Heterogeneous Effect of Affordable Care Act Medicaid Expansions on Access to Insurance Among People with Disabilities

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Motivation

- The **Affordable Care Act (ACA)** expanded Medicaid eligibility and improved private health insurance practices.
- Did the ACA differently affect people with disabilities?
- From 2009-2012 in the US, 11.6% of U.S. adults aged 18 to 64 reported a disability (CDC).
- People with disabilities often face challenges in accessing and receiving adequate healthcare due to physical barriers, long application processes, financial constraints, and discrimination.

Research Question

- **Broad**: What was the effect of the ACA on insurance take-up?
- **Narrower**: What was the effect of the ACA on Medicaid for individuals with disabilities?
- **Specific**: What was the effect of the ACA on Medicaid for different disability-related disparities (vision, hearing, ambulatory, and cognitive disabilities)?

Background: Medicaid and the ACA (2010)

- **Medicaid** (established 1965) is a health care insurance program for families and individuals with low income and limited resources.
- The **Affordable Care Act** (passed in 2010) is a comprehensive reform law that expands Medicaid, increases health insurance coverage for the uninsured, and implements reforms to the health insurance market.
- The ACA's major provisions came into force in **2014**.
- By 2014, 26 states expanded Medicaid.
- By 2016, the uninsured share of the population had roughly halved, with estimates ranging from 20 to 24 million additional people covered.
- In 2025, 41 states have adopted Medicaid expansion.

Background: Main Qualities of the ACA (2010)

- **Medicaid expansion**: made the effective income eligibility limit for Medicaid 138% of the federal poverty level
- **Individual mandate**: required most Americans to have health insurance or pay a tax penalty[1]
- **Employer mandate**: Businesses with ≥ 50 employees but don't offer health insurance are assessed an additional tax
- Creation of **Healthcare.gov**
- Insurers must accept all applicants without charging based on preexisting conditions or demographic factors (except age)
- Individuals whose household incomes are between 100-400% of the federal poverty level (FPL) can receive **federal subsidies** for premiums for policies purchased on an ACA exchange

[1] repealed starting in 2019

Literature Review

Impacts of the Affordable Care Act on Health Insurance Coverage in Medicaid Expansion and Non-Expansion States (Courtemanche et al., 2016)

- Estimates the causal effects of the ACA on health insurance coverage using data from the American Community Survey, where sample consists of 18-64 year olds from 2011 to 2014
- ACA, including Medicaid expansion, increased insurance coverage by 5.9% compared to 3.0% in states that did not expand Medicaid
- Coverage gains were largest for low-income adults, non-whites, young adults (18 – 34), and unmarried individuals

Literature Review

Effects of the Medicaid expansion under the Affordable Care Act on health insurance coverage, health care access, and use for people with disabilities (Dong et al., 2022)

- Examines the effects of the Medicaid expansion on health insurance coverage, access, and service use for working-age adults with disabilities
- Strong evidence of increased Medicaid coverage in expansion states (3.2 to 5.0%) for people with disabilities, reasonably strong evidence of reduced private insurance coverage (-2.2 to -2.5%), suggesting the "crowd-out" of private insurance
- Some evidence of reduced uninsured rate (from no effect to -3.7%)

Literature Review

Disability Heterogeneity in the Impact of the ACA's Medicaid Expansions on Disability Employment (Ne'eman and Maestas, 2022)

- Tested for heterogeneous treatment effects of the impact of the ACA's Medicaid Expansions on the employment of people with disabilities
- Segmented disabled population by disability type, disability recency, and labor force attachment
- Employment of persons with lower labor force attachment and ongoing disabilities rose by 10.5% due to Medicaid expansion
- People with lower labor force attachment and new disabilities experienced a decrease in employment of -9.2%

Empirical Strategy

- **Goal**: Measuring the effectiveness of the ACA on Medicaid and any insurance coverage pick-up for people with different types of disabilities.
- **Approach**: We will use a **triple differences (DDD)** approach to estimate the causal effect of the ACA on Medicaid and insurance enrollment among individuals with different disabilities (vision, hearing, ambulatory, and cognitive) in expansion vs. non-expansion states.

Data

- **Source**: American Community Surveys (ACS)
- **Years**: 2008-2013 (control) and 2014-2016 (treated)
- **Number of Observations**: 11,287,922 total – 5,035,344 expansion, 6,252,578 non-expansion
- **Primary Variables Used**: Type of Disability, Year, State, Medicaid Enrollment, Any Insurance Enrollment
- **Supplemented With:** Kaiser Family Foundation data to track state Medicaid expansion decisions

Research Design

- **Treatment Group**: 19 states that adopted the ACA's Medicaid expansion on 01/01/2014
- **Control Group**: 19 states that expanded in 2017+ or never expanded Medicaid
- We exclude 5 states that expanded during late-2014 to 2016, as well as 6 states that expanded Medicaid early (pre-2014)

Summary of Data

Table 1: Medicaid & Insurance Rates in Expansion vs. Non-Expansion States for All Individuals

	Non-Expansion		Expansion	
Year	Medicaid Rate (%)	Insurance Rate (%)	Medicaid Rate (%)	Insurance Rate (%)
2008	7.2	80.4	9.5	85.6
2009	7.6	79.2	10.3	84.7
2010	8.3	77.9	11.4	83.9
2011	9.4	77.1	13.1	84.0
2012	9.5	77.7	13.0	84.4
2013	9.2	78.4	12.9	84.8
2014	9.6	81.4	15.8	88.7
2015	9.9	83.9	17.6	91.4
2016	9.9	84.6	18.1	92.2

Summary of Data

Table 2: Medicaid & Insurance Rates in Expansion vs. Non-Expansion States for Vision Difficulty

	Non-Expansion		Expansion	
Year	Medicaid Rate (%)	Insurance Rate (%)	Medicaid Rate (%)	Insurance Rate (%)
2008	29.3	74.4	34.3	80.5
2009	30.1	73.6	36.1	80.7
2010	30.4	73.0	37.8	80.4
2011	32.7	72.5	41.4	81.0
2012	34.3	73.2	40.8	80.7
2013	29.9	73.6	37.6	82.3
2014	31.7	77.4	42.2	86.9
2015	31.3	79.5	44.8	90.4
2016	31.2	80.1	43.8	91.0

Summary of Data

Table 3: Medicaid & Insurance Rates in Expansion vs. Non-Expansion States for Hearing Difficulty

	Non-Expansion		Expansion	
Year	Medicaid Rate (%)	Insurance Rate (%)	Medicaid Rate (%)	Insurance Rate (%)
2008	17.9	81.7	21.3	86.7
2009	18.6	81.3	21.9	85.6
2010	19.6	80.4	23.2	85.4
2011	22.0	79.9	27.2	85.4
2012	22.1	80.2	27.2	85.3
2013	20.3	80.6	26.7	86.3
2014	21.8	82.6	29.5	89.7
2015	22.2	84.8	31.7	92.6
2016	22.8	85.8	33.1	92.4

Summary of Data

Table 4: Medicaid & Insurance Rates in Expansion vs. Non-Expansion States for Ambulatory Difficulty

	Non-Expansion		Expansion	
Year	Medicaid Rate (%)	Insurance Rate (%)	Medicaid Rate (%)	Insurance Rate (%)
2008	33.7	83.0	37.7	87.5
2009	34.2	82.8	39.3	87.5
2010	35.5	82.6	40.9	87.4
2011	37.4	81.9	44.4	87.4
2012	38.6	82.5	44.7	87.8
2013	37.2	82.6	43.2	87.8
2014	38.3	84.9	48.3	92.1
2015	38.6	86.9	51.2	94.5
2016	39.5	87.4	51.9	94.9

Summary of Data

Table 5: Medicaid & Insurance Rates in Expansion vs. Non-Expansion States for Cognitive Difficulty

	Non-Expansion		Expansion	
Year	Medicaid Rate (%)	Insurance Rate (%)	Medicaid Rate (%)	Insurance Rate (%)
2008	40.9	79.1	47.9	84.8
2009	41.8	78.9	50.1	84.7
2010	42.4	78.2	50.8	84.0
2011	44.9	78.2	54.7	85.4
2012	46.1	79.2	54.7	85.3
2013	43.9	78.7	53.0	85.6
2014	44.7	80.9	57.0	90.2
2015	45.6	83.2	59.6	92.9
2016	44.6	83.0	59.8	92.9

Model Specification

First, we estimate a DiD model for all individuals. Then, we do the same for individuals with disabilities (and without) and compare the two sets of results to see if there's a difference in how Medicaid Expansion affected each group. Finally, we estimate a Triple Difference (DDD) model to further access the effect of Medicaid expansion differed between the two groups.

Model Specification

DiD Specification

$$m_{st} = \alpha_s + \eta_t + \beta_1 \text{post}_t + \beta_2 \text{expand}_s + \beta_3 (\text{post}_t \times \text{expand}_s) + \epsilon_{st}$$

- $\boldsymbol{m_{st}}$: An individual's Medicaid enrollment
- $\boldsymbol{\alpha_s}$: State fixed effects
- $\boldsymbol{\eta_t}$: Year fixed effects
- $\textbf{post}_t$: Post-ACA (2014 and after) dummy variable
- $\textbf{expand}_s$: Medicaid Expansion state dummy variable
- $\boldsymbol{\beta_3}$: Effect of Medicaid expansion on Medicaid take-up after 2014 for individuals in expansion states relative to non-expansion states.

Model Specification

DDD Specification

$$m_{ist} = \alpha_s + \eta_t + \beta_1 d_i + \beta_2 \text{post}_t + \beta_3 \text{expand}_s + \beta_4 (d_i \times \text{post}_t) + \beta_5 (d_i \times \text{expand}_s) + \beta_6 (\text{post}_t \times \text{expand}_s) + \beta_7 (d_i \times \text{post}_t \times \text{expand}_s) + \epsilon_{ist}$$

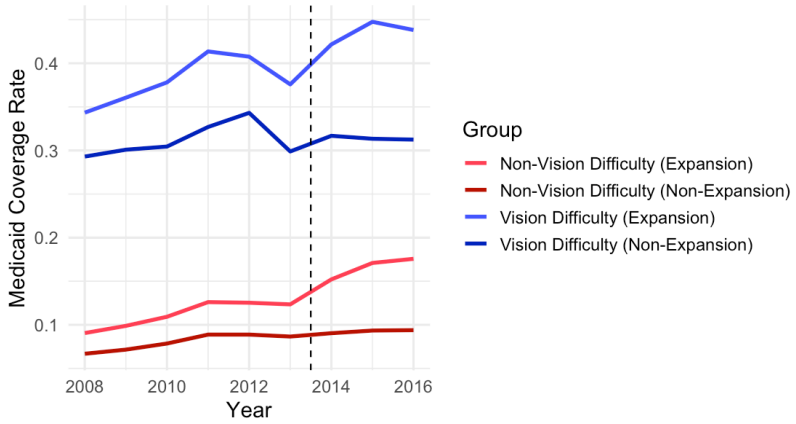
- $\boldsymbol{m_{ist}}$: An individual's Medicaid enrollment
- $\boldsymbol{\alpha_s}$: State fixed effects
- $\boldsymbol{\eta_t}$: Year fixed effects
- $\boldsymbol{d_i}$: Disability status
- $\textbf{post}_t$: Post-ACA (2014 and after) dummy variable
- $\textbf{expand}_s$: Expansion state dummy variable
- $\boldsymbol{\beta_7}$: This is the key coefficient of interest – it tells you whether the effect of Medicaid expansion was different for disabled individuals compared to non-disabled individuals in expansion states.

Assumptions

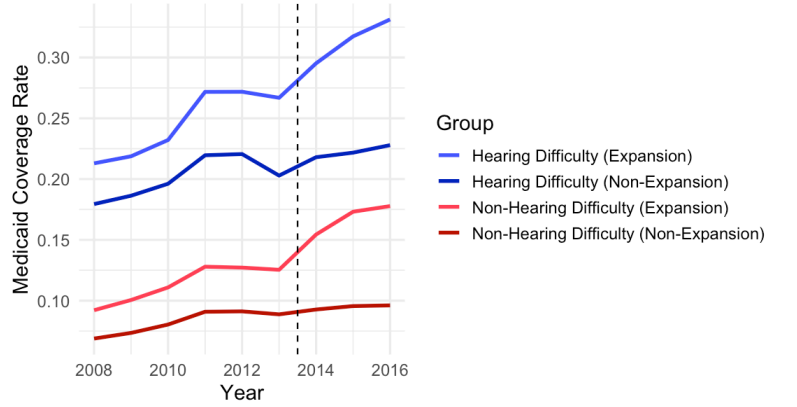
- **No Anticipation**: Medicaid and any insurance enrollment do not change in anticipation of the ACA
- **Parallel Trends**: In absence of ACA, both ACA expansion and non-expansion states would have followed parallel trends

Parallel Trends Assessment for Medicaid

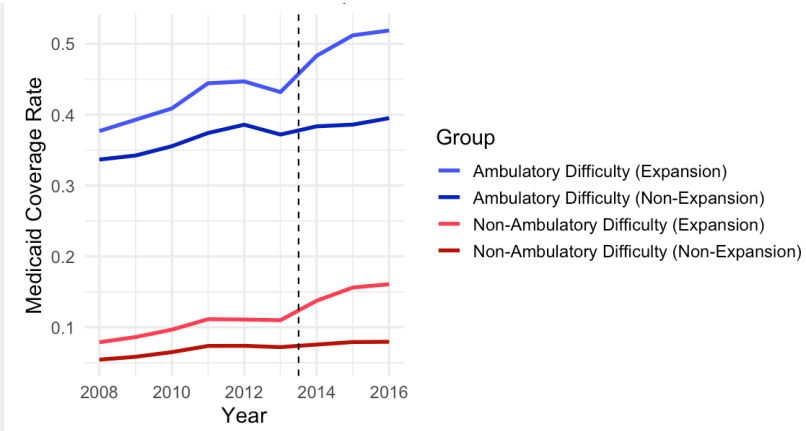
Vision Difficulty



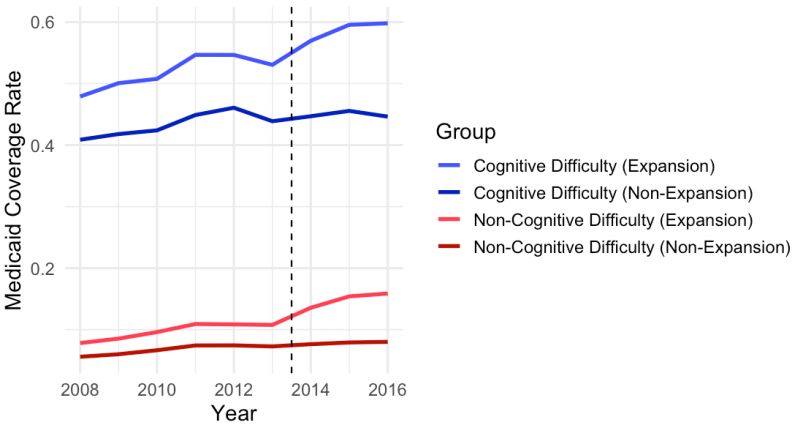
Hearing Difficulty



Ambulatory Difficulty



Cognitive Difficulty



Initial DiD

We conducted an initial DiD just comparing expansion and non expansion states.

$$m_{st} = \alpha_s + \eta_t + \beta_1 \text{post}_t + \beta_2 \text{expand}_s + \beta_3(\text{post}_t \times \text{expand}_s) + \epsilon_{st}$$

$post_t \times expand_s$	0.0416913***
Number of Observations	11287922
Standard Error	0.0003938

We observed an **4.16%** additional increase in medicaid enrollment for individuals who lived in expansion states relative to individuals in non-expansion states following the ACA.

Next we split up the population by disability status with $d_i \in \{\text{VISION}, \text{HEARING}, \text{AMBULATORY}, \text{COGNITIVE}\}$. For each d_i, we compare individuals with and without d_i disability, resulting in 8 separate regressions.

Initial DiD

Table 6: Difference in Difference Estimates For Disability and Non Disability Populations

	$\hat{\beta}^{DD}$	Standard Error	P-Value
Vision Diff	0.053231	0.004122	$<$ 2e-16
Non-Vision Diff	0.0412420	0.0003898	$<$ 2e-16
Hearing Diff	0.046478	0.003461	$<$ 2e-16
Non-Hearing Diff	0.0415181	0.0003937	$<$ 2e-16
Ambulatory Diff	0.0604412	0.0025085	$<$ 2e-16
Non-Ambulatory Diff	0.04019	0.0003731	$<$ 2e-16
Cognitive Diff	0.052463	0.002796	$<$ 2e-16
Non-Cognitive Diff	0.0403767	0.0003707	$<$ 2e-16

Triple Difference (DDD)

To conduct the triple difference, we look at the outcome variable of Medicaid enrollment with disability status $d_i \in \{VISION, HEARING, AMBULATORY, COGNITIVE\}$ using the following specification.

$$\begin{aligned} m_{ist} = \alpha_s + \eta_t + \beta_1 d_i + \beta_2 \text{post}_t + \beta_3 \text{expand}_s + \beta_4 (d_i \times \text{post}_t) \\ + \beta_5 (d_i \times \text{expand}_s) + \beta_6 (\text{post}_t \times \text{expand}_s) \\ + \beta_7 (d_i \times \text{post}_t \times \text{expand}_s) + \epsilon_{ist} \end{aligned}$$

Triple Difference (MEDICAID)

Table 7: Triple Difference Estimates for MEDICAID

	Vision Diff	Hearing Diff	Ambulatory Diff	Cognitive Diff
$d_i \times post_t \times expand_s$	0.0116207***	0.0051080*	0.0199360***	0.0115726***
Number of Observations	11287922	11287922	11287922	11287922
Standard Error	0.0027268	0.0025881	0.0016067	0.0017376

$+$ p $<$ 0.1, * p $<$ 0.05, ** p $<$ 0.01, *** p $<$ 0.001

Triple Difference (MEDICAID)

These values give us the following conclusions:

1. With ME, adults with vision difficulties in Medicaid-expansion states saw an extra 1.16% increase in coverage above the change experienced by non-disabled adults and the gap observed in non-expansion states.
2. For hearing difficulty we saw the lowest coefficient being 0.5%, ambulatory we observed the highest with 2.0%, and finally cognitive difficulty being 1.2%.

Robustness Check

- We found that omitting more states from our treatment and control group did not impact our significance.
- We also adjusted the length of our pre and post periods relative to the the treatment also achieving similar results no change in the significance.

Falsification Test

A falsification test was conduced using a placebo treatment year of 2012, when no expansion was implemented, to test whether the observed change in outcomes was due to ME. A significant placebo treatment effect would indicate that the observed change in outcomes may be driven by factors unrelated to the ME.

Table 8: Placebo Triple-Difference Estimates (Treating 2012 as the Expansion Year)

	$\hat{\beta}^{DDD}$	Standard Error	P-Value
Vision Diff	-0.004375784	0.003274198	0.181404
Hearing Diff	0.01215974	0.00302349	5.776653e-05
Ambulatory Diff	1.905866e-05	0.001878254	0.991904
Cognitive Diff	-0.002044044	0.002061017	0.3213123

Conclusion

- Among these different disability groups, their triple difference estimators differ, suggesting that **ME does indeed have heterogenous effects**. For instance while those with vision difficulties experienced a smaller effect of **1.16%**, those with ambulatory difficulties achieved twice the amount of a **2.0%** increase.
- There is a **positive heterogeneous impact** of ME on people with specific disabilities relative to those without those disabilities. By accounting for disability heterogeneity, this allows for more precise estimates of the medicaid expansion for specific populations with different disabilities.
- Existing research has largely approached disability as a binary – our study has provided a new dimension for future work demonstrating that this oversimplification erases the different experiences that these subgroups experience.

Future Extensions

- We might explore further heterogeneity such as how the ACA affected disabled individuals under different races, genders, etc.
- Other disability groups such as self-care and independent living
- Distinguish between Medicaid and private insurance coverage, to explore if Medicaid expansion crowded out private coverage among low-income, disabled individuals

[1] C. Courtemanche, J. Marton, B. Ukert, A. Yelowitz, and D. Zapata, "Impacts of the affordable care act on health insurance coverage in medicaid expansion and nonexpansion states," *National Bureau of Economic Research*, 2016.

[2] X. Dong, T. Gindling, and N. A. Miller, "Effects of the medicaid expansion under the affordable care act on health insurance coverage, health care access, and use for people with disabilities," *Disability and Health Journal*, 2022.

[3] A. Ne'eman and N. Maestas, "How does medicaid expansion impact income support program participation and employment for difference types of people with disabilities," *National Bureau of Economic Research*, 2023.

[4] H. S. Kaye, "Disability-related disparities in access to health care before (20082010) and after (20152017) the affordable care act," *National Library of Medicine*, 2019.

[5] A. Ne'eman and N. Maestas, "Disability heterogeneity in the impact of the acas medicaid expansions on disability employment," *National Bureau of Economic Research*, 2022.

[6] G. L. Krahn, "Drilling deeper on the impact of the affordable care act on disability-related health care access disparities," *National Library of Medicine*, 2019.

[7] "States getting a jump start on health reforms medicaid expansion," *KFF*, 2012.

[8] D. M. Taylor, "Americans with disabilities," *Household Economic Studies*, 2018.

[9] S. Rosenbaum, "The patient protection and affordable care act: Implications for public health policy and practice," *National Library of Medicine*, 2011.

[10] J. Gruber and B. D. Sommers, "The affordable care act's effects on patients, providers and the economy: What we've learned so far," *National Bureau of Economic Research*, 2019.

[11] R. Kaestner, B. Garrett, J. Chen, A. Gangopadhyaya, and C. Fleming, "Effects of aca medicaid expansions on health insurance coverage and labor supply," *National Library of Medicine*, 2017.

[12] S. Ruggles, S. Flood, M. Sobek, D. Backman, G. Cooper, J. A. R. Drew, S. Richards, R. Rodgers, J. Schroeder, and K. C. Williams, "IPUMS USA: Version 16.0 [dataset]," 2025.

Questions?

Summary of Data: Disability Rates

Table 9: Expansion vs. Non-Expansion States Disability Rates (Vision Ambulatory Difficulty)

	Non-Expansion		Expansion	
Year	Vision Diff (%)	Ambulatory Diff (%)	Vision Diff (%)	Ambulatory Diff (%)
2008	2.1	6.2	1.7	5.4
2009	2.1	6.3	1.7	5.5
2010	2.1	6.3	1.6	5.4
2011	2.3	6.9	1.8	6.0
2012	2.3	6.6	1.8	5.8
2013	2.4	6.6	2.0	5.8
2014	2.4	6.6	2.0	5.8
2015	2.4	6.4	2.0	5.7
2016	2.5	6.3	2.1	5.7

Summary of Data: Disability Rates

Table 10: Expansion vs. Non-Expansion States Disability Rates (Hearing & Cognitive Difficulty)

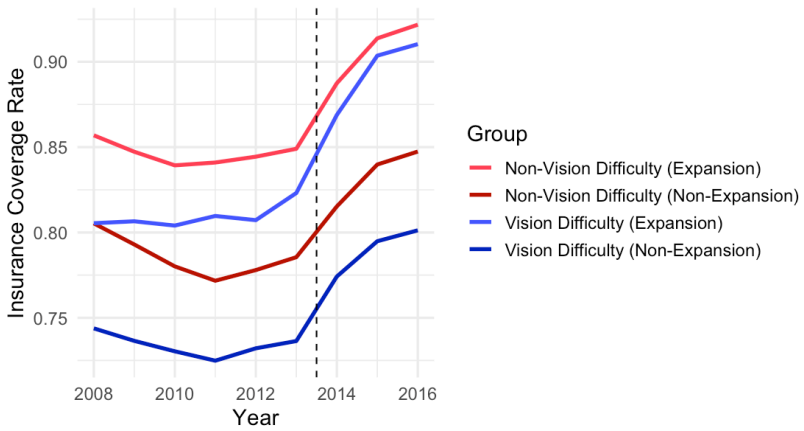
	Non-Expansion		Expansion	
Year	Hearing Diff (%)	Cognitive Diff (%)	Hearing Diff (%)	Cognitive Diff (%)
2008	2.6	4.5	2.3	4.2
2009	2.5	4.5	2.2	4.3
2010	2.5	4.7	2.2	4.3
2011	2.7	5.3	2.3	5.0
2012	2.6	5.2	2.2	5.0
2013	2.6	5.2	2.3	4.9
2014	2.5	5.3	2.3	5.1
2015	2.5	5.2	2.3	5.1
2016	2.5	5.2	2.2	5.1

Limitations

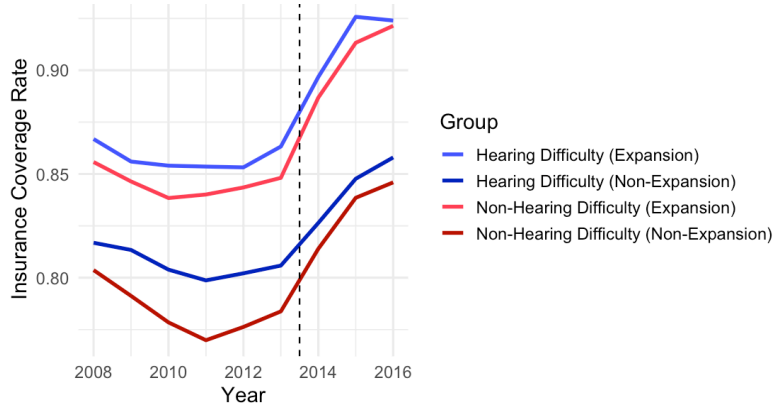
- Our data is self-reported data, so we may have issues with bias and recollection. As a result, those who legally do not have a disability may still mark it.

Parallel Trends Assessment for Any Insurance

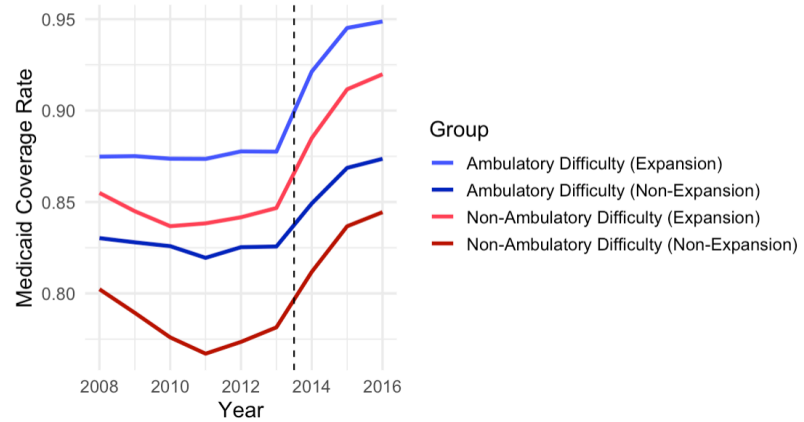
Vision Difficulty



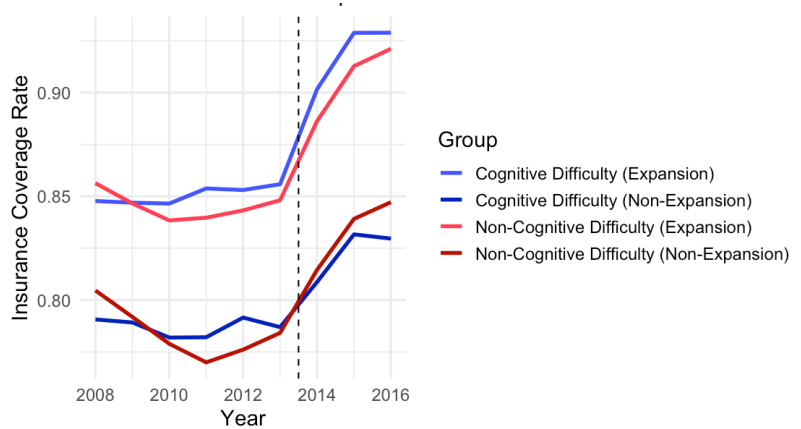
Hearing Difficulty



Ambulatory Difficulty



Cognitive Difficulty



Parallel Trends for DDD: Equation

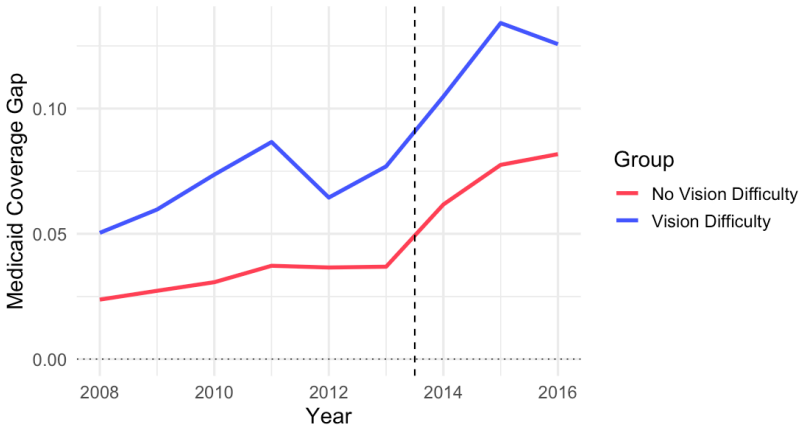
Parallel Trends Assumption

The relative outcome of the disabled group and non-disabled group in expansion state trends in the same way as the relative outcome of disabled and non-disabled group in non-expansion states.

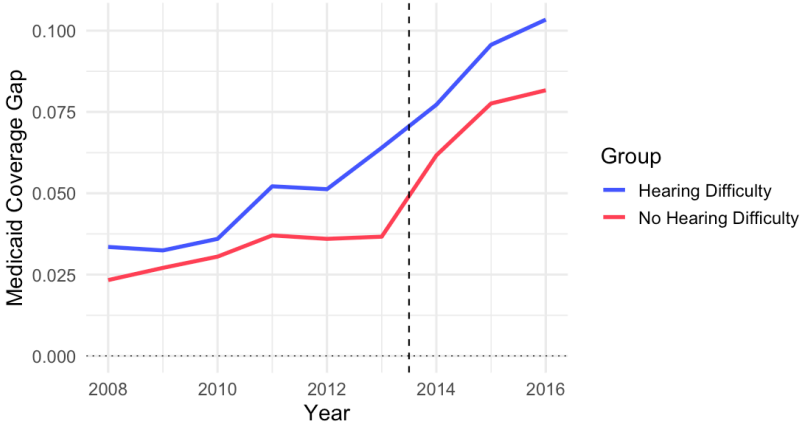
$$
\begin{aligned}
&(\mathbb{E}[Y_0 \mid E{=}1, D{=}1, P{=}1] - \mathbb{E}[Y_0 \mid E{=}1, D{=}1, P{=}0]) \\
&\quad - (\mathbb{E}[Y_0 \mid E{=}1, D{=}0, P{=}1] - \mathbb{E}[Y_0 \mid E{=}1, D{=}0, P{=}0]) \\
&= (\mathbb{E}[Y_0 \mid E{=}0, D{=}1, P{=}1] - \mathbb{E}[Y_0 \mid E{=}0, D{=}1, P{=}0]) \\
&\quad - (\mathbb{E}[Y_0 \mid E{=}0, D{=}0, P{=}1] - \mathbb{E}[Y_0 \mid E{=}0, D{=}0, P{=}0])
\end{aligned}
$$

Parallel Trends Assessment for DDD Medicaid

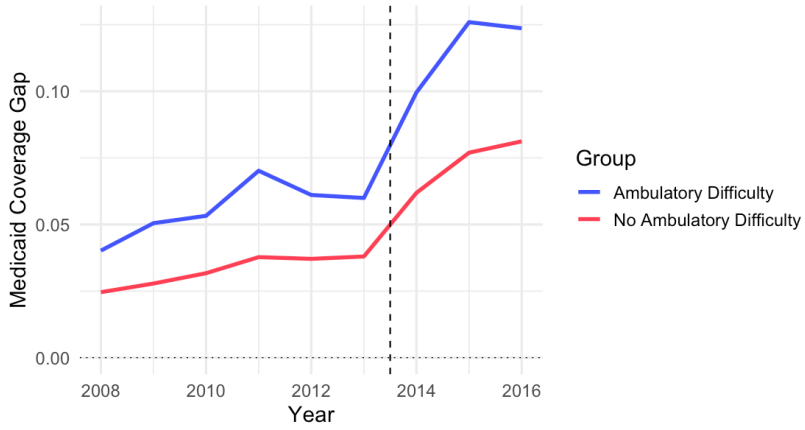
Vision Difficulty



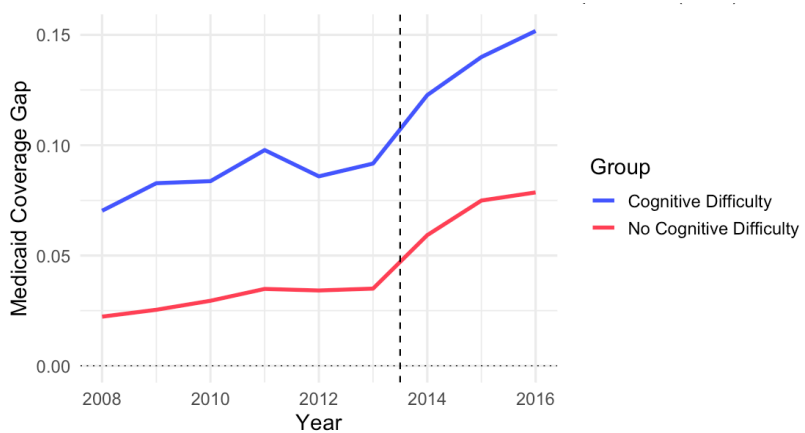
Hearing Difficulty



Ambulatory Difficulty



Cognitive Difficulty



ACS Definitions

Here ACS defines the following:

- DIFFEYE: the respondent is blind or has serious difficulty seeing even with corrective lenses.
- DIFFHEAR: the respondent is deaf or has serious difficulty hearing.
- DIFFPHYS: the respondent has a condition that substantially limits one or more basic physical activities, such as walking, climbing stairs, reaching, lifting, or carrying.
- DIFFREM: the respondent has cognitive difficulties (such as learning, remembering, concentrating, or making decisions) because of a physical, mental, or emotional condition.

Triple Difference Estimator: Formalized

Estimator for the effect of expansion state (treatment for group with disabilities after ACA

$$DDD = \left[(\bar{Y}_{E=1,P=1,D=1} - \bar{Y}_{E=1,P=0,D=1}) - (\bar{Y}_{E=0,P=1,D=1} - \bar{Y}_{E=0,P=0,D=1})\right] - \left[(\bar{Y}_{E=1,P=1,D=0} - \bar{Y}_{E=1,P=0,D=0}) - (\bar{Y}_{E=0,P=1,D=0} - \bar{Y}_{E=0,P=0,D=0})\right]$$

Triple Difference (INSURANCE)

Table 11: Triple Difference Estimates for INSURANCE

	Vision Diff	Hearing Diff	Ambulatory Diff	Cognitive Diff
$d_i \times post_t \times expand_s$	0.0171345***	0.0088073**	0.0135677***	0.0218596***
Number of Observations	11287922	11287922	11287922	11287922
Standard Error	0.0032745	0.0030947	0.0019750	0.0021560

$+$ p $<$ 0.1, * p $<$ 0.05, ** p $<$ 0.01, *** p $<$ 0.001