
Observations	1,651	1,651	1,651	1,651	1,651	5,088
R-squared	0.038	0.020	0.041	0.039	0.020	0.016

Data sources: The MEPS, 2007-2015.
Note: To estimate the effects of the ACA dependent mandate, we use regression specification (2.2). We use the whole young adults in panel A and restrict to those with any limitations in daily activities due to health conditions in panel B. For dependent variables, we use five types of annual medical spending for young adults (total, doctors' office, outpatient, emergency room, and hospital) in columns (1) to (5), respectively. In column (6), we use year from 2007 to 2013. For control variables, we include children's gender, race, Hispanic origin, family size, and regional fixed effects as control variables. Standard errors in parentheses are corrected for heteroscedasticity and clustered at young adults' age level. *** p<0.01, ** p<0.05, * p<0.1.

Panel A presents the results using the whole sample while the sample is restricted to the young adults with limitations in daily activities in Panel B. Column (1) in Panel A shows that the ACA dependent mandate did not increase young adults' total annual medical expenditures. The estimate is –$120, which is statistically insignificant. We also study the effects of the ACA dependent mandate on young adults' medical expenditures by type, such as spending for doctors' offices, outpatient offices, emergency rooms, and hospital stays, as shown in columns (2) through (5), respectively. However, we find little evidence that the dependent mandate significantly increased or decreased a certain type of medical expenditures. Panel B shows that the results remain similar when restricting the sample to young adults with limitations in daily activities in columns (1) to (5).

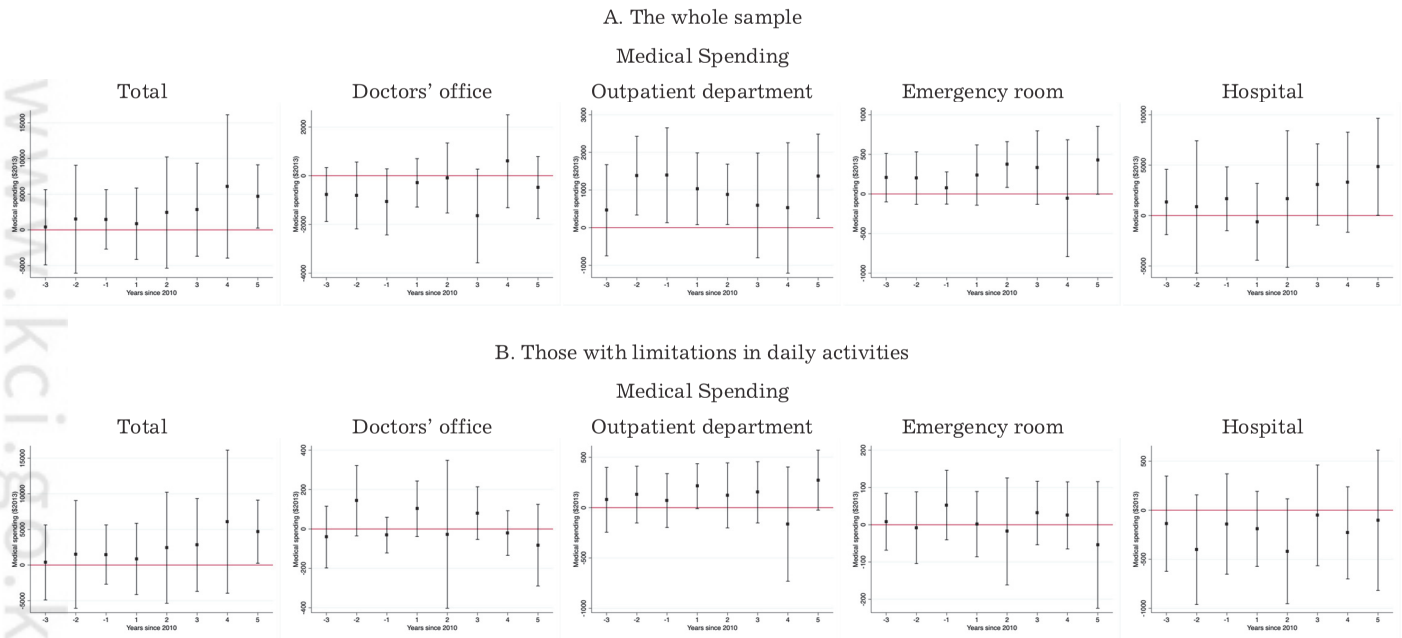
Although young adults did not increase their medical spending, their parents might have. Figure 3 and Column (6) in Table 2 present the effects of the ACA-DM on parents' medical spending.

Figure 3 shows the effects represented by the estimates of β_ks with 95% confidence intervals from the regression specification (2.1) with parents' medical spending as the dependent variables. We again present two sets of results using the whole sample in Panel A and using the families with parents who have limitations in daily activities in Panel B. In both sets of the graphs, we see little evidence that the ACA-DM increased parents' medical spending, regardless of their health status. Column (6) in Table 2 shows the effects of the ACA-DM on parents' medical spending from the specification (2.2), using the whole sample in Panel A and the sample with parents with health issues in Panel B. The ACA-DM appears to increase parents' medical spending in both sets of analyses, but the results are not statistically significant.[5]

Finally, we use the National Health Interview Survey (NHIS) to analyze whether our results are robust with other data. In this crosscheck, we study the effect of the ACA-DM on young adults' medical care utilization measured by their hospital overnight stays and doctors' office visits.

[5] Because the ACA individual mandate was implemented in 2014, which also can increase parents' medical spending, we exclude the years 2014 and 2015 from the analysis for the effects of ACA-DM on parents' medical spending.

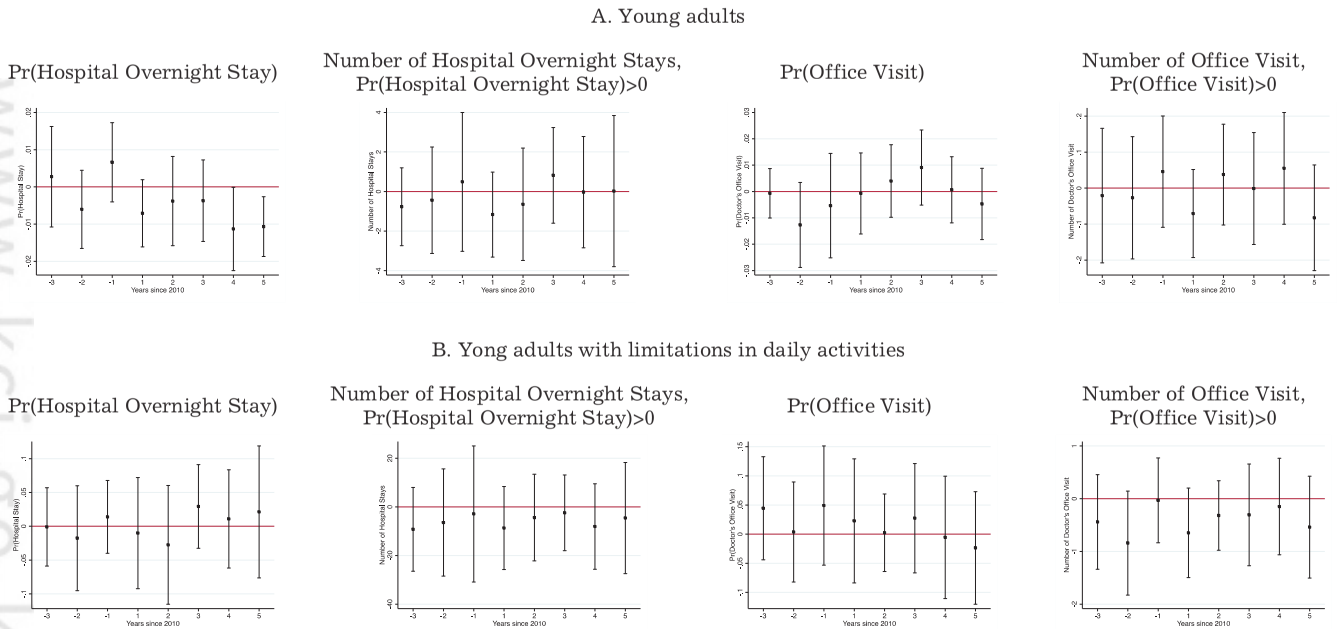
Figure 3. The Effects of the ACA-DM on Parents' Medical Spending



Data sources: The MEPS, 2007-2013.

Note: We use the whole parents in panel A and restrict the sample to those with any limitations in daily activities in panel B. For dependent variables, we use parents' total medical spending and spending for doctor's office visit, outpatient department, emergency room, and hospital. For control variables, we use parents' age, age squared, gender, race, Hispanic origin, family size, and regional fixed effects. Standard errors are corrected for heteroscedasticity and clustered at the age level. The vertical bar represents 95 percent confidence interval.

Figure 4. The Effects of the ACA-DM on Medical Care Utilization



Data sources: The National Health Interview Survey (NHIS), 2007-2015.
Note: We use the whole young adults in panel A and restrict to those with limitations in daily activities in panel B. For dependent variables, we use a dummy variable indicating a young adult's hospital overnight stay, the number of hospital stays, a dummy variable indicating a young adult's physician office visit, and the number of physician office visits. For control variables, we use children's gender, race, Hispanic origin, and regional fixed effects. Standard errors are corrected for heteroscedasticity and clustered at the age level. The vertical bar represents 95 percent confidence interval.

Figure 4 illustrates the effects of the ACA-DM on the probability of overnight hospital stays and the number of hospital stays in panel A, and the probability of doctor's office visits and the number of doctor's office visits in panel B, using the regression specification (2.1). Consistent with findings from Figure 2, no clear pattern indicates that the ACA-DM increased medical care use. These results are similar when restricting the sample to young adults with limitations in daily activities.

Table 3. Effects of the ACA Dependent Mandate on Young Adults' Medical Care

Dep Vars.	Pr(Hospital Stay)	Number of Hospital Overnight Stay	Pr(Office Visit)	Number of Office Visit
	(1)	(2)	(3)	(4)
A. Whole sample				
Treat×Post	-0.008***	-0.031	0.006*	-0.013
	(0.003)	(0.498)	(0.003)	(0.030)
Observations	159,242	9,067	159,049	16,605
R-squared	0.02	0.02	0.02	0.003
B. With limitations in daily activities				
Treat×Post	0.006	-1.534	-0.021	-0.099
	(0.021)	(2.527)	(0.026)	(0.124)
Observations	8,551	1,178	8,544	2,078
R-squared	0.03	0.03	0.03	0.02

Data sources: The NHIS, 2007-2015.
Note: To estimate the effects of the ACA dependent mandate, we use regression specification (2.2). For dependent variables, we use a dummy variable indicating a young adult's hospital overnight stay and the number of hospital stays in columns (1) and (2), a dummy variable indicating a young adult's physician office visit and the number of physician office visits in columns (3) and (4). For control variables, we include children's gender, race, Hispanic origin, and regional fixed effects as control variables. We use the whole young adults in panel A and restrict to those with any limitations in daily activities due to health conditions in panel B. Standard errors in parentheses are corrected for heteroscedasticity and clustered at young adults' age level. *** p<0.01, ** p<0.05, * p<0.1.

Table 3 summarizes the effects of the ACA-DM on young adults' medical care utilization by using the regression specification (2.2). Panel A shows that the estimation results are consistent with the findings in Figure 4. The ACA-DM did not increase medical care utilization.[1] The results are similar when restricting the sample to those with limitations in daily activities. The results in both Figure 4 and Table 3 imply that the ACA-DM did not significantly increase medical care utilization when using individual-level data.

4 Concluding Remarks

We find evidence that the ACA-DM reduced family income and did not increase young adults' medical spending. The results suggest that expansion of health insurance coverage does not necessarily increase medical spending if it is achieved through labor markets and reduces family income. However, we acknowledge that a reduction in family income would not be the only explanation, and the results may not be easily applied to other contexts. Despite these limitations, we argue that this study still provides useful insights on how health insurance expansion can affect medical spending via changes in family income.

References

Acemoglu, D., Finkelstein, A., and Notowidigdo, M. J. (2013). Income and health spending: Evidence from oil price shocks. *Review of Economics and Statistics*, *95*(4), 1079–1095.

Anderson, M., Dobkin, C., and Gross, T. (2012). The effect of health insurance coverage on the use of medical services. *American Economic Journal: Economic Policy*, *4*(1), 1–27.

[1] Estimates in columns (1) and (3) indicate that people may substitute their types of medical care from inpatient to outpatient care. The estimates are negative and statistically significant for the probability of hospital visits, but positive and statistically significant for the probability of office visits. However, patterns in Figure 4 are too noisy to conclude that the ACA dependent mandate caused individuals to substitute their medical care types.

Antwi, Y. A., Moriya, A. S., and Simon, K. (2013). Effects of federal policy to insure young adults: evidence from the 2010 Affordable Care Act's dependent-coverage mandate. *American Economic Journal: Economic Policy*, *5*(4), 1-28.

Antwi, Y.A., Moriya, A.S. and Simon, K.I., 2015. Access to health insurance and the use of inpatient medical care: Evidence from the Affordable Care Act young adult mandate. *Journal of Health Economics*, *39*, 171-187.

Antwi, Y.A., Moriya, A.S., Simon, K. and Sommers, B.D., 2015. Changes in emergency department use among young adults after the Patient Protection and Affordable Care Act's dependent coverage provision. *Annals of Emergency Medicine*, *65*(6), 664-672.

Finkelstein, A., Taubman, S., Wright, B., Bernstein, M., Gruber, J., Newhouse, J. P., Allen, H., Baicker, K., and Oregon Health Study Group. (2012). The Oregon Health Insurance Experiment: Evidence from the First Year. *The Quarterly Journal of Economics*, *127*(3), 1057-1106.

Hernandez-Boussard, T., Burns, C.S., Wang, N.E., Baker, L.C. and Goldstein, B.A., 2014. The Affordable Care Act reduces emergency department use by young adults: evidence from three states. *Health Affairs*, *33*(9), 1648-1654.

Koh, K., and Kim, S. (2022). Labor Market Impacts of Mandated Dependent Health Insurance Coverage: Evidence from the Affordable Care Act Dependent Mandate. *Labour Economics, 75*, 102128

Himmelstein, D. U., Warren, E., Thorne, D., and Woolhandler, S. (2005). Illness and Injury as Contributors to Bankruptcy. *Health Affairs (Project Hope)*, W5-63.

Appendix Tables and Figures

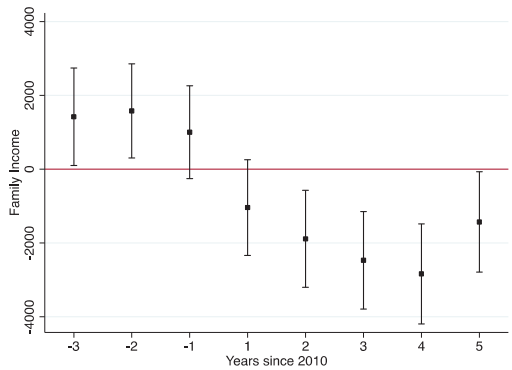
Table A1. Descriptive Statistics

Variable	Mean (Standard Deviation)
A. American Community Survey, 2008-2010	
Family income ($2013)	$97,370 (88,050)
Parents' characteristics	
Average age	48.79 (6.40)
Pr(Either of parents is White)	0.76 (0.42)
Pr(Either of parents is Hispanic)	0.17 (0.38)
Pr(Either of parents went to college)	0.76 (0.42)
Pr(Single parent)	0.28 (0.45)
Number of observations	699,488
B. Medical Expenditure Survey, 2008-2010	
Young adults' medical spending ($2013)	
Total	$1,532 (6,225)
Doctors' office	$352 (1491)
Outpatient department	$107 (1072)
Emergency department	$119 (763)
Hospital	$427 (4165)
Young adults' characteristics	
Age	19.9 (3.4)
Pr(Male)	0.53 (0.5)
Pr(White)	0.67 (0.5)
Pr(Hispanic)	0.19 (0.39)
Family size	4.29 (1.57)
Number of observations	9601

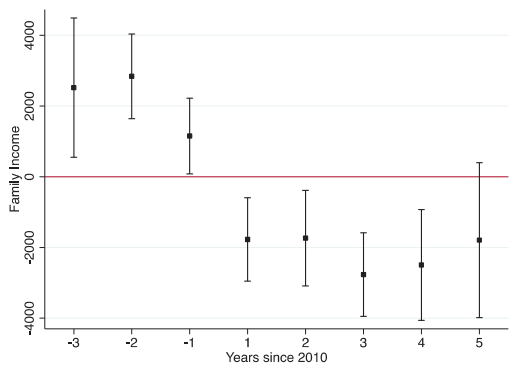
Figure A1. Effects of the ACA-DM on Family Income

Using Alternative Regression Specifications

A. Family-level analysis



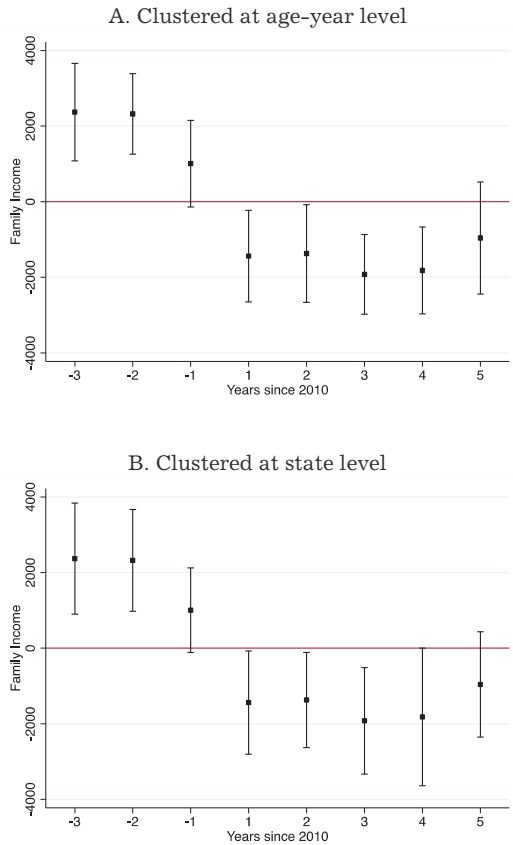
B. Excluding families with both eligible and ineligible young adults



Data sources: The ACS, 2008-2016.
Note: In panel A, we aggregate the data at the family level. In panel B, we exclude families with both eligible and ineligible young adults. For dependent variable, we use family income. For control variables, we use parents' demographics such as the average age and age squared, race, Hispanic status, and college education. Standard errors are corrected for heteroscedasticity and clustered at young adults' age level. The vertical bar represents 95 % confidence interval.

Figure A2. The Effects of the ACA-DM on Family Income

Using Alternative Standard Errors Clustered at Different Units



Data sources: The ACS, 2008-2016.

Note: For dependent variable, we use family income. For control variables, we use parents' demographics such as the average age and age squared, race, Hispanic status, and college education. The vertical bar represents 95 % confidence interval.