MERCATUS WORKING PAPER

THE EFFECT OF THE AFFORDABLE CARE ACT'S MEDICAID EXPANSION ON THE MENTAL HEALTH OF ALREADY-ENROLLED MEDICAID BENEFICIARIES

Markus Bjoerkheim, Liam Sigaud, and Kofi Ampaabeng, *Mercatus Center*

MERCATUS.ORG

MERCATUS CENTER
George Mason University

Markus Bjoerkheim, Liam Sigaud, and Kofi Ampaabeng, "The Effect of the Affordable Care Act's Medicaid Expansion on the Mental Health of Already-Enrolled Medicaid Beneficiaries," Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, June 2023.

ABSTRACT

The Affordable Care Act expanded health insurance coverage through Medicaid to 15 million low-income adults. While extensive research has shown Medicaid expansions improved access to care and health outcomes among the newly covered, less is known about the effects on those who were already covered by Medicaid. In this study, we use a difference-in-differences design to examine the impact of expansion on the self-reported general and mental health of near-elderly continuously covered Medicaid beneficiaries, using data from the Health and Retirement Study. We do not find consistent effects on general health. We find evidence of deteriorating mental health among original Medicaid beneficiaries. Our preferred estimate is a reduction of 0.51 point (10.9 percent) on the eight-point Center for Epidemiologic Studies Depression Index, and we find larger effects among important subgroups, including women (–1.10) and people with disabilities (–1.01). The effects are also larger in areas that experienced shortages of mental health workers after expansion and in nonmetropolitan counties. These results highlight the need for policymakers to consider potential negative spillover effects when expanding public insurance programs.

METADATA

Keywords: access to care, Affordable Care Act, health policy, Medicaid, Medicaid benefits, Medicaid and depression, Medicaid and mental health, Medicaid and older adults, Medicaid expansion, Medicaid expansion and mental health, Medicaid expansion original beneficiaries, spillover effects of Medicaid expansion, unintended consequences of Medicaid expansion

JEL codes: I11, I13, I18

AUTHOR CONTACT INFORMATION

Markus Bjoerkheim, Research Fellow, Mercatus Center at George Mason University, mbjoerkheim@mercatus.gmu.edu

Liam Sigaud, Research Fellow, Mercatus Center at George Mason University, lsigaud@mercatus.gmu.edu

Kofi Ampaabeng, Senior Research Fellow, Mercatus Center at George Mason University, kampaabeng@mercatus.gmu.edu

DISCLAIMER

The Effect of the Affordable Care Act's Medicaid Expansion on the Mental Health of Already-Enrolled Medicaid Beneficiaries

INTRODUCTION

Medicaid provides health insurance to more than 80 million low-income Americans, including children in low-income families and their caregivers, pregnant women, blind and disabled individuals, and the elderly. By a wide margin, it is the largest means-tested public assistance program in the United States, with total annual expenditures exceeding $700 billion. To increase health insurance coverage, the Affordable Care Act (ACA) provided enhanced federal matching funds to states that expanded their Medicaid programs to cover low-income adults at up to 138 percent of the federal poverty line. Since January 2014, the District of Columbia and 39 states have expanded Medicaid under the ACA, with about 10 million people gaining Medicaid coverage in 2014 alone, a figure that had grown to 15.3 million by 2019, or 28 percent of Medicaid enrollment in expansion states (Guth, Corallo, and Rudowitz 2021).

Building on the literature of the RAND and Oregon Health Insurance experiments, many researchers have studied the effects of the ACA's Medicaid expansion on the population targeted to gain Medicaid coverage. That research finds that expansion enhanced access to care, increased utilization, reduced financial stress, and improved some measures of health, particularly mental health outcomes such as depression, among newly covered Medicaid beneficiaries. However, the overall gains tend to be small (Baicker et al. 2018; Guth, Garfield, and Rudowitz 2020; Simon, Soni, and Cawley 2017; Sommers and Kronick 2016). The effects of Medicaid expansion on original Medicaid beneficiaries (i.e., those enrolled in Medicaid before the expansion's implementation) have been understudied. We address this gap by examining the mental health of near-elderly original Medicaid enrollees, a particularly vulnerable group with high health needs, elevated rates of disability, and few viable alternative sources of health insurance.

The increase in demand for healthcare services from newly covered Medicaid beneficiaries, in the context of a US health system already strained in many states, raises concerns that Medicaid expansion may have left fewer providers to care for those already in the program. Anecdotal reports support this view. In early 2015, Paul Keck, a psychiatrist in Ohio, noted that "there are too few people to take care of the overwhelming demand for [psychiatric] services" (Poturalski 2015). Malory Shaughnessy, the executive director of a nonprofit organization in Maine aimed at promoting addiction counseling, told local media a year after her state expanded Medicaid that "we knew there was going to be a big surge, but our [mental health treatment] capacity is not meeting the need" (Lawlor 2019).

Given the long-standing challenge of ensuring adequate access to timely, high-quality care for Medicaid beneficiaries (McMorrow and Kenney 2021), who often receive lower-quality care and experience worse health outcomes than similar patients with private insurance (Alcalá et al. 2018; Nguyen and Sommers 2016), it is important to consider potential spillover effects of Medicaid expansion (Carey, Miller, and Wherry 2020). There is some evidence that unintended consequences are widespread, including shorter office visits (Garthwaite 2012), longer patient wait times for dental visits (Buchmueller, Miller, and Vujicic 2016), slower ambulance response times (Courtemanche et al. 2019), longer wait times for medical appointments (Miller and Wherry 2017), and more frequent noncost-related delays in accessing care (McMorrow and Kenney 2021). Because the original Medicaid population is generally regarded as more vulnerable—and thus a higher priority for public policy intervention—than the population of low-income adults

targeted by Medicaid expansion, it is important to consider possible tradeoffs between ensuring access to care for the original population and extending coverage to a new group of low-income adults. Moreover, given that the original Medicaid population outnumbers newly covered beneficiaries by more than four to one, the health gains among the newly covered could be more than offset by small negative spillover effects experienced by original beneficiaries.

An expansive body of literature examines the effects of Medicaid expansion on mental health. However, almost all studies to date have focused primarily on the newly eligible population. For low-income nonelderly adults with depression, Medicaid expansion has been found to reduce uninsurance rates, increase the probability of having a personal doctor, and reduce the probability of delaying care or medications because of cost (Fry and Sommers 2018). Other studies find that Medicaid expansion increases mental health treatment utilization among those targeted to gain coverage (Creedon and Lê Cook 2016; Ghosh, Simon, and Summers 2019; Maclean et al. 2019). In addition to these benefits, some research suggests that Medicaid expansion worsened access problems in the mental health system. Fry and Sommers (2018) find signs that expansion resulted in longer appointment wait times with specialists among newly eligible beneficiaries.

We contribute to the literature in several ways. Using a sample of near-elderly adults derived from the Health and Retirement Study (HRS), we estimate the effects of the ACA's Medicaid expansion on self-reported mental health using difference-in-differences and event study approaches. The 45–64 age group, which aligns closely with our sample, made up 17 percent of total Medicaid enrollment in 2019 (Kaiser Family Foundation 2019)[1] and accounted for nearly 27 percent of total Medicaid benefit spending in 2014 (Centers for Medicare and Medicaid Services 2023). Because the near-elderly generally have more health challenges and receive more healthcare services than younger adults and children, there may be particularly significant potential spillover effects from Medicaid expansion on this population. Our sample also sheds light on the population of disabled individuals under 65 years old, which constitutes 15 percent of Medicaid recipients but accounts for one-half of all Medicaid spending and has received little attention in the context of the ACA (Wagner 2015). The longitudinal design of the HRS allows us to examine health outcomes for individuals who were already enrolled in Medicaid before the expansion's implementation in January 2014 and remained enrolled post-expansion.

Our results provide evidence that Medicaid expansion harmed the mental health of already-enrolled Medicaid beneficiaries. After controlling for statewide economic and demographic changes, our difference-in-differences analysis reveals a 0.51 point worsening of mental health as measured by the eight-point Center for Epidemiologic Studies Depression (CES-D) index, an effect that is approximately 10.9 percent of the pre-expansion mean. The effect is especially pronounced among women, disabled individuals, and residents of nonmetro areas. The most significant effects are found among beneficiaries living in areas where there was a shortage of mental health workers after the expansion. Decomposing the index to its eight individual components reveals sadness to be the only statistically significant question, but consistent signs exist across most other questions, suggesting the reductions may have been experienced broadly. We find no consistent effect of expansion on general health.

The paper proceeds as follows: First we describe our data and discuss our empirical methods. Then we present our results. Finally, we discuss the implications of our findings and conclude.

---

[1] Although comparable data are not available before 2014, it is likely that the near-elderly age group accounted for an even larger proportion of total Medicaid enrollment before expansion, given that the newly eligible group is disproportionately composed of younger adults.

Data

Our analysis is based on microdata from the HRS, which has been used extensively to study near-elderly Medicaid beneficiaries (McInerney et al. 2020; Miller, Johnson, and Wherry 2021; Tavares et al. 2023). The HRS is a nationally representative, longitudinal survey of Americans ages 50 and older and their spouses. The HRS is sponsored by the National Institute on Aging (grant number NIA U01AG009740) and is conducted by the University of Michigan (Health and Retirement Study 2022; RAND HRS Longitudinal File 2018 (V2) 2022).[2] The survey began in 1992 and is administered in biennial "waves" using primarily a mix of face-to-face and telephone interviews. Respondents are asked a wide range of questions related to their lives and families, including health outcomes and healthcare use. We link publicly available HRS data with restricted-access geographic identifiers to determine whether a given household was affected by Medicaid expansion. In our main analysis, we focus on interview questions with reference periods immediately before and after the Medicaid expansions in 2014.

In creating our analytic sample, we impose several restrictions. First, we drop respondents who did not report being enrolled in Medicaid immediately before and after expansion. Second, we exclude all respondents who had moved across states between survey waves. Third, we drop nursing home residents since they access care differently than the general population does. Fourth, we drop respondents over the age of 64 because they would likely already be covered by Medicare. Fifth, we drop states with fewer than three respondents, leaving us with data on 29 states. Sixth, we drop (the small minority of) responses collected in odd-numbered years because those respondents introduce complications related to treatment timing and potential imbalances between expansion and non-expansion states (for more information, see the appendix). Finally, to study a consistent sample, we eliminate any surveys with missing responses for any of the control variables we use. That approach leaves 437 individuals in our analytic sample. Our sample is therefore broadly representative of the near-elderly Medicaid population before expansion. Table 1 shows that across all our outcomes and other important characteristics such as disability as measured by receipt of Social Security Disability Insurance (SSDI) income, our analytic sample is statistically indistinguishable from similarly aged individuals enrolled in Medicaid in 2012–2013 who did not report being on Medicaid in 2014–2015. (The two groups differ, however, in the proportion of married respondents.) Moreover, our sample accounts for approximately 48 percent of all Medicaid recipients observed in the HRS in 2012–2013; this figure is broadly consistent with estimates from previous research (Ndumele et al. 2023).

In subgroup analyses, we explore the impact of Medicaid expansion on respondents living in areas that were not designated as mental healthcare Health Professional Shortage Areas in the pre-treatment period but were designated mental healthcare shortage areas in the post-treatment period. We identify those respondents by using historical county and census tract shortage data from the Health Resources and Services Administration.

---

[2] The HRS uses a national area probability sample of US households, with additional oversamples of African Americans, Hispanics, and residents in Florida. For more on the sample design, see Heeringa and Connor (1995).

TABLE 1. Comparison of Summary Statistics for Individuals in Analytic Sample and Others Enrolled in Medicaid in 2012–2013

	All Enrolled in Medicaid in 2012–2013	Analytic Sample (Enrolled in Medicaid in 2012–2013 and 2014–2015)	Others Enrolled in Medicaid in 2012–2013	Difference in Means	*p*-value
CES-D index: full scale	4.63	4.65	4.61	0.04	0.83
Good mental health	0.45	0.46	0.44	0.02	0.39
Poor mental health	0.28	0.28	0.27	0.01	0.73
General health: full scale	2.34	2.36	2.33	0.03	0.74
Good general health	0.15	0.15	0.14	0.01	0.79
Poor general health	0.61	0.59	0.62	–0.03	0.41
Age (years)	56.7	57.3	56.2	1.1	0.00
Female	0.67	0.69	0.65	0.04	0.19
White	0.39	0.37	0.41	–0.04	0.21
African American	0.43	0.46	0.40	0.06	0.04
Other race	0.17	0.16	0.19	–0.03	0.29
Less than high school education	0.38	0.39	0.38	0.01	0.65
Married	0.42	0.36	0.47	–0.09	0.00
Body mass index	31.0	31.5	30.7	0.8	0.13
No difficulty walking	0.80	0.81	0.80	0.01	0.69
No difficulty dressing	0.75	0.75	0.75	0.00	0.83
No difficulty bathing	0.80	0.81	0.79	0.02	0.54
No difficulty managing money	0.84	0.86	0.82	0.04	0.08
Receipt of Social Security Disability Insurance (SSDI)	0.38	0.39	0.37	0.02	0.41
Observations[a]	917	437	480	NA	NA

Note: Two-tailed *t*-tests were used to compute *p*-values. CES-D = Center for Epidemiologic Studies Depression; NA = not applicable.

a. The number of observations reported corresponds to the full-scale CES-D index. For the "Others Enrolled in Medicaid in 2012–2013" group, there is slight variation in the number of observations for other variables (ranging from 480 to 504) because of missing values. Consequently, the total number of observations (reported as 917) varies slightly, as well depending on the variable.

Outcome Variables

Our analysis is primarily based on the HRS's mental health status variable—the CES-D scale, a widely used index consisting of eight questions designed to measure depressive symptoms in the general population (Radloff 1977). Specifically, the index is the sum of six "negative" indicators minus two "positive" indicators. The negative questions ask whether the respondent experienced any of the following sentiments all or most of the time: depression, everything is an effort, sleep is restless, felt alone, felt sad, and could not get going. The positive indicators ask whether the respondent felt happy and enjoyed life all or most of the time. In the raw index, higher scores indicate worse mental health. To improve interpretability, we recode the index (with the exception of figure 1) so that a higher value indicates better mental health.

In addition to the full CES-D scale, we create two binary variables to capture Medicaid expansion's effect on the tails of the mental health distribution: poor mental health (defined as a score of 1, 2, or 3 on our recoded CES-D index) and good mental health (defined as a score of 6, 7, or 8 on our recoded CES-D index). Those variables provide important insights. For example, if Medicaid expansion were associated with an overall deterioration of mental health but a reduction in severe mental distress, we might observe a negative effect in the full CES-D scale but a reduction in poor mental health.

As an extension to the main analysis, we examine the effect of Medicaid expansion on each of the individual CES-D components' questions (see appendix).

We also examine self-reported general health, reported on a five-point Likert scale (from poor to excellent). In additional analyses (presented in the appendix), we dichotomize the general health scale into two variables: bottom of the scale (corresponding to poor or fair health) and top of the scale (corresponding to very good or excellent health).

Control Variables

It is important to emphasize that our study design of continuously enrolled Medicaid recipients accounts for all time-invariant state and individual characteristics such as age, race, gender, education level, and family background. To mitigate residual confounding factors, our models include various state-level controls that are plausibly related to mental health outcomes but are not directly affected by Medicaid expansion. These variables were collected from the University of Kentucky's Center for Poverty Research, the Kaiser Family Foundation, the US Bureau of Labor Statistics, and the Centers for Disease Control and Prevention.

Across different specifications, we control for policies aimed at helping low-income individuals and families, such as the maximum Temporary Assistance for Needy Families (TANF) benefit in dollars for a family of three and the state Earned Income Tax Credit (EITC) as a percentage of the federal EITC level. We also control for economic and political conditions: average unemployment rate, percentage of workers represented by a union, political party affiliation of the chief executive (governor for states; mayor for Washington, DC), and per capita personal income. Finally, we control for determinants of healthcare utilization: the proportion of the population that is African American, the proportion that is Hispanic, the proportion that is more than 64 years old, the Medicaid income eligibility limit for parents as a proportion of the federal poverty line, and the Medicaid–Children's Health Insurance Program (CHIP) income eligibility limit for children as a proportion of the federal poverty line.

Since some of the variables described above could be endogenous to state decisions to expand Medicaid, we also explore specifications with only a subset of controls. Our preferred models account for state-level economic and demographic changes that influence mental health outcomes.

These changes include the state unemployment rate and the proportion of the state population over age 64, African American, or Hispanic. Unemployment affects mental health outcomes through several channels, including direct effects on psychological well-being, income effects on service utilization, and risks of occupational injury. Demographic characteristics such as age and race are leading predictors of health and healthcare utilization.

EMPIRICAL SPECIFICATIONS

We estimate the standard, two-period difference-in-differences models using ordinary least squares.[3] This approach compares the original Medicaid population in expansion and non-expansion states, both pre- and post-expansion, to assess changes in health status. The basic estimating equation is as follows:

$$Y_{ist} = \beta_1(Post_t * Expand_s) + Z_{st} + State_s + Year_t + \varepsilon_{ist} \quad (1)$$

where Y_{ist} is a given outcome measure recorded in period t and state for individual i; $Post_t$ is a dummy variable for the post-expansion period (i.e., 2014); $Expand_s$ is a dummy variable identifying states that expanded Medicaid on January 1, 2014; Z_{st} is a vector of time-varying state-level controls (unemployment rate, the generosity of other safety net programs, demographic variables, etc.); $State_s$ are state fixed effects; $Year_t$ are year fixed effects; and ε_{it} is the residual term. Under conventional assumptions (the most important being the parallel trends assumption that outcomes in the two groups would have followed parallel trends in the absence of Medicaid expansion), β_1 reflects the average treatment effect on the treated (ATET) of Medicaid expansion on previously enrolled recipients' health.

We also explore event study specifications using multiple pre- and post-expansion survey waves to track trends in our outcomes. We use a standard event study approach:

$$Y_{its} = \sum_{\tau=-q}^{-1} \gamma_t D_{s\tau} + \sum_{\tau=0}^{m} \delta_t D_{s\tau} + Z_{st} + State_s + Year_t + \varepsilon_{its} \quad (2)$$

where for an individual in state s, q are leads or anticipatory effects, and m are lags or post-treatment effects relative to the last interview before expansion (Cunningham 2021). In other words, we use the implementation date of January 1, 2014, as the first post-treatment period throughout and note that while certain outcomes could be influenced through anticipation of a coming Medicaid expansion, we do not find much evidence of it in our event study results.

Summary Statistics

Summary statistics for our analytic sample are presented in table 2, broken down by expansion status and pre- and post-expansion. Although there are well-known differences in state-level social policies, demographic characteristics, income per capita, union membership, and political leadership, we find broad similarities across expansion and non-expansion states. Respondents from expansion states report somewhat better mental health before expansion, and they are broadly similar in terms of age, gender, educational attainment, body mass index, functional limitations, and marital status. Possible differences are generally stable over time, with the exception being those receiving SSDI income.

[3] Statistical analyses were performed in Stata 17 MP.

TABLE 2. Summary Statistics

	Non-expansion States (Pre-treatment)	Expansion States (Pre-treatment)	Non-expansion States (Post-treatment)	Expansion States (Post-treatment)
Outcomes				
CES-D index: full scale	4.42	4.66	4.86	4.82
Good mental health	0.39	0.49	0.47	0.52
Poor mental health	0.34	0.27	0.29	0.25
General health: full scale	2.13	2.43	2.19	2.54
Good general health	0.07	0.21	0.05	0.18
Poor general health	0.65	0.56	0.61	0.51
State-Level Controls				
Temporary Assistance for Needy Families (TANF)	$286.5	$562.5	$291.5	$574.9
Earned Income Tax Credit (EITC)	0.022	0.11	0.021	0.12
Unemployment rate	7.95%	8.71%	6.22%	6.55%
Unionization rate	8.19%	17.1%	7.74%	17.2%
Personal income per capita	$40,087.4	$48,773.9	$42,110.8	$51,778.1
Proportion of population that is African American	0.19	0.09	0.19	0.09
Proportion of population that is Hispanic	0.14	0.21	0.14	0.21
Proportion of population that is > 64 years old	0.13	0.14	0.14	0.14
Proportion of adults with diabetes	0.11	0.097	0.11	0.10
Political party of chief executive (1 = Democrat)	0.12	0.80	0.086	0.80
Medicaid income eligibility limit for parents (as proportion of federal poverty line)	0.44	1.24	0.40	1.39
Medicaid/CHIP income eligibility limit for children (as proportion of federal poverty line)	2.25	2.91	2.36	3.06
Individual Characteristics				
Age (years)	57.5	57.3	59.3	59.0
Female	0.68	0.64	0.68	0.64
White	0.57	0.53	0.57	0.53
African American	0.35	0.24	0.35	0.24

(continued)

TABLE 2. Summary Statistics (continued)

	Non-expansion States (Pre-treatment)	Expansion States (Pre-treatment)	Non-expansion States (Post-treatment)	Expansion States (Post-treatment)
Other race	0.081	0.22	0.081	0.22
Less than high school education	0.36	0.38	0.36	0.38
Married	0.34	0.30	0.34	0.29
Body mass index	31.1	31.2	31.4	31.0
No difficulty walking	0.77	0.83	0.75	0.80
No difficulty dressing	0.70	0.77	0.66	0.74
No difficulty bathing	0.73	0.82	0.68	0.82
No difficulty managing money	0.80	0.84	0.80	0.81
Receipt of Social Security Disability Insurance (SSDI)	0.49	0.23	0.46	0.34
Observations	219	218	219	218

Sources: Outcome variables and individual characteristics are from the Health and Retirement Study (HRS). State-level control variables are collected from the University of Kentucky's Center for Poverty Research, the Kaiser Family Foundation, the US Bureau of Labor Statistics, and the Centers for Disease Control and Prevention. HRS sampling weights are applied in all calculations.

Note: CES-D = Center for Epidemiologic Studies Depression; CHIP = Children's Health Insurance Program.

RESULTS

Difference-in-Differences Models

Our main results, using the full CES-D scale,[4] are presented in table 3. We find consistent evidence of deteriorating mental health in our sample. The sign is consistently negative across all specifications, but it does not attain statistical significance in the specification using only fixed effects. When our preferred controls are added, the magnitude of the effect nearly doubles (from –0.27 to –0.51) and becomes significant at the 10 percent level. Relative to the sample mean, this specification implies a 10.9 percent decline in mental health score. Additional controls increase both the effect size and its statistical significance. The influence of controlling for other policies aimed at helping the poor (namely, minimum wage, TANF generosity, and EITC level) is particularly notable. When these variables are included, the measured effect again nearly doubles (19.4 percent decline in mental health score). Other changes to the specification, such as

[4] Tables A.1 and A.2 in the appendix present results for good mental health (defined as a score of 6, 7, or 8 out of 8) and poor mental health (defined as a score of 1, 2, or 3 out of 8). Results were broadly consistent with our findings from the full scale. Medicaid expansion is associated with movement in both tails of the distribution. The fixed effects–only (equation 1) and preferred (equation 2) specifications indicated a negative effect of Medicaid expansion, but neither effect was statistically significant. However, additional controls increased both the effect size and its statistical significance.

controlling for political party affiliation of the state's governor, Medicaid eligibility for parents and children, or unionization rates, do not dramatically alter the results.

TABLE 3. Full CES-D (Mental Health) Scale

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Difference-in-differences coefficient	–0.27	–0.51*	–0.91***	–0.77***	–0.83***	–0.81***	–1.03***	–1.07***
	(0.25)	(0.30)	(0.29)	(0.28)	(0.29)	(0.27)	(0.23)	(0.23)
Sample mean	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69
Observations	874	874	874	874	874	874	874	874

Note: Model specifications: (1) state and year fixed effects only; (2) state and year fixed effects + average state unemployment rate (hereafter, unemployment), percentage of the population that is African American (hereafter, African American), percentage of the population that is Hispanic (hereafter, Hispanic), and percentage of the population > 64 years of age (hereafter, seniors); (3) state and year fixed effects + African American, Hispanic, seniors, state minimum wage (hereafter, minwage), TANF benefit for a family of three (hereafter, TANF), and EITC as a percentage of the federal poverty line (hereafter, EITC); (4) state and year fixed effects + minwage, TANF, EITC, and per capita income; (5) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, and per capita income; (6) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, and party affiliation of the chief executive (hereafter, gov); (7) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, the Medicaid income eligibility limit for parents as a proportion of federal poverty line (hereafter, Medicaid parents), and the Medicaid/CHIP income eligibility limit for children as a proportion of the federal poverty line (hereafter, Medicaid children); (8) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, Medicaid parents, Medicaid children, proportion of adults with diabetes, and state unionization rate. HRS sampling weights are applied in all regressions. CES-D = Center for Epidemiologic Studies Depression; CHIP = Children's Health Insurance Program; EITC = Earned Income Tax Credit; HRS = Health and Retirement Study; TANF = Temporary Assistance for Needy Families.

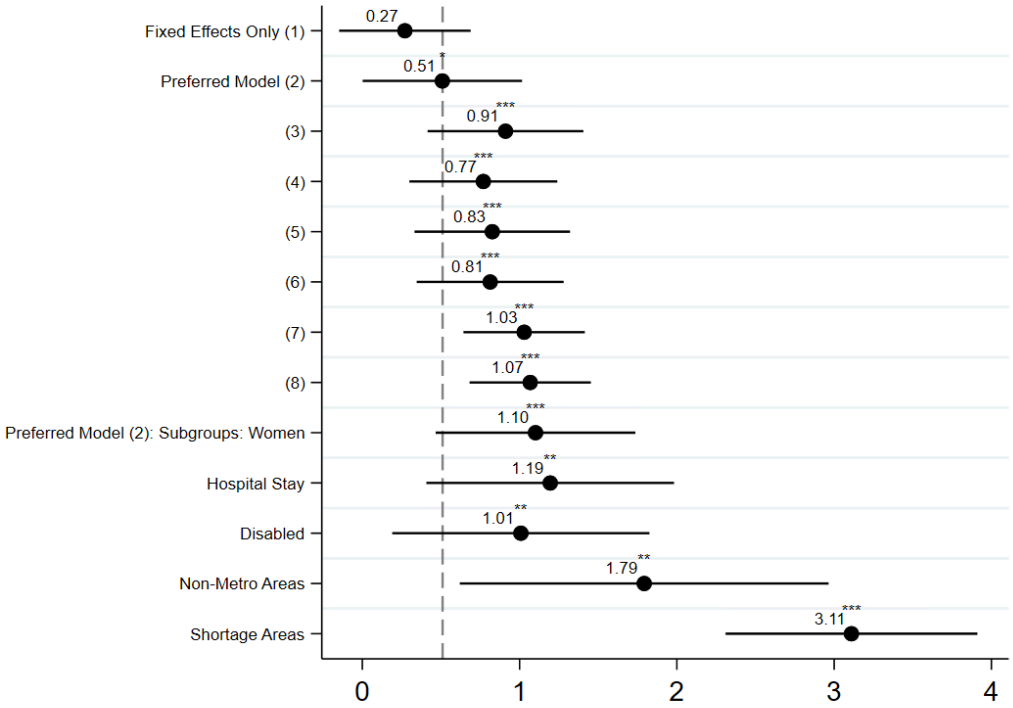
State-clustered standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 1 plots the point estimates and 90 percent confidence intervals for the models shown in table 3, as well as for specific subgroups. The baseline model for all subgroups is our preferred specification, with a coefficient of –0.51.[5] We find that Medicaid expansion's negative impact was largest among women, those with a recent hospital stay, those with a disability, inhabitants of nonmetro areas, and particularly those living in areas with shortages of mental health providers.

Table A.3 in the appendix provides difference-in-differences estimates for each component of the CES-D index, which may offer more refined insights than the aggregate measure. Medicaid expansion is associated with a significant and economically meaningful increase in the likelihood of feeling sad (34 percent reduction from the sample mean). Across the other components, we find consistent declines in indicators of positive mental health and increases in indicators of negative mental health, although those results are not statistically significant.

[5] The coefficients in figure 1 differ in sign to those found in table 3 and elsewhere in the paper because the CES-D scale is reversed for ease of interpretation.

FIGURE 1. Full CES-D (Mental Health) Scale and Subgroup Analysis



Note: Model specifications: (1) state and year fixed effects only; (2) state and year fixed effects + average state unemployment rate (hereafter, unemployment), percentage of the population that is African American (hereafter, African American), percentage of the population that is Hispanic (hereafter, Hispanic), and percentage of the population > 64 years of age (hereafter, seniors); (3) state and year fixed effects + African American, Hispanic, seniors, state minimum wage (hereafter, minwage), TANF benefit for a family of three (hereafter, TANF), and EITC as a percentage of the federal poverty line (hereafter, EITC); (4) state and year fixed effects + minwage, TANF, EITC, and per capita income; (5) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, and per capita income; (6) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, and party affiliation of the chief executive (hereafter, gov); (7) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, the Medicaid income eligibility limit for parents as a proportion of the federal poverty line (hereafter, Medicaid parents), and the Medicaid–CHIP income eligibility limit for children as a proportion of the federal poverty line (hereafter, Medicaid children); (8) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, Medicaid parents, Medicaid children, the proportion of adults with diabetes, and state unionization rate. HRS sampling weights are applied in all regressions. CES-D = Center for Epidemiologic Studies Depression; CHIP = Children's Health Insurance Program; EITC = Earned Income Tax Credit; HRS = Health and Retirement Study; TANF = Temporary Assistance for Needy Families.

The disabled subgroup consists of respondents who reported receiving Social Security Disability Insurance income at any point during our sample period. The shortage area subgroup consists of respondents who reside in jurisdictions newly designated as mental healthcare shortage areas by the Health Resources and Services Administration in the post-expansion period.

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

Table A.4 in the appendix provides difference-in-differences estimates for the subgroup of respondents reporting any SSDI income during our sample period, a particularly vulnerable subset of Medicaid beneficiaries. We find large effects across a variety of specifications.

As an extension to our main analysis, we also examine self-assessed general health, which is designed to measure holistic well-being. Table 4 presents results using the full five-point scale (from poor to excellent). Results are statistically insignificant and generally small in magnitude.

TABLE 4. General Health, Full Scale

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Difference-in-differences coefficient	0.05	0.06	0.01	0.01	0.04	0.04	0.14	0.20
	(0.19)	(0.22)	(0.25)	(0.29)	(0.27)	(0.27)	(0.29)	(0.28)
Sample mean	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33
Observations	874	874	874	874	874	874	874	874

Note: Model specifications: (1) state and year fixed effects only; (2) state and year fixed effects + average state unemployment rate (hereafter, unemployment), percentage of the population that is African American (hereafter, African American), percentage of the population that is Hispanic (hereafter, Hispanic), and percentage of the population > 64 years of age (hereafter, seniors); (3) state and year fixed effects + African American, Hispanic, seniors, state minimum wage (hereafter, minwage), TANF benefit for a family of three (hereafter, TANF), and EITC as a percentage of the federal poverty line (hereafter, EITC); (4) state and year fixed effects + minwage, TANF, EITC, and per capita income; (5) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, and per capita income; (6) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, and party affiliation of the chief executive (hereafter, gov); (7) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, the Medicaid income eligibility limit for parents as a proportion of federal poverty line (hereafter, Medicaid parents), and the Medicaid–CHIP income eligibility limit for children as a proportion of the federal poverty line (hereafter, Medicaid children); (8) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, Medicaid parents, Medicaid children, the proportion of adults with diabetes, and state unionization rate. HRS sampling weights are applied in all regressions. CES-D = Center for Epidemiologic Studies Depression; CHIP = Children's Health Insurance Program; EITC = Earned Income Tax Credit; HRS = Health and Retirement Study; TANF = Temporary Assistance for Needy Families.

State-clustered standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Tables A.5 and A.6 in the appendix reflect dichotomous variables for the top and bottom of the general health scale, respectively. Results are mostly statistically insignificant, with some evidence suggestive of improvements in general health in some specifications.

At the suggestion of a reviewer, we also produced a version of the difference-in-differences results from tables 3 and 4 that applies a Bonferroni adjustment to account for the multiplicity problem introduced by testing two separate outcomes (mental health and general health). Such an adjustment may be appropriate to counteract the mechanical increase in the probability of finding at least one statistically significant result as the number of outcomes considered increases (Bender and Lange 2001). We do not believe this to be strictly necessary because we reduced the multiplicity problem through specified analysis plans, but we note here that of the seven mental health specifications that were found statistically significant using the conventional method, six remain statistically significant after the Bonferroni adjustment was applied. Likewise, none of the

general health results attain statistical significance using the conventional method, and that remains true after making the Bonferroni adjustment. See table A.7 in the appendix for the results of this exercise.[6]

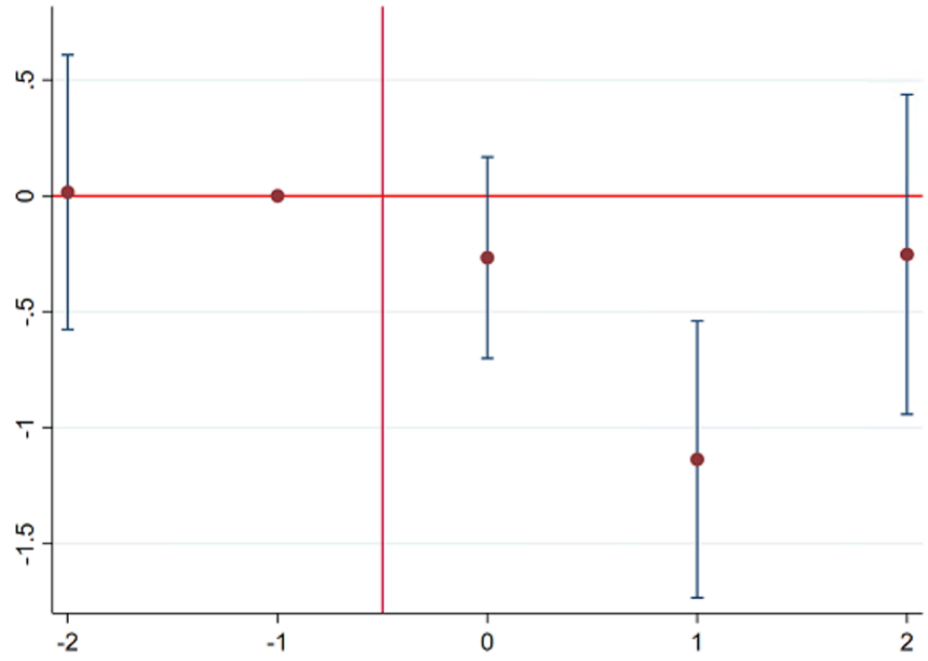
Event Study Models

Mental Health

We now turn to event study models to validate the causal interpretation of our difference-in-differences results. Because HRS respondents are surveyed biennially, each unit of event time represents approximately two years. Consequently, in our event study figures, the time points 0, 1, and 2 correspond to 2, 4, and 6 years, respectively, after the last pre-expansion observation.

Figure 2 plots coefficients and 90 percent confidence intervals from our event study specification from equation (2) for our full sample. We include the same preferred controls used in our difference-in-differences models: average state unemployment rate, percentage of the population that is African American, percentage of the population that is Hispanic, and percentage of the population over age 64 years.

FIGURE 2. Event Study of Full CES-D (Mental Health) Scale, Full Sample

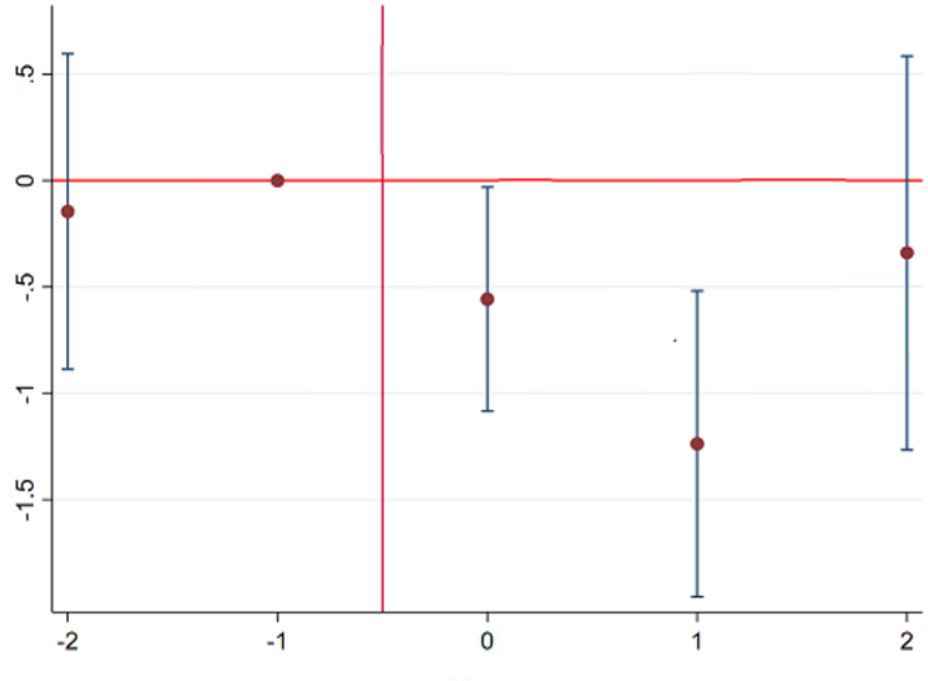


Note: CES-D = Center for Epidemiologic Studies Depression.

[6] The Bonferroni adjustment guarantees that we reject the global null hypothesis of no association between Medicaid expansion and *either* of our outcomes no more than the proportion of the highest significance level we tolerate (10 percent). The adjustment is performed by multiplying the *p*-value used in our conventional hypothesis tests by the number of outcomes (two) we examine. Table A.7 in the appendix presents a comparison of our original results and our Bonferroni-adjusted results.

The event study model is supportive of the parallel trends assumption required for our difference-in-differences results to have a causal interpretation; the coefficients are very close to zero before Medicaid expansion and show declines in CES-D scores in post-treatment periods. In tests of joint significance, we find no evidence of differences between expansion and non-expansion states in the lags before treatment ($p = 0.964$), but we find evidence of an effect after treatment ($p = 0.012$). Figure 3 shows our estimates for the same models but focusing exclusively on women. Consistent with our difference-in-differences results, we find slightly larger effects for women than for the full sample. Lagged, pre-treatment coefficients are not jointly significant ($p = 0.741$), while the post-treatment effects are significant at the 5 percent level ($p = 0.039$).[7]

FIGURE 3. Event Study of Full CES-D (Mental Health) Scale, Women Only



Note: CES-D = Center for Epidemiologic Studies Depression.

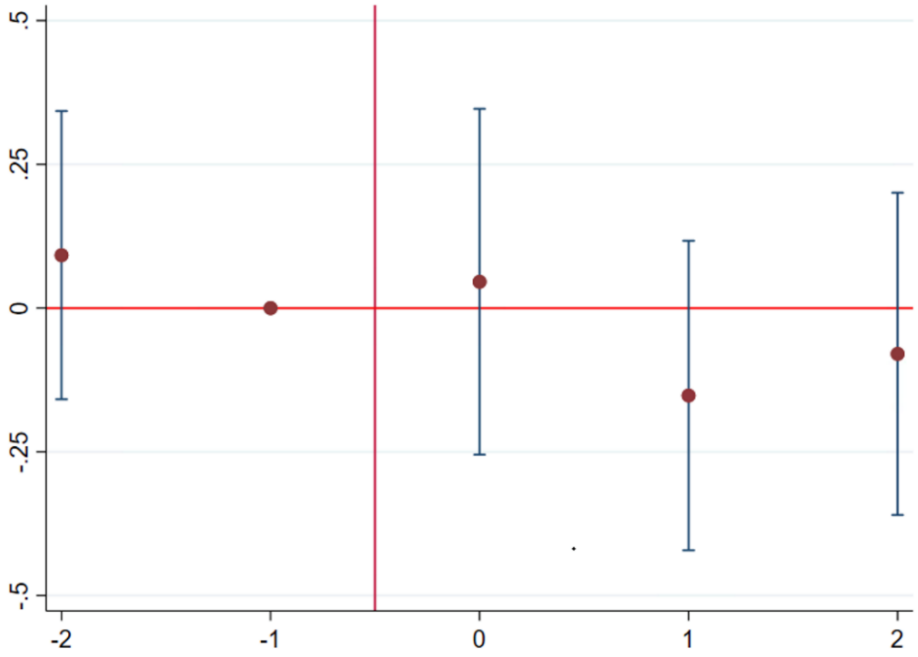
Figures A.1 and A.2 in the appendix present similar event study models for each component of the CES-D index. Medicaid expansion is associated with statistically significant increases in feelings of sadness, depression, and restless sleep. Other components, while not statistically significant, are directionally consistent with a decline in mental health. Figure A.3 in the appendix presents event study estimates for the subgroup of respondents reporting any SSDI income during our sample period.

[7] Reexamining our joint significance tests of the leads and lags in the event study results shown in figures 2, 3, and 4 using the same Bonferroni adjustment results did not materially change their interpretation. As is shown across those three figures, none of the pre-treatment coefficients were jointly significant; thus, they still support a causal interpretation. The joint test for an effect after treatment for the full sample (figure 2) was still significant at the 5 percent level after the Bonferroni adjustment, while the same test for women (figure 3) was significant at the 5 percent level using the conventional method; it was significant at the 10 percent level only after the adjustment. The tests of an effect on general health (figure 4) were not significant in either method.

General Health

We estimate identical event study models with general health as the outcome (figure 4). Results are statistically insignificant.

FIGURE 4. General Health, Full Scale



CONCLUSION

The effects of the ACA's expansion of Medicaid have generated intense interest from scholars and policymakers. And for good reason: more than 15 million people have been added to the program under the ACA's provisions. The existing literature shows increased utilization, better access to care, and improvements in certain health outcomes among the newly enrolled.

However, it is difficult to interpret what the literature says about the effects of expansion on existing enrollees. Many studies explicitly exclude this group, and those that include existing enrollees tend to include the newly covered as well. This approach presents a problem of interpretation because the theoretical predictions of the expansion's impact on these two groups are in opposite directions.

Our analysis extends previous work by analyzing a longitudinal sample of individuals continuously enrolled in Medicaid both before and after its expansion. We find evidence that Medicaid expansion leads to a decline in the mental health of near-elderly adults. In our preferred specification, we estimate a 10.9 percent decrease in self-reported depression scores, with larger effects among important subgroups such as women and people with disabilities. However, we find no consistent evidence of an effect on general health.

Several potential mechanisms could be driving our mental health findings. Our evidence is most consistent with the hypothesis that Medicaid expansion put strain on the healthcare systems in expansion states, making it difficult for some already-enrolled beneficiaries to access

psychological or psychiatric treatment. This could explain why the subgroups most affected in our sample are residents of nonmetro areas—where access to care is often more limited—and in areas with newly developed shortages of mental health professionals.[8]

Although it has not received much attention, this interpretation is consistent with previous research that has found that Medicaid expansion substantially increases the use of mental health services and outpatient mental health visits (Breslau et al. 2020; Han et al. 2015). Meinhofer and Witman (2018) also find that Medicaid expansion affected the utilization of mental health services, particularly medication-assisted treatment for opioid use disorder, and enhanced the supply of providers of such treatment who serve Medicaid patients. Since opioid use disorder disproportionately affects adolescents and younger adults, it is possible that the increase in medication-assisted treatment associated with expansion leads to some resources being diverted from other types of mental healthcare, including services more commonly used by the near-elderly. Moreover, suggestive evidence has been found that relates Medicaid expansion to declines in mental health follow-ups among Medicaid beneficiaries enrolled in managed-care plans (Ndumele, Schpero, and Trivedi 2018).[9]

Our results stand in contrast to the findings of two other recent studies that use the HRS to estimate the effect of expansion on mental health. McInerney and colleagues (2020) find no effect using a sample that includes both existing and newly covered enrollees, while Costa-Font, Raut, and Van Houtven (2021) report 4 to 5 percent improvement among spousal caregivers. This range of results using the same datasets underscores the importance of constructing the sample to specific study populations when assessing the impacts of Medicaid expansion.

A commonly cited concern among the 11 states that have not adopted the Medicaid expansion under the ACA is that adding large numbers of people to the Medicaid program might jeopardize access to care for those already enrolled. The evidence we find is consistent with this concern, particularly for women, people with disabilities, and people living in areas with higher levels of health system strain.

It may also be that Medicaid expansion leads existing beneficiaries to perceive a greater degree of uncertainty about their ability to access care. While more research is needed to understand the exact mechanisms behind our findings, we believe our results clearly illustrate that the heterogeneous impacts of expansion on mental health have not received adequate attention.

We acknowledge several limitations of our study. First, we examine only the immediate, short-run effects of Medicaid expansion. It is possible that the medium- and long-run effects will differ as individuals and health systems adapt to new constraints, payment structures, and market dynamics. Second, an inherent challenge in studying the existing Medicaid population is that requiring continuous enrollment across repeated surveys limits the sample size in available datasets, potentially introducing some instability across model specifications.

While our sample is broadly descriptive of the near-elderly Medicaid population (shown in table 1), it does not include children or younger adults. Our results may not apply to those groups, who tend to experience higher rates of Medicaid churn (MACPAC 2021), face different mental

---

[8] In unreported analyses, we examine whether changes in health behaviors can explain our results. Specifically, we examine whether Medicaid expansion induced changes in physical activity or alcohol consumption, both of which have been robustly linked to mental health outcomes. We find no consistent evidence supporting this channel.

[9] See the column for mental illness follow-up in table 2 in Ndumele, Schpero, and Trivedi (2018, 2830). The unadjusted differences imply Medicaid expansion is associated with a reduction in follow-up treatment after mental health–related hospitalizations of 9.45 percentage points, about 21 percent, among Medicaid managed-care enrollees. The difference is not statistically significant in the authors' adjusted analysis.

health challenges, and interact differently with the healthcare system. Still, our research sheds light on the spillover effects of Medicaid expansion on a large, medically vulnerable group of older adults.

REFERENCES

Alcalá, Héctor E., Dylan H. Roby, David T. Grande, Ryan M. McKenna, and Alexander N. Ortega. 2018. "Insurance Type and Access to Health Care Providers and Appointments under the Affordable Care Act." *Medical Care* 56 (2): 186–92.

Baicker, Katherine, Heidi L. Allen, Bill J. Wright, Sarah L. Taubman, and Amy N. Finkelstein. 2018. "The Effect of Medicaid on Management of Depression: Evidence from the Oregon Health Insurance Experiment: The Effect of Medicaid on Management of Depression." *Milbank Quarterly* 96 (1): 29–56.

Bender, Ralf, and Stefan Lange. 2001. "Adjusting for Multiple Testing—When and How?" *Journal of Clinical Epidemiology* 54 (4): 343–49.

Breslau, Joshua, Bing Han, Julie Lai, and Hao Yu. 2020. "Impact of the Affordable Care Act Medicaid Expansion on Utilization of Mental Health Care." *Medical Care* 58 (9): 757–62.

Buchmueller, Thomas, Sarah Miller, and Marko Vujicic. 2016. "How Do Providers Respond to Changes in Public Health Insurance Coverage? Evidence from Adult Medicaid Dental Benefits." *American Economic Journal: Economic Policy* 8 (4): 70–102.

Carey, Colleen M., Sarah Miller, and Laura R. Wherry. 2020. "The Impact of Insurance Expansions on the Already Insured: The Affordable Care Act and Medicare." *American Economic Journal: Applied Economics* 12 (4): 288–318.

Centers for Medicare and Medicaid Services. 2023. "Age and Gender Tables." National Health Expenditure Data. https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Age-and-Gender

Costa-Font, Joan, Nilesh Raut, and Courtney Harold Van Houtven. 2021. "Medicaid Expansion and the Mental Health of Spousal Caregivers." IZA Discussion Paper No. 14754, IZA Institute of Labor Economics. https://docs.iza.org/dp14754.pdf

Creedon, Timothy B., and Benjamin Lê Cook. 2016. "Access To Mental Health Care Increased but Not for Substance Use, While Disparities Remain." *Health Affairs* 35 (6): 1017–21.

Courtemanche, Charles, Andrew Friedson, Andrew P. Koller, and Daniel I. Rees. 2019. "The Affordable Care Act and Ambulance Response Times." *Journal of Health Economics* 67 (September): 102213.

Cunningham, Scott. 2021. *Causal Inference: The Mixtape*. New Haven, CT: Yale University Press.

Fry, Carrie E., and Benjamin D. Sommers. 2018. "Effect of Medicaid Expansion on Health Insurance Coverage and Access to Care among Adults with Depression." *Psychiatric Services* 69 (11): 1146–52.

Garthwaite, Craig L. 2012. "The Doctor Might See You Now: The Supply Side Effects of Public Health Insurance Expansions." *American Economic Journal: Economic Policy* 4 (3): 190–215.

Ghosh, Ausmita, Kosali Simon, and Benjamin D. Sommers. 2019. "The Effect of Health Insurance on Prescription Drug Use among Low-Income Adults: Evidence from Recent Medicaid Expansions." *Journal of Health Economics* 63 (January): 64–80.

Guth, Madeline, Bradley Corallo, and Robin Rudowitz. 2021. "Medicaid Expansion Enrollment and Spending Leading Up to the COVID-19 Pandemic." *KFF* (blog), January 12, 2021. https://www.kff.org/medicaid/issue-brief/medicaid-expansion-enrollment-and-spending-leading-up-to-the-covid-19-pandemic.

Guth, Madeline, Rachel Garfield, and Robin Rudowitz. 2020. "The Effects of Medicaid Expansion under the ACA: Studies from January 2014 to January 2020." *KFF* (blog), March 17, 2020. https://www.kff.org

/medicaid/report/the-effects-of-medicaid-expansion-under-the-aca-updated-findings-from-a-literature-review.

Han, Xuesong, Binh T. Nguyen, Jeffrey Drope, and Ahmedin Jemal. 2015. "Health-Related Outcomes among the Poor: Medicaid Expansion vs. Non-Expansion States." *PLOS ONE* 10 (12): e0144429.

Health and Retirement Study, (RAND HRS Longitudinal File 2018 (V2)) public use dataset. Produced and distributed by the University of Michigan with funding from the National Institute on Aging (grant number NIA U01AG009740). Ann Arbor, MI (July 2022).

Heeringa, Steven G., and Judith H. Connor. 1995. "Technical Description of the Health and Retirement Survey Sample Design." Institute for Social Research, University of Michigan, Ann Arbor.

Kaiser Family Foundation. 2019. "State Health Facts: Medicaid Enrollment by Age." https://www.kff.org/medicaid/state-indicator/medicaid-enrollment-by-age/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D.

Lawlor, Joe. 2019. "New Medicaid Patients Strain Maine's Mental Health Services." *Portland Press Herald*, December 22.

Maclean, Johanna Catherine, Benjamin Cook, Nicholas Carson, and Michael F Pesko. 2019. "Public Health Insurance and Prescription Medications for Mental Illness." *B.E. Journal of Economic Analysis and Policy* 19 (1): 1–25.

MACPAC (Medicaid and CHIP Payment and Access Commission). 2021. "An Updated Look at Rates of Churn and Continuous Coverage in Medicaid and CHIP." MAPCPAC, October. https://www.macpac.gov/wp-content/uploads/2021/10/An-Updated-Look-at-Rates-of-Churn-and-Continuous-Coverage-in-Medicaid-and-CHIP.pdf.

McInerney, Melissa, Ruth Winecoff, Padmaja Ayyagari, Kosali Simon, and M. Kate Bundorf. 2020. "ACA Medicaid Expansion Associated with Increased Medicaid Participation and Improved Health among Near-Elderly: Evidence from the Health and Retirement Study." *INQUIRY: The Journal of Health Care Organization, Provision, and Financing* 57 (January): 004695802093522.

McMorrow, Stacey, and Genevieve M. Kenney. 2021. "How Did the Affordable Care Act Medicaid Expansion Affect Coverage and Access to Care for Low-Income Parents Who Were Eligible for Medicaid before the Law Was Passed?" *INQUIRY: The Journal of Health Care Organization, Provision, and Financing* 58 (January): 004695802110502.

Meinhofer, Angélica, and Allison E. Witman. 2018. "The Role of Health Insurance on Treatment for Opioid Use Disorders: Evidence from the Affordable Care Act Medicaid Expansion." *Journal of Health Economics* 60 (July): 177–97.

Miller, Sarah, and Laura R. Wherry. 2017. "Health and Access to Care during the First 2 Years of the ACA Medicaid Expansions." *New England Journal of Medicine* 376 (10): 947–56.

Ndumele, Chima D., Anthony Lollo, Harlan M. Krumholz, Mark Schlesinger, and Jacob Wallace. 2023. "Long-Term Stability of Coverage among Michigan Medicaid Beneficiaries: A Cohort Study." *Annals of Internal Medicine* 176 (1): 22–28.

Ndumele, Chima D., William L. Schpero, and Amal N. Trivedi. 2018. "Medicaid Expansion and Health Plan Quality in Medicaid Managed Care." *Health Services Research* 53 (August): 2821–38.

Nguyen, Kevin H., and Benjamin D. Sommers. 2016. "Access and Quality of Care by Insurance Type for Low-Income Adults before the Affordable Care Act." *American Journal of Public Health* 106 (8): 1409–15.

Poturalski, H. 2015. "Ohio Has 'Critical' Shortage of Psychiatric Hospital Beds." *Journal-News,* March 1. https://www.journal-news.com/news/ohio-has-critical-shortage-psychiatric-hospital-beds/MJVEik3ZCkQP81oS60epWI.

Radloff, Lenore Sawyer. 1977. “The CES-D Scale: A Self-Report Depression Scale for Research in the General Population.” *Applied Psychological Measurement* 1 (3): 385–401.

RAND HRS Longitudinal File 2018 (V2). Produced by the RAND Center for the Study of Aging, with funding from the National Institute on Aging and the Social Security Administration. Santa Monica, CA (July 2022).

Simon, Kosali, Aparna Soni, and John Cawley. 2017. “The Impact of Health Insurance on Preventive Care and Health Behaviors: Evidence from the First Two Years of the ACA Medicaid Expansions: Impact of Health Insurance on Preventive Care and Health Behaviors.” *Journal of Policy Analysis and Management* 36 (2): 390–417.

Sommers, Benjamin D., and Richard Kronick. 2016. “Measuring Medicaid Physician Participation Rates and Implications for Policy.” *Journal of Health Politics, Policy and Law* 41 (2): 211–24.

Tavares, Jane, Marc A. Cohen, Susan Silberman, and Lauren Popham. 2023. “Medicaid Utilization among Middle-Age and Older Adults: A Health and Retirement Study Longitudinal Analysis (1998 to 2014).” *Journal of Aging and Social Policy* 35 (3): 343–59.

Wagner, Kathryn L. 2015. “Medicaid Expansions for the Working Age Disabled: Revisiting the Crowd-out of Private Health Insurance.” *Journal of Health Economics* 40 (March): 69–82.

APPENDIX: SUPPLEMENTAL MATERIALS

TABLE A.1. Good Mental Health

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Difference-in-differences coefficient	–0.05 (0.07)	–0.09 (0.07)	–0.17** (0.07)	–0.14** (0.06)	–0.15** (0.07)	–0.15** (0.07)	–0.20*** (0.07)	–0.13* (0.07)
Sample mean	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
Observations	874	874	874	874	874	874	874	874

Note: Model specifications: (1) state and year fixed effects only; (2) state and year fixed effects + average state unemployment rate (hereafter, unemployment), percentage of the population that is African American (hereafter, African American), percentage of the population that is Hispanic (hereafter, Hispanic), and percentage of the population > 64 years of age (hereafter, seniors); (3) state and year fixed effects + African American, Hispanic, seniors, state minimum wage (hereafter, minwage), TANF benefit for a family of three (hereafter, TANF), and EITC as a percentage of the federal poverty line (hereafter, EITC); (4) state and year fixed effects + minwage, TANF, EITC, and per capita income; (5) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, and per capita income; (6) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, and party affiliation of the chief executive (hereafter, gov); (7) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, the Medicaid income eligibility limit for parents as a proportion of the federal poverty line (hereafter, Medicaid parents), and the Medicaid–CHIP income eligibility limit for children as a proportion of the federal poverty line (hereafter, Medicaid children); (8) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, Medicaid parents, Medicaid children, the proportion of adults with diabetes, and state unionization rate. HRS sampling weights are applied in all regressions. CES-D = Center for Epidemiologic Studies Depression; CHIP = Children's Health Insurance Program; EITC = Earned Income Tax Credit; HRS = Health and Retirement Study; TANF = Temporary Assistance for Needy Families.

State-clustered standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.2. Poor Mental Health

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Difference-in-differences coefficient	0.02	0.07	0.14***	0.12*	0.16***	0.16***	0.19***	0.25***
	(0.06)	(0.05)	(0.04)	(0.06)	(0.04)	(0.04)	(0.04)	(0.06)
Sample mean	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Observations	874	874	874	874	874	874	874	874

Note: Model specifications: (1) state and year fixed effects only; (2) state and year fixed effects + average state unemployment rate (hereafter, unemployment), percentage of the population that is African American (hereafter, African American), percentage of the population that is Hispanic (hereafter, Hispanic), and percentage of the population > 64 years of age (hereafter, seniors); (3) state and year fixed effects + African American, Hispanic, seniors, state minimum wage (hereafter, minwage), TANF benefit for a family of three (hereafter, TANF), and EITC as a percentage of the federal poverty line (hereafter, EITC); (4) state and year fixed effects + minwage, TANF, EITC, and per capita income; (5) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, and per capita income; (6) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, and party affiliation of the chief executive (hereafter, gov); (7) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, the Medicaid income eligibility limit for parents as a proportion of the federal poverty line (hereafter, Medicaid parents), and the Medicaid–CHIP income eligibility limit for children as a proportion of the federal poverty line (hereafter, Medicaid children); (8) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, Medicaid parents, Medicaid children, the proportion of adults with diabetes, and state unionization rate. HRS sampling weights are applied in all regressions. CES-D = Center for Epidemiologic Studies Depression; CHIP = Children's Health Insurance Program; EITC = Earned Income Tax Credit; HRS = Health and Retirement Study; TANF = Temporary Assistance for Needy Families.

State-clustered standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.3. CES-D (Mental Health) Scale, Individual Components

	Felt Depressed	Everything an Effort	Sleep Was Restless	Felt Lonely	Felt Sad	Could Not Get Going	Was Happy	Enjoyed Life
Difference-in-differences coefficient	0.08	0.01	0.09	0.04	0.16**	−0.01	−0.07	−0.04
	(0.05)	(0.06)	(0.07)	(0.05)	(0.07)	(0.09)	(0.08)	(0.04)
Sample mean	0.36	0.56	0.57	0.42	0.47	0.43	0.69	0.79
Observations	874	866	872	872	866	868	870	870

Note: All models were estimated using our preferred controls: state and year fixed effects, average state unemployment rate, percentage of the population that is African American, percentage of the population that is Hispanic, and percentage of the population > 64 years of age. HRS sampling weights are applied in all regressions. CES-D = Center for Epidemiologic Studies Depression.

State-clustered standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.4. Full CES-D (Mental Health) Scale, Disabled Subgroup

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Difference-in differences coefficient	–0.61 (0.54)	–0.80 (0.51)	–1.49*** (0.50)	–1.45*** (0.48)	–1.33*** (0.46)	–1.34*** (0.44)	–1.38*** (0.43)	–1.50** (0.56)
Sample mean	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
Observations	398	398	398	398	398	398	398	398

Note: Model specifications: (1) state and year fixed effects only; (2) state and year fixed effects + average state unemployment rate (hereafter, unemployment), percentage of the population that is African American (hereafter, African American), percentage of the population that is Hispanic (hereafter, Hispanic), and percentage of the population > 64 years of age (hereafter, seniors); (3) state and year fixed effects + African American, Hispanic, seniors, state minimum wage (hereafter, minwage), TANF benefit for a family of three (hereafter, TANF), and EITC as a percentage of the federal poverty line (hereafter, EITC); (4) state and year fixed effects + minwage, TANF, EITC, and per capita income; (5) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, and per capita income; (6) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, and party affiliation of the chief executive (hereafter, gov); (7) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, the Medicaid income eligibility limit for parents as a proportion of the federal poverty line (hereafter, Medicaid parents), and the Medicaid–CHIP income eligibility limit for children as a proportion of the federal poverty line (hereafter, Medicaid children); (8) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, Medicaid parents, Medicaid children, the proportion of adults with diabetes, and state unionization rate. CES-D = Center for Epidemiologic Studies Depression; CHIP = Children's Health Insurance Program; EITC = Earned Income Tax Credit; HRS = Health and Retirement Study; TANF = Temporary Assistance for Needy Families.

HRS sampling weights are applied in all regressions.

The disabled subgroup consists of respondents who reported receiving Social Security Disability Insurance income at any point during our sample period.

State-clustered standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.5. General Health, Top of Scale

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Difference-in-differences coefficient	–0.01 (0.03)	–0.02 (0.05)	–0.03 (0.05)	–0.01 (0.07)	–0.03 (0.06)	–0.02 (0.06)	0.00 (0.05)	0.03 (0.04)
Sample mean	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Observations	874	874	874	874	874	874	874	874

Note: Model specifications: (1) state and year fixed effects only; (2) state and year fixed effects + average state unemployment rate (hereafter, unemployment), percentage of the population that is African American (hereafter, African American), percentage of the population that is Hispanic (hereafter, Hispanic), and percentage of the population > 64 years of age (hereafter, seniors); (3) state and year fixed effects + African American, Hispanic, seniors, state minimum wage (hereafter, minwage), TANF benefit for a family of three (hereafter, TANF), and EITC as a percentage of the federal poverty line (hereafter, EITC); (4) state and year fixed effects + minwage, TANF, EITC, and per capita income; (5) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, and per capita income; (6) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, and party affiliation of the chief executive (hereafter, gov); (7) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, the Medicaid income eligibility limit for parents as a proportion of the federal poverty line (hereafter, Medicaid parents), and the Medicaid–CHIP income eligibility limit for children as a proportion of the federal poverty line (hereafter, Medicaid children); (8) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, Medicaid parents, Medicaid children, the proportion of adults with diabetes, and state unionization rate. HRS sampling weights are applied in all regressions. CHIP = Children's Health Insurance Program; EITC = Earned Income Tax Credit; HRS = Health and Retirement Study; TANF = Temporary Assistance for Needy Families.

State-clustered standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.6. General Health, Bottom of Scale

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Difference-in-differences coefficient	–0.01 (0.08)	–0.03 (0.09)	–0.05 (0.11)	–0.07 (0.12)	–0.07 (0.11)	–0.07 (0.11)	–0.12 (0.11)	–0.19* (0.11)
Sample mean	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Observations	874	874	874	874	874	874	874	874

Note: Model specifications: (1) state and year fixed effects only; (2) state and year fixed effects + average state unemployment rate (hereafter, unemployment), percentage of the population that is African American (hereafter, African American), percentage of the population that is Hispanic (hereafter, Hispanic), and percentage of the population > 64 years of age (hereafter, seniors); (3) state and year fixed effects + African American, Hispanic, seniors, state minimum wage (hereafter, minwage), TANF benefit for a family of three (hereafter, TANF), and EITC as a percentage of the federal poverty line (hereafter, EITC); (4) state and year fixed effects + minwage, TANF, EITC, and per capita income; (5) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, and per capita income; (6) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, and party affiliation of the chief executive (hereafter, gov); (7) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, the Medicaid income eligibility limit for parents as a proportion of federal poverty line (hereafter, Medicaid parents), and the Medicaid–CHIP income eligibility limit for children as a proportion of the federal poverty line (hereafter, Medicaid children); (8) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, Medicaid parents, Medicaid children, the proportion of adults with diabetes, and state unionization rate. HRS sampling weights are applied in all regressions. CHIP = Children's Health Insurance Program; EITC = Earned Income Tax Credit; HRS = Health and Retirement Study; TANF = Temporary Assistance for Needy Families.

State-clustered standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

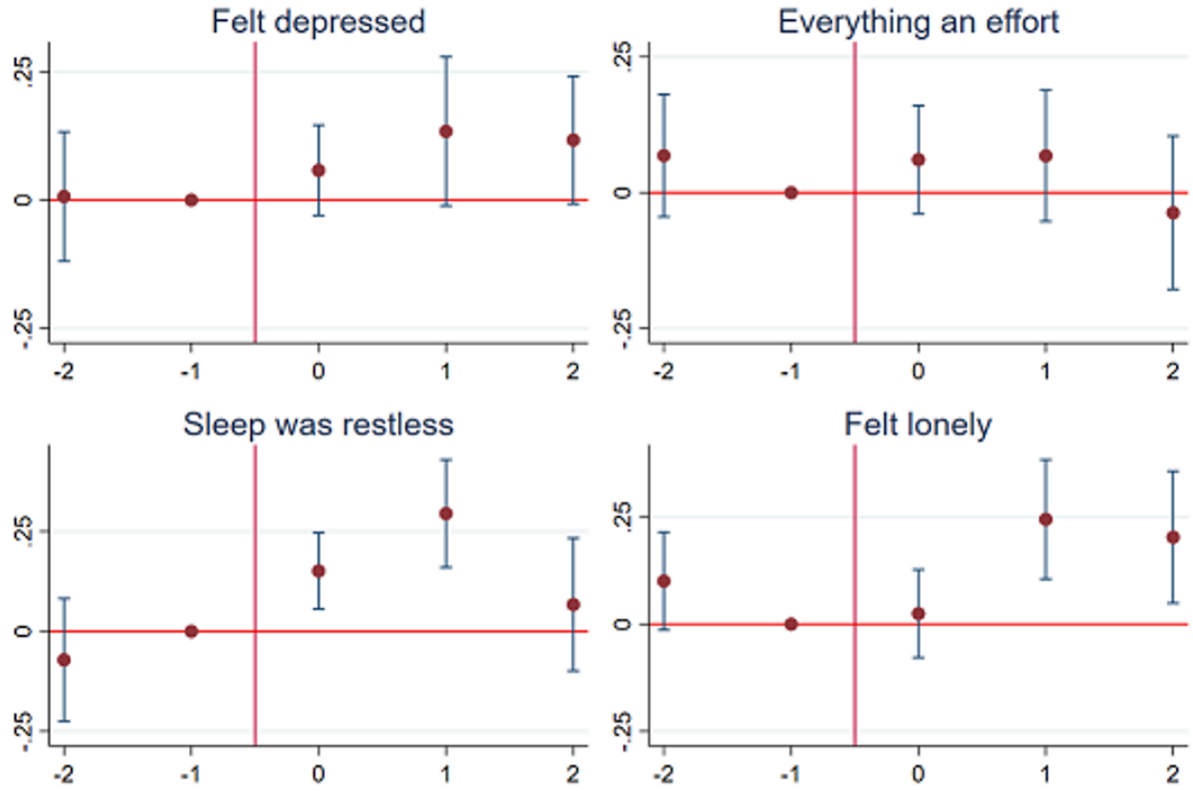
TABLE A.7. Original Results versus Bonferroni-Adjusted Results

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mental Health	Statistical significance in original results	Not significant	*	***	***	***	***	***	***
	Statistical significance in Bonferroni-adjusted results	Not significant	Not significant	**	**	**	**	***	***
General Health	Statistical significance in original results	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant
	Statistical significance in Bonferroni-adjusted results	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant

Note: Model specifications: (1) state and year fixed effects only; (2) state and year fixed effects + average state unemployment rate (hereafter, unemployment), percentage of the population that is African American (hereafter, African American), percentage of the population that is Hispanic (hereafter, Hispanic), and percentage of the population > 64 years of age (hereafter, seniors); (3) state and year fixed effects + African American, Hispanic, seniors, state minimum wage (hereafter, minwage), TANF benefit for a family of three (hereafter, TANF), and EITC as a percentage of the federal poverty line (hereafter, EITC); (4) state and year fixed effects + minwage, TANF, EITC, and per capita income; (5) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, and per capita income; (6) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, and party affiliation of the chief executive (hereafter, gov); (7) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, the Medicaid income eligibility limit for parents as a proportion of the federal poverty line (hereafter, Medicaid parents), and the Medicaid–CHIP income eligibility limit for children as a proportion of the federal poverty line (hereafter, Medicaid children); (8) state and year fixed effects + African American, Hispanic, seniors, minwage, TANF, EITC, per capita income, gov, Medicaid parents, Medicaid children, the proportion of adults with diabetes, and state unionization rate. CHIP = Children's Health Insurance Program; EITC = Earned Income Tax Credit; HRS = Health and Retirement Study; TANF = Temporary Assistance for Needy Families.

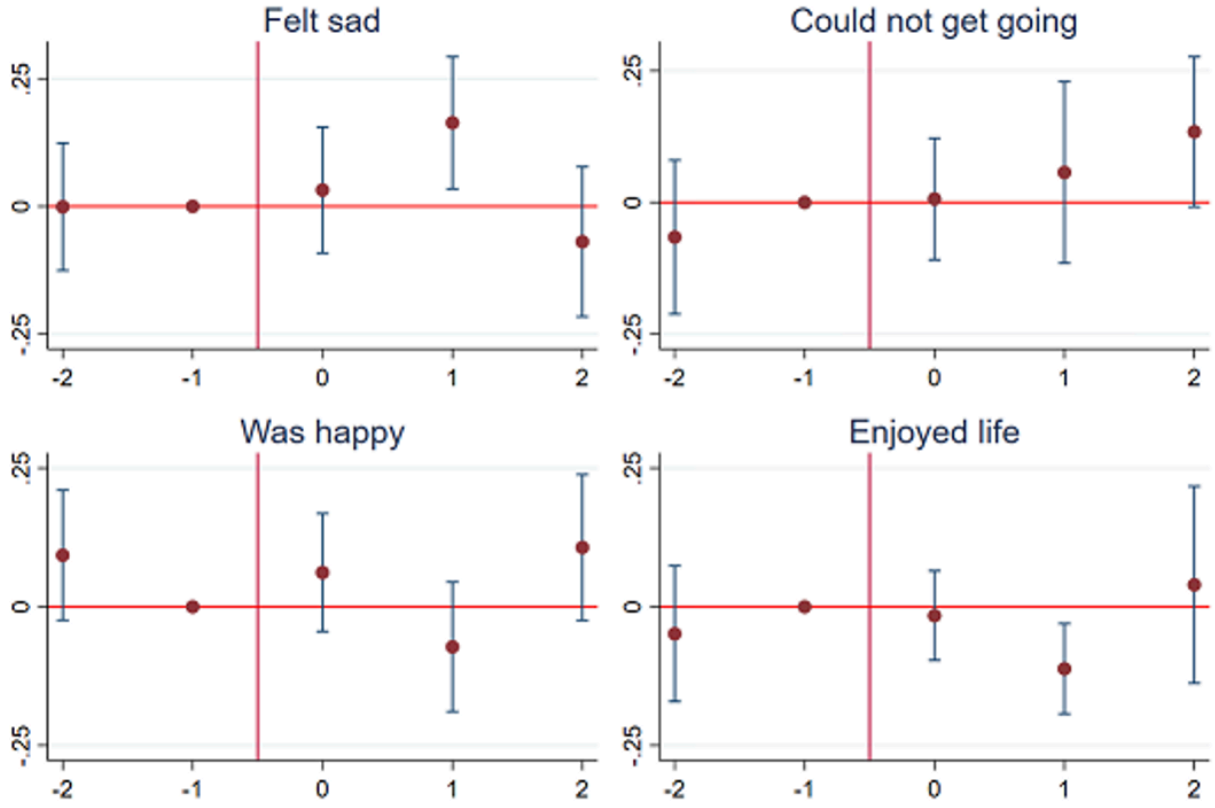
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

FIGURE A.1. CES-D (Mental Health) Scale, Individual Components



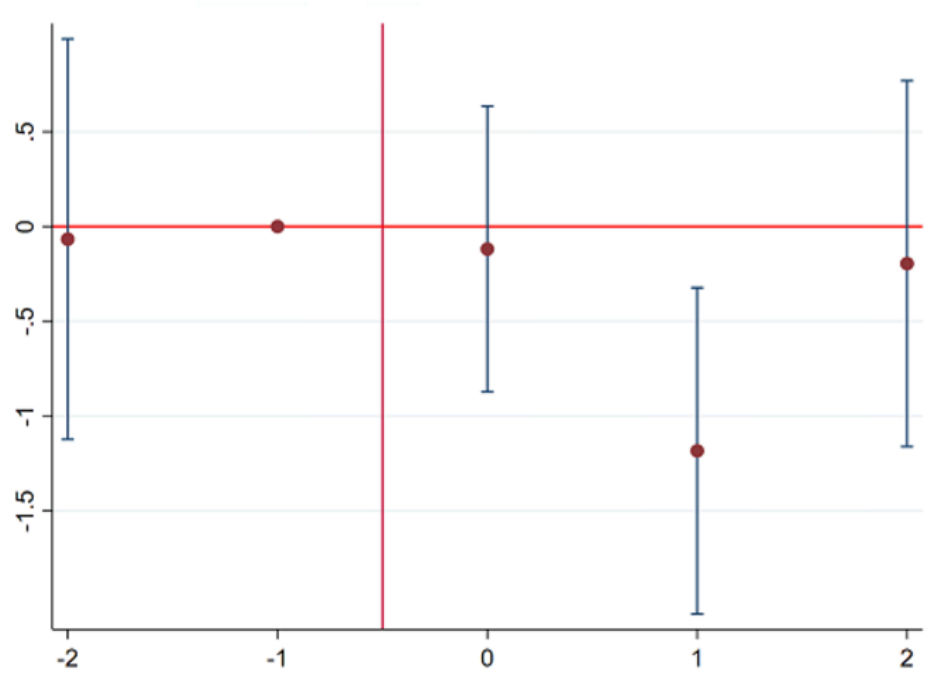
Note: CES-D = Center for Epidemiologic Studies Depression.

FIGURE A.2. CES-D (Mental Health) Scale, Individual Components



Note: CES-D = Center for Epidemiologic Studies Depression.

FIGURE A.3. Full CES-D (Mental Health) Scale, Disabled Subgroup



Note: CES-D = Center for Epidemiologic Studies Depression.

Odd-Numbered Years Exclusion

As with our difference-in-differences models above, our event-study models are run using only survey-responses from even-numbered years (2010, 2012, 2014, 2016, and 2018). We use this approach because the 2010 wave of the HRS enrolled a new cohort, which meant an unusually large share of interviews took place in 2011, which in turn changed the reference period of the interviews. While we have no reason to believe it would be related to Medicaid expansions, we did observe a statistically significant imbalance across expansion and non-expansion states in the proportion of respondents surveyed in odd years. Every six years, the HRS enrolls a new cohort of respondents, a process that includes more in-person interviews, which tends to result in more interviews being conducted the following (odd) year and thus changes the reference period. Although this is usually a small proportion of the interviews—somewhere between 3 and 10 percent of responses during wave 10, which started in 2010 (and are thus shown as –2 in event time)—roughly one-third of the interviews took place in 2011. During that wave, the fraction of odd-year interviews was higher in expansion states, which biased the –2 event time coefficient, though it is important to note it did not influence the waves (11 and 12) used in our main estimations.