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Medicaid Expansion and the Mental Health of Spousal Caregivers

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ABSTRACT

Medicaid Expansion and the Mental Health of Spousal Caregivers*

Health insurance expansions can exert wellbeing effects on individuals who provide informal care to their loved ones, reducing their experience of depression. This study exploits evidence from the Affordable Care Act's (ACA) Medicaid expansion to *examine the effects on the mental wellbeing of informal caregivers*. Drawing on an event study and a Difference-in-Differences (DID) design we investigate the policy impact of ACA Medicaid expansion using longitudinal evidence (from the Health and Retirement Study, HRS) for 2010 to 2018 for low-income individuals aged 64 or below. We find that *ACA's Medicaid expansion reduced depressive symptoms among caregivers*, and specifically we estimate that exposure to ACA Medicaid expansion gives rise to a 0.38 points (equivalent to 4-5%) reduction in the CESD score (a negative scale in which the lowest scale indicates the best mental wellbeing). We also find that *ACA Medicaid* causes a spillover effect at the household level, improving the well-being of the spouse care recipient. Our results are robust to various specifications, and we identify several potential driving mechanisms for the findings: reductions in out-of-pocket expenses and labor supply and, as expected, increased Medicaid uptake. The evidence from falsification tests confirms that the estimated effects are purely due to ACA's Medicaid expansion and no other phenomena.

JEL Classification:	I18
Keywords:	insurance expansion, Medicaid, mental wellbeing, ACA, spousal mental health, informal care

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1. Introduction

In most western countries, care needs of old age individuals with disability are sustained by the duties performed by family caregivers. The informal supply of care by family caregivers reduces the potential of individuals going with unmet needs or being supported by government (Adelman et al, 2014). However, the reliance on an informal system of long-term care comes at the cost of significant wellbeing sacrifices by caregivers. Caregiving spouses exhibit a unique emotional and financial connection to disabled individuals, and for them providing care might results from a strong intergenerational social norm, and hence might not feel optional. The latter calls for potential government policies to protect such caregivers to continue with their caregiving duties. Informal caregiving is only sustainable if caregivers are supported, as caregiving limits the independence of caregivers, as well as their ability to maintain dual roles as caregivers and workers. Reductions in caregivers labor supply (Van Houtven *et al* 2013; Chairi *et al* 2015) such as temporary or permanent labor market exit (including early retirement) are common adjustments to cope with caregiving duties. Work reductions also can take place gradually through reducing hours or foregoing promotions, which also reduces caregiver income and financial wellbeing. Impacts of caregiving on work and economic security are especially exacerbated when health insurance benefits are tied to employment. Examining this question will be purpose of this paper.

The wellbeing of caregivers can improve in countries where individuals with limited income generating sources are entitled to health insurance, as the United States (US). In the U.S., aside from low-income individuals who can qualify for public insurance throughout their working years (Medicaid), historically health insurance benefits have come from employment until citizens qualify for public governmental insurance (Medicare) at age 65. Given that health insurance

typically is connected to employment decisions, limited employment opportunities can increase the prospect of not having any form of health insurance, thereby increasing exposure to the health and financial risks of ill health (including mental health). Limited health insurance can exert important detrimental consequences to caregiver wellbeing more generally, as it impacts the ability to engage in preventative activities (e.g., flu shots, preventive care, and screenings) and increases the stress associated with their daily duties. If uninsured caregivers delay or forgo needed health care, it may give rise to depressive episodes[1]. Thus, understanding the experiences and mental health wellbeing of low-income caregiver spouses is critical, as there are not ready direct programs and tools to ameliorate consequent negative economic and health consequences of caregiving in the United States.

Health insurance reform in the United States, and more specifically associated Medicaid expansions in 2010 (hereafter called ACA-Medicaid) allows for testing the effect of Medicaid on caregiver's wellbeing. Medicaid is the historical public insurance program that serves low-income residents and ACA-Medicaid expansion occurred through increasing the income limits for eligibility, generally to 138% the federal poverty level in states that expanded. In this way the Affordable Care Act (ACA) expanded health coverage for residents, yet the Supreme Court decision of 2012 made such expansion optional, allowing states to decide whether to continue with the Medicaid expansion. Hence, it is possible to exploit state variation in ACA-Medicaid expansion on the wellbeing of spousal caregivers.

Medicaid expansion may affect informal family caregivers who are the backbone of the long term supports and services infrastructure. 19% of Americans are providing unpaid care to an

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[1] Specifically, given that caregivers experience burden, stress and strain at higher rates compared to non-caregivers, lack of health insurance could prevent treatment of consequent mental health conditions such as anxiety and depression.

adult with health or functional needs and 61% of family caregivers are employed (AARP, 2020). Family caregivers provide substantial cost savings to Medicare and Medicaid, and very limited research has examined the effect of insurance expansions on spousal caregiver's wellbeing. Only one papers has examined an effect, but it relies on a proxy measures of caregivers' mental health and focuses on quality-of-life measures (Torres et al, 2020) rather than depressive symptoms.

This paper draws on longitudinal data from the Health and Retirement Survey (HRS) including state geographic identifiers to examine the effect of exposure to Medicaid expansion on caregiver's wellbeing, and especially the presence of depressive symptoms. We document evidence that suggests that Medicaid expansion reduces depressive symptoms, increases happiness, and that this effect primarily is the case among low wealth individuals who are most likely to gain insurance through the expansion. There is no spillover effect among those who are not eligible for the expanded eligibility, e.g., those 65 and above who are on Medicare. The effect size suggests a reduction of 4-5% in depressive symptoms score (0.38 when measured on the scale 0-8).

The rest of the paper is organized as follows. The next section reports the related literature that overall summarizes the effects expanding caregiver's health insurance and other benefits on proxies for caregiver's wellbeing. Section three describes the data employed and the empirical strategy followed in this paper. Section four reports the results, fifth section extends the paper, and a final section concludes.

2. Related Literature

This paper contributes to two literatures debate, namely the wellbeing effects for caregiving and the effects of Medicaid expansion.

Caregivers' mental health. Coe and Van Houtven (2009) estimate that providing care for a sick mother increases the number of depressive symptoms reported by 47% (compared to caregivers whose mother died). Other studies suggest an association with an increased use of antidepressants, tranquilizers, painkillers, and gastrointestinal agents (Schmitz and Stroka, 2013). One paper that examined correlations found that the caregiver's number of prescription drugs increases (including SSRIs) among intensive caregivers compared to less intensive caregivers of persons with dementia (Van Houtven, et al, 2005). Thus, there may be differential effects on mental health based on intensity of caregiving provided. Smith et al. (2019) provide preliminary evidence that the PCAFC program reduced the perception of financial burden and controlled the depressive symptoms among treatment group participants. Finally, caregiver supports could spill over to care recipient wellbeing. Van Houtven et al. (2019) find that family caregiver enrollment in the Program of Comprehensive Assistance for Family Caregivers (PCAFC), a program for Veteran soldiers' families, increased Veteran use of mental health care.

Another way to improve the wellbeing of caregiver is by making sure that health care needs are met by providing health insurance to caregivers. Given that Medicaid expansion expanded health insurance among eligible individuals after the ACA, one could expect an effect on wellbeing. However, health insurance might be only one of the numerous barriers to caregiver access to health care, as caregivers are known to have trouble accessing care for themselves or delaying their own care compared to non-caregivers (Slaboda et al, 2021). Hence, it is an empirical question whether insurance expansion did manage to improve wellbeing.

Medicaid expansion. Evidence so far has documented that Medicaid expansion reduces preventable hospitalizations (Wen et al., 2019), increases some indicators of quality care and outcomes (Sommers et al., 2017), lowers hospital readmission rates and improves financial wellbeing (Courtemanche et al., 2017; Han et al., 2015) including a reduction in eviction rates (Allen et al., 2019). Positive effects may result from several mechanisms such higher disposable income (e.g., by reducing out of pocket expenses), better access to health care (to address acute and chronic conditions that destabilize one's life in other domains such as work) and lower costs in the event of needing care (averting catastrophic costs). Similarly, Medicaid expansion improved the access to formal paid long-term care (Van Houtven et al, 2020). However, the effects of ACA-Medicaid expansion are specifically important among a population that otherwise has limited access to insurance because they perform caregiving duties – low-income caregiving spouses. Understanding the effects of ACA-Medicaid expansion on caregiver mental health among those most likely to gain insurance through the policy change, is the objective of this paper.

3. The Data

This study draws on data from the Health and Retirement Survey (HRS) data from 2010 to 2018 to capture the effect of ACA Medicaid Expansion, and avoid the data reflecting the effect of the Great Recession. The HRS is a nationally representative publicly available longitudinal data for people 50 years or older. It is a biannual survey that interviews the respondents who were born in 1931-1941, 1942-1947 (War baby sample), and 1924-1930 (the children of the depression age-CODA) sample (National Institute on Aging and The Social Security Administration 2018). It collects the comprehensive information about the important aspects of elderly life. Given that our analysis is focused on Medicaid expansion for individuals up to the age 65, we restrict our sample to age 64 and below. In addition, we remove such respondents who are disabled and are enrolled

in Medicare program, as they are not eligible for ACA-Medicaid expansion. A sample of caregivers, who provided care to their partners, obtained from "Functional Limitations and Helpers - Respondents" section of HRS Core file. These respondents are merged with the RAND HRS Longitudinal file to obtain the comprehensive information, including mental health, wellbeing, and health behaviors, for the selected respondents who cared for their partners. Further, we obtain access to the restricted geographical identifiers file that include information about individuals' state of residence and combine our main sample with this restricted file. The geographical identification file maps an individual with her state of residence. The final sample of this study contains 2748 observations for 1147 individuals.

4. Empirical Strategy

Our empirical strategy relies on an event study estimation, followed by a generalized difference-in-differences (DID) estimation to identify the causal impact of ACA's Medicaid expansion on the mental wellbeing of spousal caregivers.

Event Study Design. Equation 1 represents our specification for a non-parametric event study. As ACA's Medicaid expansion was brought in effect in the year 2014, most states expanded their coverage in 2014 while a few of the remaining did so in 2016. We define the event (r=0) for the year 2014 that is when the expansion of Medicaid began. The biannual nature of HRS survey makes us assign events once in every two years. We define indicator variables representing events relative to the event of Medicaid expansion. The following model of non-parametric event study treats year 2012 (r=-1) as a baseline category.

$$Y_{it} = \beta X_{it} + \Lambda_s + \varphi_{-2} + \sum_{r=0}^{2} \varphi_r + \left(\gamma_{-2} + \sum_{r=0}^{2} \gamma_r\right) * ACA\_ME + \mu_i + \epsilon_{it} \quad (1)$$

Where Y_{it} corresponds to the outcome variable i.e., CESD score on Mental health[2]. The Λ_s and μ_i represent state as well as individual level fixed effects. The γ_r indicates coefficients on leads and lags on Affordable Care Act Medicaid Expansion states (ACA_ME) relative to omitted baseline category, γ_{-1}. The X_{it} represents the control variables included in the model, whereas φ_r indicates coefficients on leads and lags for no-ACA Medicaid expansion states relative to the omitted category of φ_{-1}. One of the major advantages of the event study is that it allows us to identify the significant outcome pattern relative to the adoption of Medicaid reform of 2014. For the event study to be credible, we need to satisfy the parallel trend aka mean-independence of the timing of the reform and no-anticipation of treatment assumptions.

Difference-in-Differences. To identify the impact of ACA Medicaid expansion on the mental wellbeing of spousal caregivers, we use a difference-in-differences design, which is a quasi-experimental approach widely used for causal identification (Angrist and Krueger 1999; Athey and Imbens 2006; Bertrand, Duflo, and Mullainathan 2004; Ai and Norton 2003; Puhani 2012; Greene and Liu 2020; Lechner, Rodriguez-Planas, and Fernández Kranz 2016). We divide the data into two groups, ACA Medicaid states and No-ACA Medicaid states, based on the Medicaid expansion reform took place in 2014 onward as a part of affordable care act. Our model for the generalized difference-in-differences is depicted in Equation 2.

$$Y_{ist} = \beta_0 + \rho X_{ist} + \sigma_s + \vartheta_t + \beta_1 * ACA\_ME + \beta_2 * Post + \beta_3 * ACA\_ME * Post + \theta_i + \epsilon_{ist} \quad (2)$$

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[2] CESD stands The Center for Epidemiologic Studies Depression (CESD) scale. CESD Components: Negative Components:- Depression, everything is an effort, sleep is restless, felt alone, felt sad, and could not get going. Positive Components:- Felt Happy and Enjoyed life.

Where Y_{ist} is any outcome related to Mental health for individual (*i*) in state (*s*) at time (*t*). ACA_ME denotes the states that expanded Medicaid coverage as per the reform suggested under the Affordable Care Act, whereas Post refers to time-period when the reform began in 2014 onward. We are interested in the coefficient, β*3*, as it estimates the causal impact of ACA's Medicaid expansion on the mental wellbeing of spousal caregivers living in states that expanded coverage post reform. The σ_s is the state specific controls that eliminates time-invariant differences among various states, whereas ϑ_t accounts for variation in outcomes across time. The X_{ist} incorporates the set of individual and household level controls into the model. Using a Fixed Effects Models, Equation 2 removes the person specific time-constant unobserved heterogeneity (θ_i) that can be a potential source of endogeneity.

5. Results

Descriptive Evidence

The descriptive statistics is shown in Table 1 along with sample size. The mean CESD score of mental health is 2.48. The CESD score is a sum of eight components[3], which ranges from 0 to 8 and the lowest CESD score indicates the best mental health. We identify four components of CESD score (felt sad, felt alone, felt happy, and felt depressed) to decompose any response to ACA Medicaid expansion. Slightly more than three quarters of sample individuals felt happy, whereas proportions of individuals feeling sad, alone, and depressed are 32%, 26%, and 26%, respectively. The average individual has a family income $17,588 and is 56 years old although the age range of the caregivers examines in the study range from 27 to 64. Approximately, 95% of individuals has

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[3] Source: HRS RAND Longitudinal File, "RwCESD is the sum of RwDEPRES, RwEFFORT, RwSLEEPR, (1-RwWHAPPY), RwFLONE, RwFSAD, RwGOING, and (1-RwENLIFE). Thus, the higher the score, the more negative the Respondent's feelings in the past week. RwCESDM counts the number of missing values among the individual measures."

at least one child. In addition, we show descriptive statistics for other individual level indicators such as health, retirement status, and other demographic variables.

The pre- and post- ACA Medicaid trends for Medicaid uptake, CESD score, and happiness are shown in the figure 1 a, b, & c. The trends for Medicaid uptake of individuals living in ACA Medicaid states compared to non-expansion states clearly indicate that ACA Medicaid increased the coverage among states who expanded Medicaid. However, the trends of CESD score are slightly varied as only half of the components of CESD score were responsive to ACA Medicaid. Thus, a composite score does not represent the expected trends. However, the trend for happiness provides evidence of the existence of parallel trends before the adoption of ACA Medicaid.

Table 1 Descriptive Statistics

	Individual Level Characteristics of the Sample				
	N	Mean	Std Dev	Min	Max
CESD Score	2,489	2.48	2.44	0	8
Felt Sad	2,488	0.32	0.465	0	1
Felt Alone	2,489	0.26	0.44	0	1
Felt Happy	2,484	0.77	0.423	0	1
Felt Depressed	2,487	0.26	0.44	0	1
ACA Medicaid	2,489	0.29	0.45	0	1
Age	2,489	56.2	6.1	27	64
Medicaid	2,467	0.30	0.46	0	1
Male	2,489	0.42	0.49	0	1
Family Income	2,489	17588	9827	0	35200
College/More	2,489	0.28	0.45	0	1
Have Children	2,489	0.95	0.22	0	1
White American	2,489	0.512	0.5	0	1
Retired	2,489	0.49	0.5	0	1
Fair/Poor Health	2,489	0.51	0.5	0	1

Note: this table provided the descriptive statistics of the main variables we employ in the analysis.

Figure 1: Trends for a) Medicaid uptake, b) CESD Score of Mental Health, and c) the Happiness index for 2010-2018.

(a)
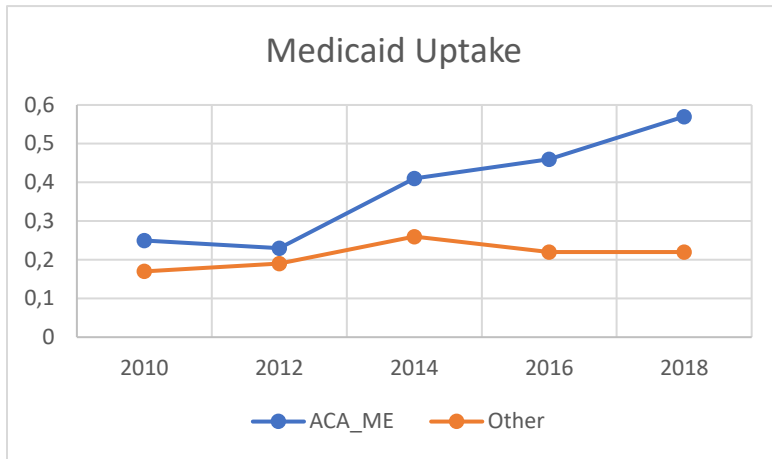
(b)

(c)
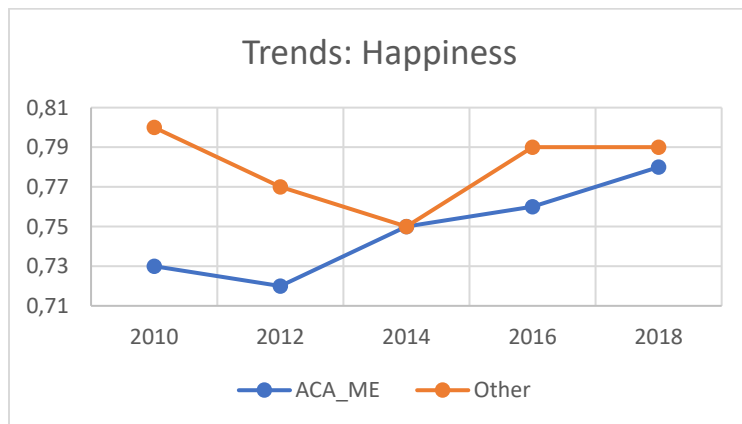
Note: time trends of individuals exposed and not exposed to Medicaid expansion and 2010-2018.

Event Study Design. After running the model specified in Equation 1, we then subsequently plot the estimated coefficients of the non-parametric event study regression as depicted in Figure 2. Figure 2 (a-d) displays the event study plots for CESD score, happiness,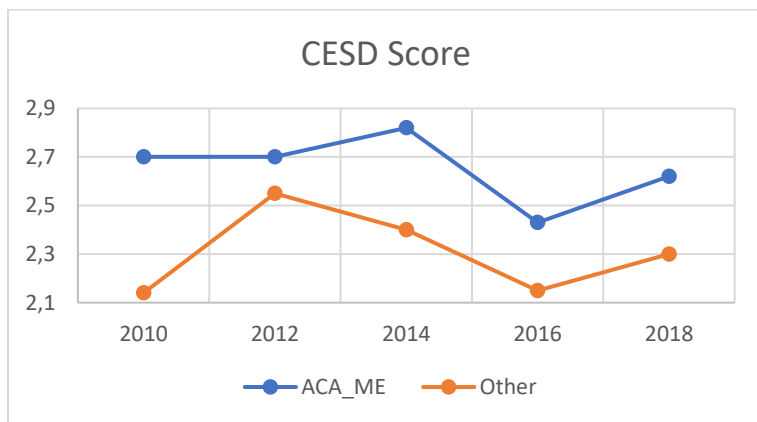 sadness, and feeling depressed, respectively. We observe that ACA Medicaid expansion lowered the CESD score, when the event occurred at t=0, for spousal caregivers living in expansion states compared to their counterparts in non-expansion states. Similarly, ACA reform increased the feeling of happiness and decreased the likelihood of feeling sad and depressed, with respect to year 2012 (or t=-1). Although we observe parallel trends for happiness and feeling depressed, we do not obtain the perfect trends for CESD score and feeling of sadness. This might be because CESD score consists of eight different components and not all the components are affected by ACA Medicaid (ref. Table 3). Therefore, we also run the event study analysis for Mechanisms[4] and find that labor market outcomes are one of the reasons driving the effect which is quite evident in Figure 3 (a-c). We can also observe that the parallel trend assumption is not violated in Figure 3 (a-c). These findings strengthen our results from Figure 2 (a-d).

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[4] Please refer to the Figure A1 of Appendix for the event study trends for another set of mechanisms i.e., Out-of-pocket expenses (extensive margins for OOP, $100 or More OOP, and $500 or more OOP).

Figure 2. Event study design of ACA Medicaid Expansion exposure on CESD Score - and three score components

Note: This figure depicts the results of the events study design of the ACA Medicaid expansion on mental health (CESD) and three of its components for the period 2010-2018.

Figure 3. Event study design of ACA Medicaid Expansion exposure on Potential Mechanisms (Labor participation)

a)

b)

(c)
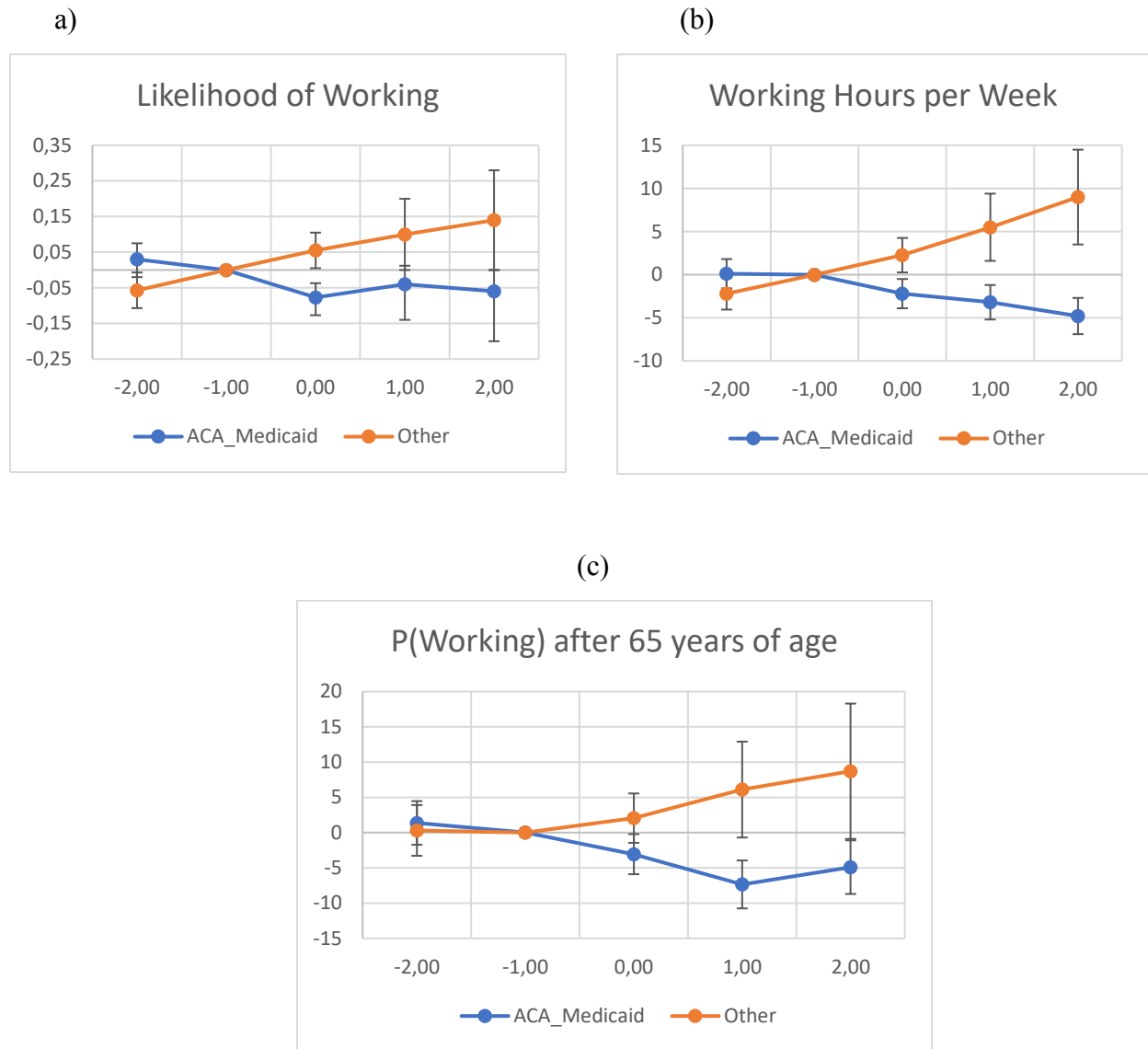
Baseline Estimates

Next, Table 2 reports the baseline results. Column 1 of Table 2 reports the baseline model without any controls, state, and year fixed effects, but incorporates the person level fixed effects into the model. All the models specified in Table 2 incorporate person level fixed effects into the

model. Columns 2 & 3 indicate the estimates of the impact of Medicaid expansion on CESD

mental wellbeing score after the inclusion of year and state level fixed effects, respectively, into

the models maintaining that ACA Medicaid expansion did improve the mental wellbeing of

individuals living in Medicaid expansion states when compared with other states. Finally, we run

the fully specified model and reports its results in Column 4 of Table 2 after the inclusion of set

of controls into the model along with year and state fixed effects. We observe a 0.376 points

(average 4-5%) reduction in the CESD score among the states adopting Medicaid expansion,

compared to the remaining states (a higher CESD score represents a worsening mental health).

We find that results are significant at 1% level and suggests that ACA Medicaid expansion is

associated with improvement in mental wellbeing.

Table 2 Baseline Linear Estimates of the effect of ACA Medicaid Expansion on Mental Health

	Dependent Variable			
	CESD - Mental Health Score			
	(1)	(2)	(3)	(4)
ACA_Medicaid	-0.37***	-0.36**	-0.393**	-0.376**
	(0.12)	(0.168)	(0.18)	(0.176)
Year Fixed Effects	NO	YES	YES	YES
State Fixed Effects	NO	NO	YES	YES
Control Variables	NO	NO	NO	YES
Individual Fixed Effects	YES	YES	YES	YES
N	2,489	2,489	2,489	2,489

*Significant at 10%; ** significant at 5%; *** significant at 1%, robust standard error clustered at the panel level.

Note: The estimates are obtained using the sample from Health and Retirement Study, Waves 10-14 (2010-2018), and Age<65. Each coefficient indicates OLS estimates of equation (2). The variable ACA_Medicaid is a treatment variable, which is a binary indicator for whether Medicaid expansion occurred in the state at a given year. We estimate the impact of ACA Med Exp on CESD score of Mental Wellbeing in which Column (1) includes no variables other than treatment or ACA Med Exp. Column (2) introduces years fixed effects into the model. Column (3) adds states fixed effects. Column (4) includes control variables namely age, gender, age^2, income, health status, retirement status, race, education, and children. All the models include individual fixed effects.

Table 3 Linear Estimates of the effect of ACA Medicaid Expansion on CESD Score Components

	CESD Components							
	EnjoyLife	CantGetGoing	FeltSad	FeltAlone	Happy	SleepRestricted	Evrytng_Effort	FeltDepressed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ACA_Medicaid	0.056*	-0.0325	-0.075**	-0.07**	0.0873**	0.0123	0.00324	-0.0822**
	(0.0294)	(0.0427)	(0.038)	(0.0346)	(0.0355)	(0.0441)	(0.039)	(0.0375)
Year + Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Individual Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
N	2,486	2,481	2,488	2,489	2,484	2,488	2,481	2,487

*significant at 10%; ** significant at 5%; *** significant at 1%, robust standard error clustered at the panel level.

Note: The estimates are obtained using the sample from Health and Retirement Study, Waves 10-14 (2010-2018) and Age<65. Each coefficient indicates OLS estimates of equation (2). The variable ACA_Medicaid is a treatment variable, which is a binary indicator for whether ACA Medicaid expansion occurred in the state at a given year. We estimate the impact of ACA Medicaid on each component of CESD score of Mental Wellbeing, from Column (1)-(8). All models include state, year, and person level fixed effects, along with control variables namely age, gender, age^2, income, health status, retirement status, race, education, and children.

The CESD score of Mental Health is composed of eight different components that forms this score. We regress these eight components on treatment variable, controls, state, and year dummies in a Fixed effects model. Table 3 represents the results corresponds to these components. We observe that not all the components of CESD score are significant or affected by ACA Medicaid. We find that ACA Medicaid reduced the feelings of sadness, loneliness, and depression, and consistently it *increased the feeling of happiness and enjoyment of life*. Other components' estimates found to be not significantly associated with the ACA's Medicaid. These decomposed results help us identify which aspects of mental health are affected due to Medicaid expansion. Most importantly, we report that the reform brought happiness in the lives of caregivers who otherwise did not have covered access to Medicaid services.

Placebo Tests

Next, we run a set of falsification tests to confirm that an improvement in mental wellbeing of caregivers is indeed caused only by ACA reform and it affected informal spousal caregivers and a specific age group of such caregivers, i.e., not all spousal caregivers. In a first instance, we separate a HRS sample for individuals up to age 64, who became eligible for ACA Medicaid but were different than spousal caregivers. There is a mixed evidence that ACA reform affected the mental wellbeing of eligible low-income adults. However, most studies find no significant impact of ACA Medicaid on mental health of eligible individuals (Cowen and Hao 2020; Mclnerney et al. 2020), whereas others find that access to Medicaid can improve self-reported mental health (Finkelstein et al. 2008) and fewer days spent in poorer mental health (Griffin and Bor 2020). Part I of Table 4 reports that ACA Medicaid had no impact on the CESD[5] score of Mental health for non-caregivers or individuals other than spousal caregivers. Secondly, we assume that Medicaid expansion reform began in 2010 instead of 2014 and check whether we find our falsification test to be true. Estimates from Part II of Table 4 indicate that Medicaid reform began in 2010 had no significant impact on the mental health of spousal caregivers. This finding confirms that the effect on mental health of caregivers occurred only after 2014, when the passage of law allowed states to expand Medicaid coverage. At last, we carry out analysis using our fully specified model on individual aged 65 and above and check whether our main results are valid. Part III of Table 4 estimates that ACA's Medicaid expansion had no significant impact on the mental wellbeing of people aged 65 and above as well as living in states that adopted Medicaid expansion, relative to remaining states. This is an important finding and

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[5] Please refer to the Appendix for the impact of ACA Medicaid on individual components of CESD score for non-caregivers. Almost all the components are found to be insignificant for non-caregivers.

allows us to conclude that the reform affected the lives of only those who were eligible for

extended coverage of Medicaid, but did not have spillovers such as through the woodwork effect.

Table 4 Placebo Tests - Linear Estimates of the effect of ACA Medicaid Expansion on Mental Wellbeing among *Non-caregivers* as well as *Non - treated individuals*

	CESD - Mental Health Score
I) Non-caregivers Sample	(1)
ACA_Medicaid	-0.01
	(0.08)
N	13,275
II) Assuming ACA ME in 2010	(2)
ACA_ Medicaid	-0.362
	(0.49)
N	2,489
III) Age 65 and Above	(3)
ACA_ Medicaid	0.05
	(0.114)
N	3,605
State + Year Fixed Effects	YES
Control Variables	YES
Individual FE	YES

*Significant at 10%; ** significant at 5%; *** significant at 1%, robust standard error clustered at the panel level.

Note: The estimates are obtained using the sample from Health and Retirement Study, Waves 10-14 (2010-2018). Each coefficient indicates OLS estimates of equation (2). The variable ACA_Medicaid is a treatment variable, which is a binary indicator for whether ACA Medicaid expansion occurred in the state at a given year. We estimate the impact of ACA Medicaid on CESD score of Mental Wellbeing as a part of falsification tests, part I and II. All models include state, year, and person level fixed effects, along with control variables namely age, gender, age^2, income, health status, retirement status, race, education, and children.

Robustness Checks

Next, we test the robustness of our main baseline estimates to different alternative specifications,

and more specifically we test whether our estimates are consistent when we restrict our sample to

individuals with total wealth below $100k (more likely to qualify for Medicaid), and by adding

household level fixed effects instead of person level fixed effects (capture household specific

unobservables). The upper panel (Part I) of Table 5 shows a robust and consistent result when

restricting wealth to $100k and below. As expected, the magnitude of estimated effect increases

slightly compared to our baseline effect, and the effect is significant indicating that the effect is

mainly driven by the states expanding Medicaid coverage in 2014. Similarly, the lower panel

(Part II) of Table 5 reports the estimated effect after accounting for household level fixed effects

in place of individual fixed effects into the main baseline specification. Again, we find that our

main results are robust to this change in specification as the effect only varies slightly and its

significance is maintained.

Table 5 Robustness Checks - Effect of ACA Medicaid Expansion on Mental Wellbeing (Low Wealth and household fixed effects)

	CESD - Mental Health Score
I) Restricting Wealth to $100k and below	(1)
ACA_Medicaid	-0.40**
(s.e)	(0.191)
II) Using Household Level Fixed Effects	(2)
ACA_Medicaid (s.e)	-0.365**
	(0.215)
State + Year Fixed Effects	YES
Control Variables	YES
Individual FE	YES
N	(1) 2,069; (2) 2200

*significant at 10%; ** significant at 5%; *** significant at 1%, robust standard error clustered at the panel level.

Note: The estimates are obtained using the sample from Health and Retirement Study, Waves 10-14 (2010-2018) , and Age<65. Each coefficient indicates OLS estimates of equation (2). The variable ACA_Medicaid is a treatment variable, which is a binary indicator for whether ACA Medicaid occurred in the state at a given year. We estimate the impact of ACA Medicaid on CESD score of Mental Wellbeing as a part of Robust-ness check for baseline estimates, part I and II. All models include state, year, and person level fixed effects, along with control variables namely age, gender, age^2, income, health status, retirement status, race, education, and children.

Heterogeneity. The US population differs, across various socio-economic characteristics, in the level of Medicaid coverage. Therefore, the expansion of Medicaid differs for several state with some states immediately expanding their coverage compared to others. The use of health and retirement study allows us to assess responses across various groups of population. Thus, we estimate our fully specified baseline model using the interactions of our treatment variable with different observable so characteristics such as gender, education, retirement status, ethnicity, health status and the number of children. Table 6 reports the heterogenous effect of ACA's Medicaid on the mental wellbeing of spousal caregivers across different socioeconomic categories. We observe that Medicaid expansion significantly improves the mental wellbeing of caregivers with fair or poor health, whereas it doesn't significantly affect the healthy caregivers. The female caregivers see significant improvement in mental wellbeing after the reform, when compared with their counterparts. In addition, the lesser educated caregivers are more likely to see improvement in their mental wellbeing when compared with highly educated individuals. Similarly, we find that non-retired individuals are comparatively more likely to observe gain in mental wellbeing after the Medicaid expansion reform. It is also observed that individuals without children have shown significantly greater improvement in mental wellbeing post reform. This is an important and a profound finding in which the effect on individuals without children is three times that of those with children, possibly due to no other sources of informal care in the family. In addition, Non-White Americans are more likely to see improvement in their mental wellbeing compared to white Americans, this is because relatively more non-white Americans fall under low-income categories and rely on Medicaid for insurance. Finally, we estimate a greater improvement in mental wellbeing among caregivers living in Medicaid expansion states with state market exchanges compared to Medicaid expansion states with federal level market

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exchanges. This is a novel observation consistent with the greater flexibility of state exchanges over federal exchanges in meeting individuals insurance preferences.

Table 6 Heterogeneity of ACA Medicaid Expansion on Mental Wellbeing

ALL		CESD - Mental Health Score
Health	Good/Best/Excellent	-0.158
	Fair/Poor	-0.551*** †
Gender	Female	-0.453**
	Male	-0.27
Education	High School/Less	-0.42**
	Some/More College	-0.23
Marketplace	Federal Exchange	-0.314
	State Exchange	-0.405**
Retirement Status	Not Retired	-0.554**
	Retired	-0.24
Have Children	NO	-1.14**
	YES	-0.35**
Ethnicity	Non-White	-0.51**
	White	-0.20
	State & Year FE + Controls	Yes
	Individual FE	Yes

*significant at 10%; ** significant at 5%; *** significant at 1%, robust standard error clustered at the panel level.

Note: The estimates are obtained using the sample from Health and Retirement Study, Waves 10-14 (2010-2018) , and Age<65. Each coefficient indicates OLS estimates of equation (2). The variable ACA_Medicaid is a treatment variable, which is a binary indicator for whether ACA Medicaid expansion occurred in the state at a given year. Column (1) shows the estimates of the impact of ACA Medicaid on CESD score of Mental Wellbeing across different sub-populations. Column (2) represents proportion of sub-group relative to its counterpart across categories. All models include state, year, and person level fixed effects, along with control variables namely age, gender, age^2, income, health status, retirement status, race, education, and children.

Mechanisms

Finally, we examine several potential mechanisms driving the effect of ACA Medicaid expansion on mental wellbeing of caregivers as reported in Table 7. First, we identify the impact of ACA Medicaid on the Medicaid uptake of individual as the reform is expected to increase the coverage for individual caregivers. The alternate provision of long-term care via Medicaid coverage can be relaxing and relieving for spousal caregivers. Thus, increase in Medicaid coverage due to ACA's Medicaid reform can have positive impact on the welfare of caregivers. Another potential channel through occurs via Out-of-pocket expenses (OOP). We find a negative and significant effect of ACA Medicaid on the extensive margin of out-of-pocket expenses e.g., the likelihood of paying expenses out of pocket. However, we find negative impact on intensive margin of out-of-pocket expenses, but these results are not significant. Finally, the ACA Medicaid reform is estimated to have negative impact on the likelihood of working for wages (extensive margin) and on the number of hours worked per week (intensive margin). This is because low-income caregivers without insurance are usually constrained to work for funding their medical costs (or to be insured by their employers). In contrast, if they are on Medicaid then, they can reduce or adjust the number of hours on employment. This finding is suggestive of a potential causal link between caregiver's labor market participation and her mental health. We also find that ACA Medicaid reduces caregiver's probability of working after 62 as well as 65 years, respectively.

Table 7: Mechanisms of the effect of ACA Medicaid Expansion on Mental Wellbeing

	Medicaid	OOP_Extsv Mrgn	OOP>$100	OOP > $500	Working	Hours/Week	P(Work) after 62	P(Work) after 65
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ACA_Medicaid	0.132***	-0.079*	-0.099**	-0.079*	-0.062*	-2.62*	-4.83*	-4.86**

(s.e)	(0.036)	(0.0439)	(0.0438)	(0.0414)	(0.035)	(1.44)	(2.84)	(2.26)
Number of Obs	2,467	2,489	2,489	2,489	2,489	2,460	1,947	2,403
State & Year FE + Controls	YES	YES	YES	YES	YES	YES	YES	YES
Individual FE	YES	YES	YES	YES	YES	YES	YES	YES

*significant at 10%; ** significant at 5%; *** significant at 1%, robust standard error clustered at the panel level.

Note: The estimates are obtained using the sample from Health and Retirement Study, Waves 10-14 (2010-2018) , and Age<65. Each coefficient indicates OLS estimates of equation (2). The variable ACA_Medicaid is a treatment variable, which is a binary indicator for whether ACA Medicaid expansion occurred in the state at a given year. We estimate the impact of ACA Medicaid on CESD score of Mental Wellbeing on outcomes, which potentially drive the effect, as a part of mechanism. Column (2) represents proportion of sub-group relative to its counterpart across categories. All models include state, year, and person level fixed effects, along with control variables namely age, gender, age^2, income, health status, retirement status, race, education, and children.

The Effect on the Mental Health of Spouses

We also investigate whether ACA Medicaid resulted in household spillover due to improvement in wellbeing of caregivers. It important to note that caregiver's mental health can have significantly larger impact on the wellbeing of their spouse due to respondents' unique role of caregiving. We especially find the impact of ACA Medicaid on the mental wellbeing of the spouse being care for. Column 4 of Table 7 indicates the fully specified model that incorporate state, year, and individual fixed effects along with a set of controls. We find that ACA Medicaid significantly decreased the CESD[6] score of mental health by 0.55 points, on an average, when compared with remaining states. This effect is equivalent to 6% improvement in the CESD score of mental health for spouse and is greater than the actual effect (4-5%) on the mental health of caregiver. Overall, our results suggest that the ACA Medicaid expansion exerts spillover effects on the household members, especially spouses being cared for, because it improves well-being of caregivers by making health insurance accessible.

Table 8. Linear Estimates of the effect of ACA Medicaid Expansion on Mental Health of Caregiver's Spouses

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[6] Please refer to the Appendix Table A3 for the impact of ACA Medicaid on individual components of CESD score for spouse being cared for.

	CESD - Mental Health Score for Spouse			
	(1)	(2)	(3)	(4)
ACA_Medicaid	-0.34***	-0.52***	-0.49***	-0.554***
	(0.122)	(0.17)	(0.19)	(0.194)
Year Fixed Effects	NO	YES	YES	YES
State Fixed Effects	NO	NO	YES	YES
Control Variables	NO	NO	NO	YES
Individual Fixed Effects	YES	YES	YES	YES
N	2,713	2,713	2,713	2,416

*Significant at 10%; ** significant at 5%; *** significant at 1%, robust standard error clustered at the panel level.

Note: The estimates are obtained using the sample from Health and Retirement Study, Waves 10-14 (2010-2018) , and Age<65. Each coefficient indicates OLS estimates of equation (2). We estimate the impact of ACA Medicaid on CESD score of Mental Wellbeing of spouse being cared for, as a part of spillover effect of ACA Medicaid on household. Column 4 includes state, year, and person level fixed effects, along with control variables namely age, gender, age^2, income, health status, retirement status, race, education, and children.

6. An Extension – An Instrumental Variable Approach

We extend our analysis to instrumental variable (IV) approach and run the baseline models using Medicaid uptake as a treatment variable, which is one of the important mechanisms responsible for the effect on mental wellbeing. We use this approach to test alternatively the impact of ACA Medicaid expansion on the mental wellbeing of caregivers who are mainly low-income adults in the US. Equation 3 & 4 represent the first and second stage regressions, respectively.

$$Medicaid_{ist} = \beta_0 + \rho X_{ist} + \sigma_s + \vartheta_t + \beta_1 * ACA\_ME_{st} + \theta_i + \epsilon_{ist} \tag{3}$$

$$CESD_{ist} = \eta_0 + \Lambda X_{ist} + \delta_s + \Psi_t + \eta_1 * \widehat{Medicaid}_{ist} + \theta_i + V_{ist} \tag{4}$$

Table 9 denotes the IV estimates in which we use ACA Medicaid expansion as an instrumental variable for Medicaid update. The exogeneity assumption requires that ACA Medicaid must affect Mental wellbeing only through Medicaid uptake. We think this assumption is satisfied because ACA Medicaid is designed solely for Medicaid expansion and states without ACA Medicaid do

not expand Medicaid coverage. The F-statistics of the first stage is 18, which is well above the threshold of 10. Thus, our instrument satisfies the validity assumption. Column (1) indicates the OLS estimates of impact of Medicaid on CESD score of mental health, whereas column (2) represents IV estimates. We find that CESD score of mental health decreases for individual with Medicaid by 3 points as compared to individual without Medicaid. This is quite a strong effect and indicates the importance of Medicaid for improving the mental health of individual. Similarly, we repeat our models in equation 3 & 4 for other important components of CESD score, namely happiness, Sadness, and depression. We find that the uptake of Medicaid increases the happiness and decreases the feeling of sadness as well as depression. Overall, we conclude that ACA Medicaid expansion improves the mental wellbeing of an individual living in the state that expanded Medicaid relative to other states.

Table 9: Instrumental Variable Estimates of ACA Medicaid Expansion on Mental Wellbeing

	CESD Score		Felt Happy		Felt Sad		Felt Depressed	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Medicaid	0.0181	-3.001**	-0.0180	0.666**	-0.00886	-0.59*	-0.0063	-0.661**
	(0.153)	(1.453)	(0.0332)	(0.32)	(0.035)	(0.312)	(0.0342)	(0.31)
First Stage F-Statistic		18		18		18		18
State + Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Individual Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
N	2467	2108	2462	2103	2466	2107	2465	2106

*Significant at 10%; ** significant at 5%; *** significant at 1%, robust standard error clustered at the panel level.

Note: The estimates are obtained using the sample from Health and Retirement Study, Waves 10-14 (2010-2018) , and Age<65. Each coefficient indicates OLS estimates of equation (4). The variable Medicaid is a treatment variable, which is a binary indicator for whether an individual is enrolled in Medicaid in the state at a given year. We estimate the impact of Medicaid on CESD score of Mental Wellbeing and on its components. Column (1,3,5,7) & (2,4,6,8) represent OLS and IV estimates, respectively. All models include state, year, and person level fixed effects, along with control variables namely age, gender, age^2, income, health status, retirement status, race, education, and children.

7. Conclusion

This paper has examined the effect of the expansion of public insurance (Medicaid) resulting from the introduction of the Affordable Care Act (ACA) to caregivers who previously had limited access to private health insurance (due to low-income and low-benefit work activities and/or limited employment opportunities derived from their caregiving duties). Drawing on evidence from Affordable Care Act's Medicaid expansion; we document evidence of Medicaid expansion effects on the mental health of caregiving souses. We exploit the quasi-experimental change that occurred due to the expansion of Medicaid coverage under ACA. We observe that ACA Medicaid improved the mental wellbeing of careers (we estimate 0.38 points decrease in the CESD scale, which is equivalent to an average 4-5% reduction in CESD score/depressive symptoms). The effects are driven by specific components of the CESD score, mainly happiness, sadness, depression, and loneliness, which were affected due to ACA Medicaid.

These results indicate that availability of health insurance to adult spousal caregivers can significantly reduce the mental burden associated with informal caregiving. These findings offer some answers to the demand of sustainable arrangement for informal caregiving. The ACA Medicaid is observed to benefit spousal caregivers by significantly improving their otherwise deteriorating mental health. We also find that the ACA Medicaid results in spillover at household level by significantly improving the well-being of spouses being cared for. No one has cast ACA Medicaid expansion as a caregiver support policy. However, combined, our results suggest that ACA-Medicaid expansion is in fact an indirect caregiver support policy, improving mental health of both caregivers and spousal care recipients. Therefore, indirect and direct programs supporting the modal providers of long-term care in the United States -- unpaid informal caregivers – could

help minimize the negative mental health impacts of caregiving, while supporting the preference

of disabled older adults to remain safely in their own homes.

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Appendix

Figure A1. Event study design of ACA Medicaid Expansion exposure on Out-of-Pocket Expenses.

a)

(b)

(c)
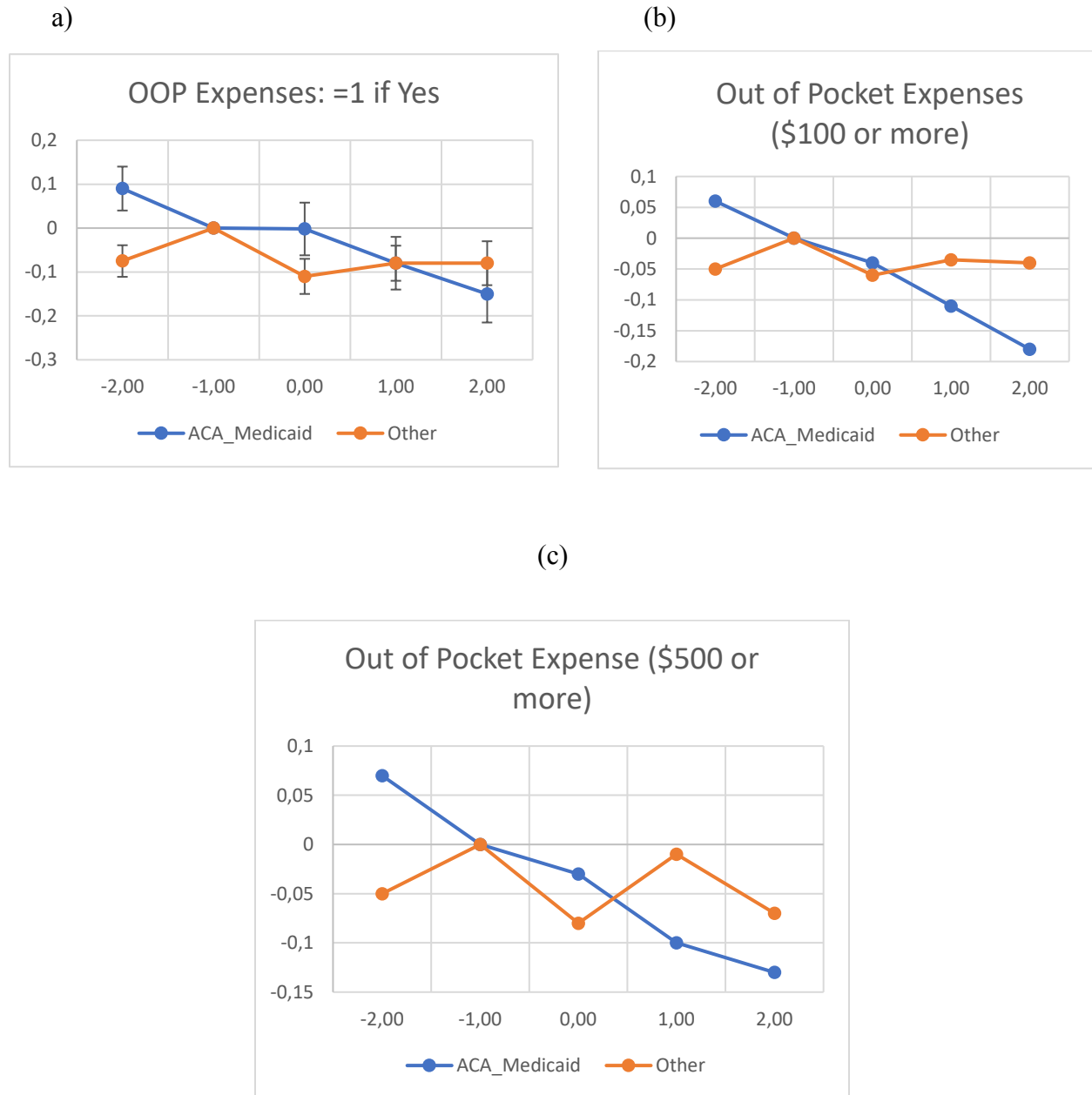
Table A1. Linear Estimates of the effect of ACA Medicaid Expansion on Mental Health

	Dependent Variables			
	CESD Mental Health Score			
	(1)	(2)	(3)	(4)
ACA_Medicaid	-0.34***	-0.337**	-0.372**	-0.376**
	(0.112)	(0.157)	(0.168)	(0.176)
Age				0.339
				(0.285)
Age^2				-0.00164
				(0.00227)
Married				-0.343
				(0.233)
Non-Housing Wealth				-2.94e-07
				(8.86e-07)
Income				5.67e-06
				(6.01e-06)
Fair/Poor Health				1.014***
				(0.144)
R_retire				
Year Fixed Effects	NO	YES	YES	YES
State Fixed Effects	NO	NO	YES	YES
Control Variables	NO	NO	NO	YES
Individual Fixed Effects	YES	YES	YES	YES
N	2,822	2,822	2,822	2,489
R-squared	0.004	0.011	0.043	0.094
Number of respd_id	1,130	1,130	1,130	1,061

Table A2. Linear Estimates of the effect of ACA Medicaid Expansion on CESD components of Non-caregivers

	EnjoyLife	CantGetGoing	FeltSad	FeltAlone	Happy	SleepRestricted	EvrytngEffort	FeltDepressed
CESD Components (Non-caregivers Sample)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ACA_Medicaid	-0.0137	0.0048	0.0036	-0.0128	0.0016	-0.029*	0.0073	0.0023
	(0.013)	(0.018)	(0.017)	(0.0163)	(0.016)	(0.018)	(0.017)	(0.016)
State + Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Individual Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
N	13,253	13,228	13,259	13,265	13,245	13,256	13,259	13,266

Table A3. Linear Estimates of the Effect of ACA Medicaid Expansion on Mental Health of Caregiver's Spouses: CESD Components

	EnjoyLife	CantGetGoing	FeltSad	FeltAlone	Happy	SleepRestricted	EvrytngEffort	FeltDepressed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ACA_Medicaid	0.01	-0.053	-0.094**	-0.084**	0.12***	-0.07	-0.07*	-0.08*
	(0.031)	(0.047)	(0.041)	(0.04)	(0.039)	(0.044)	(0.039)	(0.043)
State + Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Individual Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
N	2,412	2,407	2,413	2,416	2,407	2,413	2,413	2,414