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ORIGINAL PAPER

The effects of the affordable care act on labor supply and other uses of time

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Abstract

A vast literature studies the behavioral impacts of health care reforms, often coming to controversial conclusions. Here we examine the time allocation effects of the Affordable Care Act, also known as Obama Care, focusing on two pillars, namely Medicaid expansion, which increased access to public health insurance, and the Tax Credit Premium, subsidizing the purchase of private health insurance. Using 2012–2015 daily diary data from the American Time Use Survey, we take a difference-in-difference-in-differences approach, which exploits the cross-state variation in the timing of ACA implementation, together with differences in income eligibility thresholds, to identify the effects at stake. Considering a sample of childless adults aged 27–64, a group not eligible for public health insurance before ACA, we find that the Medicaid expansion reduced their labor supply by over an hour per day, increasing part-time work, while the Premium Tax Credit is associated with a slight increase in employment levels. The implications for other uses of time are also analyzed.

Keywords Affordable care act · Health care reform · Labor supply · Time allocation

JEL classification I13 · I18 · J01 · J22

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1 Introduction

It is well established that access to healthcare may impact individual economic behavior. In this work we examine the effects of the Affordable Care Act (ACA) on individual labor supply and other uses of time.

The previous literature univocally suggests that the ACA has substantially increased health insurance coverage in the US (Antwi et al., 2013; Barbaresco et al., 2015; Cantor et al., 2012; Courtemanche et al., 2017, 2018; Frean et al., 2017; Kaestner et al., 2017; Sommers & Kronick, 2012; Wherry and Miller 2016)[1]. Indeed, before the ACA, only specific groups, such as, for example, poor households with young children or those aged more than 65, had access to public health insurance, while only a subset of workers, among those working full-time, could benefit from employer-provided health insurance.

A vast body of literature has studied whether the expansive health insurance coverage offered by ACA affected employment and hours worked, as well as “job lock” and “job push” (i.e. whether a worker takes a job that matches their skills and preferences)[2]. The first component of the ACA reform, namely the Dependent Coverage Mandate (DCM) which came into force in September 2010[3] and extended the parent healthcare coverage to adult children up to 26 years old, is the most studied ACA reform to date. Most studies associate the DCM with a reduction in labor supply (Depew, 2015; Dillender et al., 2022; Duggan et al., 2021); moreover, using data from the American Time Use Survey, other scholars found an increase in part-time work for eligible young people (Lenhart et al. 2017; Archambault and Baker, 2018) and a reduction in job locks, together with an increase in the time devoted to leisure activities and job search (Colman and Dave, 2018).

Contrasting evidence on the employment effects of Medicaid expansion, another important component of the ACA reform, was reported by Bailey and Chorniy (2015), Kaestner et al. (2017) and Moriya et al. (2016), while Gooptu et al. (2016) and Leung and Mas (2018) found no effect of the reform on labor supply[4]. From a theoretical standpoint, Nakajima and Tuzemen (2016) developed a general equilibrium model of labor demand and supply, incorporating health insurance in the model, to predict that the Medicaid expansion would significantly increase part-time employment. In a similar vein, Aizawa (2019) examined the optimal joint policy design of the vari-

[1] In line with the literature concluding that since the introduction of Medicare (public health insurance for the elderly aged 65), the number of uninsured people aged over 65 has dramatically fallen (Card et al., 2008, 2009).

[2] To further explore the impact of the ACA on incentives to invest in human capital (i.e. to obtain. education), refer to Chakrabarti and Pinkovskiy (2019).

[3] Prior to this, employment-sponsored insurance (ESI) covered insured workers’ children until the age of 19, if not enrolled in school, and until the age of 24, if students. The ACA made coverage available up to age 26 for adult children. In 2009, before the ACA Dependent Coverage Mandate, 31.4%of those 19–25 years old lacked coverage.

[4] Moreover, Kumar (2020), using a regression kink design framework, found a negative effects of Medicaid generosity on the lower quantiles of household income. There are also contrasting findings on the employment effects of Medicaid eligibility extensions before the Obama Care Reform (Baicker et al., 2014; Barkowski, 2020; Dave et al., 2015; Garthwaite et al., 2014).

ous pillars of the ACA by developing and estimating a life-cycle equilibrium labor market search model.

Regarding the other pillar of the ACA reform, namely the Tax Credit Premium subsidy, some studies have investigated its employment effects. While most works did not find clear evidence of labor supply adjustments among workers close to the eligibility cutoff after receiving subsidies (Hinde, 2017; Kucko, Rinz, and Solow, 2018; Magne, 2019), others have found that taxpayers have adjusted their income to remain eligible for the subsidy, by both reducing labor supply and increasing deductions (Heim et al., 2021).

In this study we try to shed some light on these contradicting results by deploying a quasi-experimental design based on a staggered triple difference-in-differences empirical model. Such approach allows us to properly address the complexity of the treatment design associated to the implementation of the different components of the ACA reform. In fact, the ACA Medicaid expansion was implemented at different points in time across states, starting in 2014, with some states not putting it into force (due to a Supreme Court decision, leaving states the freedom to implement this ACA pillar or not); in contrast, the ACA Premium Tax Credit was implemented in all states in 2014, but its income eligibility threshold was different according to whether each state had already implemented the Medicaid expansion[5].

The proposed approach thus relies on a triple differences approach (i.e., a difference-in-difference-in-differences design) to estimate the effect of the Medicaid Expansion and the Tax Credits on the labor supply of the potential beneficiaries, while allowing for the effects to differ in 2014 and 2015 (as in Frean et al., 2017, who focused on the coverage effects of ACA)[6]. In particular, in the case of Medicaid expansion analysis, the control group includes individuals with income above the eligibility threshold, as well as those residing in states that did not put this ACA pillar into force; while for the ACA tax credit analysis, the control group includes individuals with income outside the eligibility range and such group varies depending on whether the state had already implemented Medicaid expansion.

Our analysis uses daily data on hours devoted to paid work, household work, and leisure time, for a representative sample of US residents, drawn from the American Time Use Survey (ATUS), so that we are able to capture the effects of the reform on the actual hours of work and other uses of time of childless adults, potentially eligible for Medicaid Expansion or Tax Credit Premium Subsidies.

We find that the Medicaid expansions has reduced working hours by about an hour and a half in 2014 and 2015, and that part-time work has increased by approximately 14%. Rather comfortingly, these effects are found to be robust to a wide set of robustness checks. In terms of heterogeneity, the labor supply responses to the

[5] See Appendix A1 and A3 for details.

[6] We focus on 2014 and 2015 as 2016 Trump's victory had a non-negligible impact on the Affordable Care Act. As highlighted by Rice et al. (2018), President Trump- although he did not succeed in abolishing the ACA entirely- did not pursue a push towards universal health coverage in the USA, and significantly increased volatility and uncertainty regarding the future of the ACA. Among others, Pham et al. (2018) found that Trump's intention to replace Obamacare has had a huge negative impact on the insurance sector. In the same vein, Peng et al. (2020) found that the labor market impact of the ACA reform was only transient, becoming null starting from 2016.

ACA Medicaid expansion are stronger for women, older workers aged above 50, and those without college education. Moreover, we find evidence that Medicaid expansion increased household work, and especially, household management activities, as well as caring for other households and volunteering. On the contrary, it slightly reduced the time devoted to practicing sports. In contrast, the ACA Tax credit premium is associated with a 7% increase in employment levels and reduced leisure time by almost half an hour per day.

Our results can be compared with those obtained by Aslim (2022), the only other study – to the best of our knowledge – exploring the Medicaid expansion impact on labor supply using a quasi-experimental design relying on a regression discontinuity approach. His analysis relies on the monthly Current Population Survey to study the Medicaid Expansion and finds an increase in part-time work by childless adults but no effect at the extensive margin on labor market participation. The work, however, leverages on a difference in discontinuities design around 138% of the Federal Poverty Line (FPL) and thus focusing on a local effect around the identified threshold; moreover, to reduce the risk of a downward bias in estimated effects stemming from the simultaneous implementation of the Premium Tax Credit, Aslim (2022) limits his analysis to workers very close to the Medicaid eligibility threshold. This approach, while fostering internal robustness, might limit its external validity.

Our work, while consistent with Aslim (2022) main findings, offers novel empirical evidence by adopting an empirical approach that extends the validity of the results by properly addressing the complexity of the treatment design. From an empirical perspective, we simultaneously identify the impact of the Premium Tax Credit and of the Medicaid expansion in order to separately analyze the effects of both pillars of the ACA reform, while preserving a higher degree of external validity across more income groups. Our identification strategy allows us to account for the possibility that individuals in (Medicaid) non-adopting states and with income below the threshold for Premium subsidies, might have incentives to work more and qualify for subsidies. Neglecting Premium Tax Credit subsides thus might induce a downward bias in the impact of the Medicaid reform on labor market outcomes.

Moreover, our work provides a more detailed view on alternative use of time as provided by the ATUS data with respect to the Aslim (2022) analysis based on the Current Population Survey. Indeed, the investigation of the impacts of the various pillars of the reform on the time use of Americans, together with the analysis of their effects on the labor markets, provides a more comprehensive picture of the implications of the reform. ATUS involves a lengthy and detailed interview asking specifically how one's time was used during the previous day. This approach may reduce the anchoring bias, potentially hindering the reliability of more general questions characterizing surveys such as CPS (Schwartz and Sudman, 1999; Bonhomme et al., 2024). Furthermore, relying on the ATUS data allows us to show that the additional time was mainly dedicated to housing chores and voluntary activities rather than leisure time.

These findings are consistent with standard time allocation models (Becker, 1965), where a reduction in labor supply is expected to lead to a reallocation of time toward non-market activities that generate utility. This expectation is supported by prior evidence showing that, when worktime declines, individuals often increase time spent on home production or with children (Aguiar & Hurst, 2007; Guryan et al., 2008).

Our understanding of the literature on the impact of the ACA reform is that most contributions focus mainly on the earlier Dependent Coverage Mandate reform or on the second pillar of ACA – namely the Medicaid expansions; however, the ACA also introduced Tax Premium Credits as another pillar of the ACA reform. While some authors do acknowledge that such measures might have an impact on labor supply, and have already investigated the issue, this work remains, to the best of our knowledge, the first study that simultaneously isolates the impact of the Medicaid expansion and Premium subsidies' introduction on labor supply and other time uses. The simultaneous analysis of both reforms allows us to estimate more precisely their effects, by creating appropriate control and treatment groups for each policy and disentangling their effects.

Finally, in our discussion we argue that our results might be explained by two mechanisms that drive labor supply adjustments. While Aslim (2022) only focuses on "job lock" concerns, we suggest that workers might also adjust their working hours to be eligible for Medicaid expansion. In other words, it is not just the access to healthcare that might induce workers to reduce their working hours, but rather workers might be forced to reduce their working hours to access healthcare. Thus, we believe that both mechanisms might generate similar effects on labor supply and might reduce the quality of the matching process in the labor market, so that means-tested access to healthcare might hinder labor market functioning. It follows that while Medicaid expansion may help reduce such inefficiencies, universal healthcare coverage should still be pursued not just appealing to moral concerns but also because of labor market efficiency arguments.

The rest of the paper is organized as follows. Section 2 provides background on healthcare reform, Sect. 3 describes the data, and Sect. 4 outlines the empirical model. The results of the estimation are discussed in Sect. 4. Section 5 shows results concerning other uses of time and the last section (Sect. 6) concludes. Appendix A (Online Appendix) provides additional analyses, figures, and tables that support the main findings of the paper.

2 Background on healthcare reform

The ACA was signed into law by President Barack Obama on 23 March 2010. It is widely recognized that ACA represents the largest expansion ever of the US healthcare system from Medicare, a reform passed in the mid-1960s of the last century. Before the ACA, many Americans did not have access to public health insurance or to a private (employer-provided) health-care plan. The ACA aims at both expanding access to public health care for poor households and making private healthcare affordable, thus virtually granting universal health insurance coverage. Three key provisions compose the main pillars of this broad healthcare reform.

The first one involves regulating healthcare insurance market at federal level requiring insurers to cover all applicants regardless of pre-existing conditions, banning medical underwriting, and eliminating annual and lifetime benefit limits.

The second one, established an individual mandate requiring U.S. legal residents to obtain insurance or pay a tax penalty, with exemptions for certain low-income individuals. This penalty was limited to the larger of $95 or 1% of annual income in 2014. However, it has grown to the larger of $325 per adult or 2% of taxable income in 2015, and finally to the larger of $695 per adult or 2.5% of income in 2016 (Frean et al., 2017). The penalty was then reduced to zero starting in 2019.

To improve affordability, the third one expanded Medicaid eligibility to all individuals earning up to 138% of the federal poverty level. However, a 2012 Supreme Court ruling made this expansion optional, leading to varied adoption across states. The detailed list of expansion states and date of expansion is reported in Appendix A1. This cross-state variation in the timing of implementation and income eligibility thresholds enables us to identify the effects of these two ACA policies on labor supply and other uses of time.

Individual states could first adopt this reform in January 2014 at the same time as a Premium Tax Credit was introduced. Workers earning between 100% and 400% of the Federal Poverty Line (FPL) were eligible for this tax credit provided they did not already benefit from Medicare, Medicaid or other affordable employer-sponsored insurance. Note that this implies that in Medicaid expansion states, the Premium Tax Credit was available to those with earnings between 138% and 400% of the FPL.

Medicaid expansion benefitted directly civilian non-disabled childless adults aged between 27 and 64 years old up to 138% of the Federal Poverty Line. The ACA, however, may also be associated with wider positive effects thanks to positive information spillovers on other previously eligible groups. The literature refers to these positive indirect impact as "woodwork effects" (e.g. Sommers & Epstein, 2011, Frean et al., 2017, Aslim, 2019, 2022). Within the context of this paper, we only focus on direct effects attributable to the Medicaid expansion and premium tax credit and thus we define our focus sample accordingly.

Indeed, disabled individuals, as well as those with children, had been already eligible for access to Medicaid before the 2014 Affordable Care Act Medicaid expansion. Individuals younger than 27 were already eligible to access healthcare coverage through parental insurance under the Dependent Coverage Mandate, while those older than 64 could access Medicaid benefits. Moreover, military staff enjoyed HMO-type military healthcare plants. As a consequence, most low-income childless adults were uninsured, relied on safety-net providers or emergency Medicaid, or if they earned up to 138% FPL.

3 Data

We use for the analysis data drawn from the American Time Use Survey, or ATUS, (2012–2015), which is conducted by the Census for the Bureau of Labor Statistics on a continuous basis, from January to December including weekends or festivities. The ATUS sample is a random sub-sample of respondents to the Current Population Survey (CPS), who are asked to fill in an activity diary, recording all their activities in the past 24 h. About 10,000 households per year are interviewed.

Unlike CPS, ATUS has not been yet used to explore the consequences on labour supply of Medicaid reforms. The ATUS dataset is preferred to the monthly CPS data as it allows for a more comprehensive understanding of time use of respondents –

beyond working hours. Moreover, ATUS involves a lengthy and detailed interview asking specifically how one's time was used during the previous day. This approach may thus help reduce anchoring bias potentially hindering reliability of more general questions characterizing surveys such as CPS. Challenges related to anchoring bias and potential ways to reduce them with more specific questions have been widely discussed in the literature (e.g. Schwartz and Sudman 1999, and Bonhomme et al., 2024). Furthermore, ATUS is more likely to reduce measurement errors and provide a more detailed view of respondents' actual use of time both for work and leisure activities.

To the best of our knowledge, only Colman and Dave (2018) use ATUS to explore the impact of the Dependent Coverage Mandate. We take a similar approach focusing on Medicaid expansion instead. Our main analysis includes weekends and festivities as the provided sampling weights account for the oversampling of the different demographic groups and of weekends, as well as for non-response. However, the Appendix A10 (Tables A13 and A14) reports robustness checks excluding responses provided during weekends and festivities. These analyses show that the main coefficients of interest remain directionally unchanged and statistically significant.

The sample we focus on for this work includes those directly affected by the Medicaid expansion. This group includes childless non-disabled civilian individuals, aged between 27 and 64, encompassing both singles and individuals in a couple (either married or cohabiting), who were not eligible for Medicaid before the 2014 ACA Expansion.

The main outcomes are the hours worked and the employment status defined based on whether the individual reported to work on the diary day. We also use CPS employment information for robustness checks ensuring ATUS derived definition of employment status are consistent with the main CPS interview.

We also consider as working only those reporting at least one hour working per day. Part-time work is defined as working less than 400 min on any given week-day based on the ATUS diary (i.e. 6 h 40 min per day or 33 h and 20 min on a five-day week). The main analyses are also replicated using the 390 min and 410 min as well as CPS defined variables on hours worked the previous week (detailed results are available in Appendices A8 and A9, tables A10-A13). These analyses corroborate the main findings showing that the results are not sensitive to different definitions of part-time work.

Household work is defined as including main chores, such as cleaning, cooking, setting the table, doing the dishes, doing the laundry, and shopping for food. Household management activities, such as checking the accounts, are considered separately. Voluntary work is also considered as an outcome, together with caring for individuals from other households. Leisure activities include doing sports, attending cultural and sports events, socializing, as well as watching television.[7]

The individual characteristics considered include gender, age, marital status, education, ethnicity, state of residence, a dummy for living in a rural or urban area, and dummies for household income categories, as household income is collected in brackets in the CPS -and we perform robustness checks for the eligibility brackets.

[7] For further details, refer to Appendix A3, Table A3.

To determine eligibility for the ACA pillars of Medicaid expansion and Tax Credit Premiums, respectively, we consider the household income bracket and compare it to the ACA pillar eligibility income, which is defined as a function of the Federal Poverty Lines (FPL). For the latter, we use data from the Kaiser Family Foundation.[8] In particular, households with income above 138% of the FPL are not eligible for the Medicaid expansion, while those with income above 400% of the FPL are not eligible for the Premium Tax Credit. In states that have not yet enforced the Medicaid expansion, the tax credits are available starting at 100% of FPL, while in Medicaid expansion states, the tax credit subsidies begin at 138% of FPL. We report descriptive statistics for the sample characteristics, pooling together the years in the analysis, in the Appendix A2, Table A2.

Notably, Medicaid eligibility is determined using the modified adjusted gross income (MAGI), based on the health insurance unit. This unit overlaps with the ATUS dataset household unit as we impose sample restrictions on childless adults. Thus, we can use ATUS – and CPS – household gross income brackets to identify eligibility to Medicaid of the selected households. The eligibility threshold is however only approximated.

Medicaid has been expanded to include all those workers earning less than 138% of Federal Poverty Line. This threshold is equivalent to $16,105 for single households, and it increases to $21,707 for two people households. Our analysis allows us to include as treated single households up to $15,000 and couples up to $20,000. The difference between the considered threshold and the actual one ranges between 6.8% and 7.9%. Our empirical strategy thus conservatively excludes workers with income slightly above the Medicaid expansion threshold considering them as untreated. Similarly, the Premium Tax Credit can be enjoyed by those without access to Medicaid and with incomes up to 400% of FPL. This threshold is equivalent to $46,800 for single households and $62,920 for couples. In turn they are approximated by the income group including earners up to $50,000 and $60,000 respectively. The difference between the considered threshold and the actual one ranges between 4.8% and 6.8%. While these income approximation to the threshold are not perfect we use them as the best available proxy to the legally defined eligibility threshold for Medicaid Expansion and Premium Tax Credit. Appendix A3 reports the full details of the threshold estimation.

4 Empirical approach

To identify and estimate the impacts of the ACA Medicaid expansion and Tax Premium subsidies on individual labor supply and other uses of time, we rely on a triple differences research design, additionally allowing the impacts of these two ACA pillars to differ between 2014 and 2015 (as in Frean et al., 2017), to account for specific ACA features, such as the enforcement penalties, which varied over time. Our empirical model is the following:

[8] Other scholars used FPL data from the Kaiser Family Foundation, such as, for example, Sommers. et al. (2012) and Wherry and Miller (2016).

$$\begin{aligned} Yijt = {} & A + \alpha Ypov_i + \beta StateMed_{jt} + \gamma Year + \zeta Month + \eta States_j + \\ & + \tau Ypov_i * States_j + \varrho Year * States_j + \delta Ypov_i * StateMed_{jt} * Post14 + \\ & + \theta Ypov_i * StateMed_{jt} * Post15 + \eta Premium_i + \lambda Premium_i * Post14 + \\ & + \varLambda Premium_i * Post15 + mX_{ijt} + \rho U_{jt} + v \end{aligned} \tag{1}$$

.

where subscript *i* indexes the individual, *j* indicates the state of residence of the respondent, while t indicates the year of the survey, which ranges from 2012 to 2015. We only observe each individual once. Y_{ijt} refers to outcomes for the individual *i* resident in state *j* at time *t*. *Ypov* is a dummy that assumes value 1 if the individual i is potentially eligible for Medicaid, with household income below the Federal Poverty Line (FPL) threshold for Medicaid expansion eligibility. The variable *Premium* is a dummy taking value 1 if the individual *i* is potentially eligible for the ACA Tax Premium credit, based on their household income and zero otherwise[9]. *StateMed* is a dummy that takes value 1 if the state expanded Medicaid (on the date of the respondent diary), and 0 otherwise. Year, Month and States are fixed effects for year, month and state respectively. *Ypov*States* is an interaction variable of Medicaid expansion income eligibility and state of residency dummy. *Year*States* is an interaction variable of survey year and state of residency dummy. The variables *Premium*Post14* and *Premium*Post15* capture eligibility for Tax Premium subsidies in 2014 and 2015.

The vector X_{ijt} includes socio-demographic controls such as age, gender, education, marital status, a dummy for living in a rural or urban area, ethnicity, and household income (which is collected in income brackets, and we include dummies for each bracket but the first, which is the reference category). This control aims to capture potential changes in working hours due to income levels changes. In other words, the proposed model explores the average impact on labor supply within each income group[10]. It also includes a weekend dummy, which takes value one if the respondent filled in the ATUS diary on a Saturday or a Sunday, to account for the variation in individual daily activities at weekends, versus weekdays. Additionally, we control for the level of state monthly unemployment (U_{jt}) in the ATUS interview month[11]. This control is meant to control for differences in economic cycle conditions across different states.

The errors *v* are allowed to be correlated within states as we use robust standard errors clustered at the state level. We use ATUS BLS sample weights throughout the analysis[12]. The model is estimated using OLS model including individual cross-sectional survey weights.

We can disentangle the effects of the two ACA pillars that we consider, thanks to the cross-state variation in the timing of implementation of the Medicaid Expansion

[9] Vice versa, the Tax Credit ACA pillar was implemented in all states in 2014. For more detailed.

information regarding the ACA pillars and eligibility rules, please consult Appendices A1 and A3.

[10] For further details regarding controls consult appendix A2. Appendix A12 also reports further robustness checks ensuring this is not a case of bad control.

[11] Appendix A12 reports further robustness checks ensuring this is not a case of bad control.

[12] We exploit a question on whether or not the survey questionnaire was incomplete for robustness check, by excluding from the estimation sample individuals with an incomplete questionnaire, which does not alter our conclusions in any meaningful way.

between 2014 and 2015, with some states not implementing it at all, due to a Supreme Court Decision making the implementation arbitrary. In contrast, the Tax Credit pillar was implemented in all states in 2014, but the FPL threshold for its eligibility varied across states, depending on whether the Medicaid expansion was yet implemented by the state or not. Income eligibility thresholds also vary between childless singles and childless couples, which compose our sample, as the Federal Poverty Line (which is the reference to calculate the various ACA eligibility thresholds) differs across them.

In particular, households with income above 138% of the Federal Poverty Level (FPL) are not eligible for the Medicaid expansion, while those with income above 400% of the FPL are not eligible for the Premium Tax Credit. However, in states that have not yet enforced the Medicaid expansion, the ACA tax credits are available starting at 100% of the FPL, while in Medicaid expansion states, the tax credits begin at 138% of the FPL. These thresholds are approximated following the available income groups defined within ATUS dataset as described in the data section.

The effects of the two ACA pillars considered in this study – namely Medicaid expansion and Tax Premium credit – are allowed to vary in 2014 and 2015. This staggered approach follows Frean et al. (2017) allowing to account for changes in penalties for non-compliance enforced after the ACA deployment. In other words, we allow for the ACA pillars to have a different impact in the first and second year of their implementation, distinguishing between states that implemented the Medicaid Expansion in 2014, and those that did so in 2015.

Under this setup, the coefficients of interest, which capture the ACA effect on the outcomes, are, respectively, *Ypov*StateMed*Post14* and *Premium*Post14* for the first policy year and *Ypov*StateMed*Post15* and *Premium*Post15* for the second policy year.[13] Other robustness checks include the removal from the estimation sample of states that implemented some other previous expansions of Medicaid (see Appendix A4-A5, tables A4 and A5). By doing so, the estimation sample becomes closer to that in some earlier work on the ACA employment effects (Aslim, 2022; Kaestner et al., 2017; Leung and Mas, 2018). Nonetheless, other earlier ACA studies used a similar sample cut as we do in our main specification, including all states that implemented the ACA Medicaid expansion pillar (Courtemanche et al., 2017; Simon et al., 2017).

Moreover, as opposed to earlier literature (e.g. Aslim, 2022, Kaestner et al., 2017), our model accounts for the impact of the Premium Tax Credit to avoid a potential downward bias associated with control group access to healthcare costs related tax credit. The Appendix A11 (Table A15) reports the results of the main analysis corroborating the hypothesis that failing to account for the introduction of Premium Tax Credit introduces a downward bias.

Additional robustness checks include replicating the same analyses reducing the considered income group – first including only the income groups up to $250,000 and then going down to the smallest fully untreated income group above including

[13] These terms replace Ypov*StateMed*cohort2014*2014 and Ypov*StateMed*cohort2014*2015 and Ypov*StateMed*cohort2015*2015 in Eq. (1). As suggested by Wooldridge (2021), such specification allows us to take into account the staggered nature of the implementation of the reform and to appropriately build control samples for each year under scrutiny.

household units with gross earnings between $60,000 and $75,000. Results reported in Appendix A7 (Tables A6-A8) show that the main coefficients of interest remain directionally unchanged and statistically significant.

5 Main results

Table 1 shows the estimates of our main specification (Eq. (1)) for labor market outcomes: working hours (intensive margins) and employment (extensive margin). All models include state, year, and month fixed effects and controls for gender, age, education, marital status, race and ethnicity, urban/rural area of residence, household income, weekend dummy, and state monthly unemployment rate. Observations are weighted using ATUS BLS sample weights. Standard errors are clustered at the state level.

The ACA Medicaid expansion negatively affected hours worked in 2015 (see column (1)). In particular, childless people reduced working time by about 45 min per day. On the contrary, the working hours of potential recipients of the Premium Tax credit increased by 30 min per day in 2014 (the year of implementation of the tax credit pillar in all the states) but with no effect in 2015.

Table 1 Effects of ACA pillars on labor market outcomes

	Hours of work	Hours of work, if hours > 0	Employment	Part-time
	(1)	(2)	(3)	(4)
Ypov*StateMed*Post14	−10.39	−99.2441**	0.04	0.10
	(39.71)	(43.0216)	(0.07)	(0.07)
Ypov*StateMed*Post15	−44.74*	−77.2080*	−0.04	0.15*
	(25.62)	(41.7552)	(0.04)	(0.08)
*Premium*Post14*	32.01*	−3.4873	0.07**	−0.00
	(16.91)	(14.4326)	(0.03)	(0.03)
Premium*Post15	−6.75	−10.4471	0.00	0.02
	(17.33)	(19.7352)	(0.02)	(0.03)
Observations	10,417	4,805	10,417	4,805
R-squared	0.27	0.18	0.23	0.21
Years	12–15	12–15	12–15	12–15
Cluster level	state	state	state	state
Controls	x	x	x	x

The model is specified in Eq. 1. Controls include age, gender, education, marital status, the metropolitan area of residence, ethnicity, income categories, weekend dummy, monthly state unemployment levels, and fixed effects for state, month, and year. Standard errors are clustered at the state level. ATUS weights are applied. Labor supply is measured in minutes per day, preserving the diary format. Employment probabilities are measured on a 0 (not employed) – 1 (employed) scale. Part-time is a dummy variable (0 = full-time, 1 = part-time), constructed including only workers. Statistical significance is denoted as: $p<0.10$ = *, $p<0.05$ = **, $p<0.01$ = ***

When restricting the sample to individuals who reported positive hours of work on the diary day (column (2)), the negative effect of the Medicaid expansion on working hours becomes about twice as large (in absolute value) and significant both in 2014 and 2015, while the Tax Premium effect fades away. Therefore, as reported in column (3), employment (the extensive margin) increased with eligibility to the ACA Tax Premium (by 7% points) but it did not go up with access to Medicaid expansion, which in contrast reduced the hours worked (the intensive margin) by well over an hour per day, among the employed.

To better characterize these findings, and also, in light of the earlier ACA literature that focused on part-time versus full-time employment effects (e.g., Aslim, 2022), we consider part-time work outcomes, defining part-time as working 35 h or less per week (see column (4) of Table 1) – or 400 min per day (or ~33.5 h per week). We find suggestive evidence that the reduction in hours worked due to the Medicaid expansion resulted in an increase in part-time employment by about 14% points. This is in line with Aslim (2022) who found evidence of 13.7% increase in part-time employment in ACA Medicaid expansion states within its main findings.[14] In contrast, we do not find any effect on part-time versus full-time employment for the Premium tax credit pillar of ACA, which only affects (positively) the decision to enter employment but not the hours worked, according to our estimates. These results are robust to multiple threshold specifications on the intensive margin to define an active worker as well as to distinguish between full-time and part-time employees (see Appendix A8, tables A9-A10). Moreover, as reported in Appendix A9 (tables A11 and A12), we replicate the analysis using CPS variables included in our ATUS dataset. The results from this analysis are consistent for direction and magnitude with what has been found in earlier literature using the full CPS as sample as well as our main results described below[15].

Next, we allow the effects of interest to vary across states that implemented the Medicaid expansion in 2014 (i.e. the 2014 cohort), and states that implemented it in 2015 (i.e. the 2015 cohort). The results of estimation (see Table 2) suggest that the ACA Medicaid expansion led to an overall reduction in labor supply of about one hour and forty minutes per day, on average, for the first group of states to implement this pillar, while no effect is found for the very few states that implemented it later on (whose low number might also explain at least in part the lack of precision of the estimates).

5.1 Robustness checks and placebos

The validity of our identification strategy rests on the assumption that, in the absence of treatment, the outcomes of interest for treated individuals would have followed the same trend as for the control group. While we cannot directly test this assumption, we

[14] Dillender et al. (2022) also concluded that the ACA's employer mandate, a different ACA component, induced an increase in "involuntary" part-time.

[15] For instance, our main analysis using CPS variables report an increase in part-time employment of 13.2%. This finding is extremely close to the main finding reported by Aslim (2022; Table 5) indicating a 13.7% increase in part-time employment. Further details are available in Appendix A9 tables A11-A12.

Table 2 Effect of ACA reform on labor outcomes: distinguishing earlier implementation States

	Hours of work	Hours of work, if hours > 0	Employment	Part-time
	(1)	(2)	(3)	(4)
Ypov*StateMed*cohort14*2014	−10.88	−106.46**	0.04	0.10
	(39.07)	(42.28)	(0.07)	(0.07)
Ypov*StateMed*cohort14*2015	−46.40***	−99.60***	−0.04	0.17**
	(15.79)	(34.88)	(0.04)	(0.08)
Ypov*StateMed*cohort15*2015	−36.89	17.32	−0.05	0.05
	(110.54)	(127.77)	(0.12)	(0.18)
Premium*Post14	31.99*	−3.67	0.07**	−0.00
	(16.85)	(14.45)	(0.03)	(0.03)
Premium*Post15	−6.74	−10.36	0.00	0.02
	(17.40)	(19.81)	(0.02)	(0.03)
Observations	10,417	4,805	10,417	4,805
R-squared	0.27	0.18	0.23	0.21
Years	12–15	12–15	12–15	12–15
Cluster level	state	state	state	state
Controls	x	x	x	x

The model is specified in Eq. (1), with some variations (see Sect. 3 and Footnote 11). Controls include age, gender, education, marital status, metropolitan area of residence, ethnicity, income categories, a weekend dummy, monthly state-level unemployment rates, and state, month, and year fixed effects. Standard errors are clustered at the state level. ATUS weights are applied. Labor supply is measured in minutes per day, preserving the diary format. Employment probabilities are measured on a 0 (not employed) to 1 (employed) scale. Part-time is a dummy variable equal to 0 (full-time) or 1 (part-time), constructed using only the sample of workers. Statistical significance is denoted as $p<0.10$ = *, $p<0.05$ = **, $p<0.01$ = ***

graphically inspect the behavior of the outcomes for the treated and control groups, in the period before the ACA pillars considered here (see Fig. 1), concluding that, overall, the parallel trend assumption holds true in the pre-reform period[16]. As a placebo, we re-estimated the model assuming that the two ACA pillars had been implemented in 2013, which, as expected, did not affect any of the outcomes (see Table 3).

Next, we investigated any anticipatory effects by including in the model regression additional interaction terms (leads) for the 2013 pre-reform year, which did not show statistical significance, indicating the absence of any anticipatory effects (see Table 4).

Finally, we randomly assigned policy eligibility across individuals and states, preserving the actual number of treated/control individuals in our data. We replicated this random allocation 1000 times and report the distribution of estimated values of the coefficients on *Ypov*StateMed*Post14* and *Ypov*StateMed*Post15*, for the intensive margin responses, in the upper panel of Fig. 2. The following panel of Fig. 2 shows the distribution of the estimated coefficients on the Premium*Post14 terms for the extensive margin responses, while the lower panel reports the distribution with respect to the *Ypov*StateMed*Post14* terms for the part-time specification. In all

[16] The common trend assumption holds including all income groups except for the highest one including those earning more than $150,000. Our main analysis uses the largest available sample where the common trends assumption seems to hold.

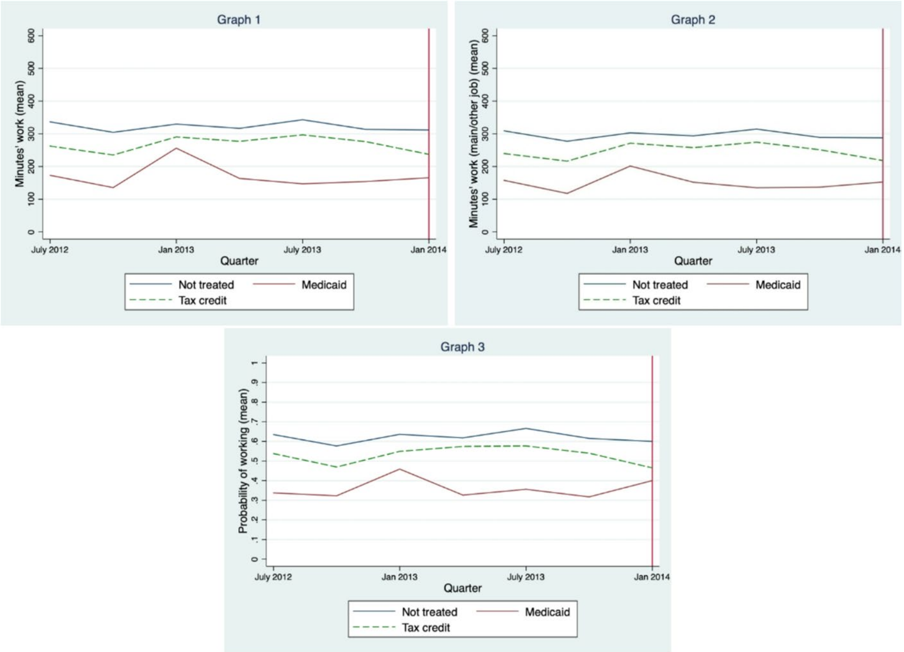

Fig. 1 Robustness analysis: Parallel trends. Notes: Average daily minutes worked in the main job (Graph 1), average daily minutes worked in the main job as well as in other jobs (Graph 2), and the probability of working a positive number of hours on the day of the ATUS diary interview (Graph 3). The data are aggregated by quarter (three-month periods). Sample weights are applied

Table 3 Robustness analysis: fake timings of reforms implementation

Outcomes	Minutes of work	Minutes of work, if minutes > 0	Employment	Part-time
	(1)	(2)	(3)	(4)
Ypov*StateMed*Post13	−2.96	15.01	−0.01	0.01
	(30.54)	(30.71)	(0.06)	(0.0828)
Premium*Post13	15.26	7.58	0.01	−0.0407
	(17.79)	(15.34)	(0.03)	(0.0307)
Observations	10,417	4,805	10,417	4,805
R-squared	0.27	0.1810	0.2303	0.2125
Years	12–15	12–15	12–15	12–15
Sample	2	2	2	2
Cluster level	state	state	state	state
Controls	x	x	x	x

The model is specified in Eq. (1). Controls include age, gender, education, marital status, metropolitan area of residence, ethnicity, income categories, a weekend dummy, monthly state-level unemployment rates, and state, month, and year fixed effects. Standard errors are clustered at the state level. ATUS weights are applied. Labor supply is measured in minutes per day, preserving the diary format. Employment probabilities are measured on a 0 (not employed) to 1 (employed) scale. Part-time is a dummy variable equal to 0 (full-time) or 1 (part-time), constructed using only the sample of workers. Statistical significance is denoted as: $p<0.10$ = *, $p<0.05$ = **, $p<0.01$ = ***

Table 4 Robustness analysis: anticipatory effects (Leads)

Outcomes	Minutes of work	Minutes of work, if minutes>0	Employ-ment	Part-time
	(1)	(2)	(3)	(4)
Ypov*StateMed*Post14	−18.75	−104.62**	0.02	0.13*
	(37.15)	(43.87)	(0.07)	(0.07)
Ypov*StateMed*Post15	−52.85**	−83.31*	−0.06	0.18**
	(27.95)	(47.84)	(0.05)	(0.08)
Ypov*StateMed*Post13	−20.41	−14.21	−0.04	0.09
	(27.96)	(41.38)	(0.05)	(0.08)
Premium*Post14	38.42**	−0.87	0.08***	−0.03
	(16.58)	(18.12)	(0.03)	(0.03)
Premium*Post15	−0.28	−7.80	0.01	−0.01
	(19.01)	(24.20)	(0.03)	(0.04)
Premium*Post13	13.61	5.57	0.01	−0.05
	(19.41)	(18.73)	(0.04)	(0.04)
Observations	10,417	4,805	10,417	4,805
R-squared	0.27	0.18	0.23	0.21
Years	12–15	12–15	12–15	12–15
Sample	2	2	2	2
Cluster level	state	state	state	state
Controls	x	x	x	x

The model is specified in Eq. (1). Controls include age, gender, education, marital status, metropolitan area of residence, ethnicity, income categories, a weekend dummy, monthly state-level unemployment rates, and state, month, and year fixed effects. Standard errors are clustered at the state level. ATUS weights are applied. Labor supply is measured in minutes per day, preserving the diary format. Employment probabilities are measured on a 0 (not employed) to 1 (employed) scale. Part-time is a dummy variable equal to 0 (full-time) or 1 (part-time), constructed using only the sample of workers. Statistical significance is denoted as: $p<0.10$ = *, $p<0.05$ = **, $p<0.01$ = ***

cases, the average of the estimated coefficients is centered at zero, thus corroborating the validity of the estimates from our model.

As a further robustness check, we removed from the estimation sample one state at a time, to test for whether the results in Table 1 may be driven by a specific state, which was not the case (see Appendix A6, figure A2). Moreover, we also examined whether slightly varying the (income) eligibility threshold affects the findings (see Appendix A7) and results are barely affected.

5.2 Heterogeneous effects

We conducted heterogeneity analysis for a wide range of individual characteristics. Estimates of the employment effects of ACA pillars by age are shown in Table 5, distinguishing individuals aged less than 50, or aged 50 and above, respectively. We conclude that the Medicaid expansion induced a reduction in working hours of about two hours per day for people aged 50 and above, for whom part-time work increased

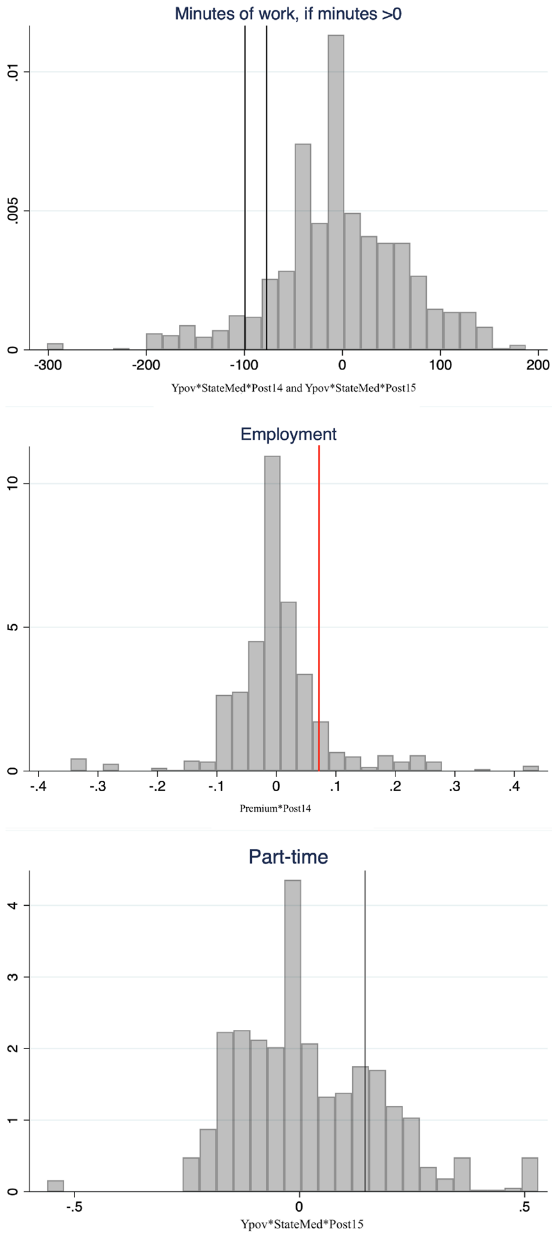

Fig. 2 Robustness analysis: Random allocation of reforms eligibility conditions. Notes: All panels of Figure 2 are based on Equation (1). In the first panel, the dependent variable is “minutes of work, if minutes >0”; in the second panel, it is the employment dummy; and in the third, the part-time dummy. In this context, however, the Medicaid and Tax Credit treatments were randomly assigned. The y-axis displays the probability density function of the estimated coefficients. The vertical lines correspond to the "true" estimated value of the coefficients, reported respectively in Table 1, column (2) (black lines, Ypov*StateMed*Post14=-99.2441** and Ypov*StateMed*Post15=-77.2080*), column (3) (red line, Pre- mium*Post14=0.0712**) and column (4) (grey line, Ypov*StateMed*Post15=0.1450**)

by roughly 25% points. This suggests a higher sensitivity of older people’s labor supply to health coverage, which appears plausible.

Coming to heterogeneity of responses by gender (see Table 6), the reduction in hours worked due to the Medicaid expansion is somewhat larger for women (equal to a drop of over two hours per day, with an increase in part-time work of 25% points) than for men (slightly over an hour per day, with an increase in part-time work of

Table 5 Heterogeneity analysis: age

Outcomes	Over 50 Min. of work, if min.>0	Under 50 Min. of work, if min.>0	Over 50 Empl.	Under 50 Empl.	Over 50 Part-time	Under 50 Part-time
	(1)	(2)	(3)	(4)	(5)	(6)
Ypov*StateMed*Post14	−67.50	−78.91**	0.10	0.03	0.02	0.00
	(58.28)	(37.72)	(0.08)	(0.10)	(0.16)	(0.08)
Ypov*StateMed*Post15	−124.87*	−11.57	0.01	−0.06	0.26*	−0.05
	(67.38)	(73.86)	(0.06)	(0.05)	(0.15)	(0.15)
Premium*Post14	−21.75	14.72	0.08*	0.07	0.00	0.01
	(21.55)	(17.43)	(0.04)	(0.05)	(0.05)	(0.07)
Premium*Post15	27.53	−35.63	−0.00	0.01	−0.02	0.04
	(23.03)	(28.98)	(0.05)	(0.07)	(0.06)	(0.05)
Observations	2,376	2,429	5,674	4,743	2,376	2,429
R-squared	0.27	0.22	0.24	0.28	0.28	0.27
Years	12–15	12–15	12–15	12–15	12–15	12–15
Cluster level	state	state	state	state	state	state
Controls	x	x	x	x	x	x

The model is specified in Eq. (1). Controls include age, gender, education, marital status, metropolitan area of residence, ethnicity, income categories, a weekend dummy, monthly state-level unemployment rates, and state, month, and year fixed effects. Standard errors are clustered at the state level. ATUS weights are applied. Labor supply is measured in minutes per day, preserving the diary format. Employment probabilities are measured on a 0 (not employed) to 1 (employed) scale. Part-time is a dummy variable equal to 0 (full-time) or 1 (part-time), constructed using only the sample of workers. Statistical significance is denoted as: $p<0.10$ = *, $p<0.05$ = **, $p<0.01$ = ***

17% points), though the statistical significance of these effects vary by policy year (as they were perhaps stronger in some states than others). For the ACA Tax credit pillar, there is a positive employment effect for women but not for men, for whom the effect is not statistically significant. These results are in line with the literature finding larger labor supply responses to policy reforms for women than for men.

Table 7 report the effects for Whites and "Non-Whites", pooling together Blacks, Hispanics, Asians, Indians, Hawaiians and other ethnic groups, to conclude that the ACA Medicaid expansion reduced working hours of Non-Whites both in 2014 (by about 166 min per day) and 2015 (by about 79 min per day), though there is no significant increase in part-time work for them, suggesting that hours were very long before the reform for Non-Whites. Whites reduced daily hours by about 2 h in 2015 and increased part-time work by about 30% points. The ACA Tax Credit pillar did not have any effect on the employment of Non-Whites either, while it increased the employment of Whites by about 8% points. Thus, the ACA may have reduced long hours for non-Whites, increasing part-time and employment of Whites.

Heterogeneity of results by education is the focus of Table 8, which distinguishes individuals with a college degree from those with high school or less. The latter group drives the estimates, with a reduction of about an hour per day but without any increase in part-time work, in response to the ACA Medicaid Expansion; while the ACA Tax Credit pillar increased their employment by about 9% points. Most of the heterogeneity findings for the ACA Medicaid expansion are in line with those reported by Aslim (2022), who also studied the latter ACA pillar. Moreover, as

Table 6 Heterogeneity analysis: gender

Outcomes	Men Min. of work, if min.>0	Women Min. of work, if min.>0	Men Empl.	Women Empl.	Men Part-time	Women Part-time
	(1)	(2)	(3)	(4)	(5)	(6)
Ypov*StateMed*Post14	−84.22**	−37.88	0.03	0.09	0.17**	−0.07
	(33.20)	(60.48)	(0.09)	(0.11)	(0.08)	(0.12)
Ypov*StateMed*Post15	1.48	−135.23***	−0.04	−0.04	0.06	0.25**
	(80.7712)	(35.01)	(0.06)	(0.06)	(0.19)	(0.12)
Premium*Post14	−13.91	2.35	0.03	0.10*	0.05	−0.05
	(20.37)	(20.22)	(0.04)	(0.05)	(0.03)	(0.05)
Premium*Post15	9.36	−19.10	−0.02	0.03	−0.03	0.06
	(30.71)	(24.97)	(0.04)	(0.04)	(0.04)	(0.05)
Observations	2,511	2,294	5,117	5,300	2,511	2,294
R-squared	0.23	0.22	0.26	0.26	0.28	0.26
Years	12–15	12–15	12–15	12–15	12–15	12–15
Cluster level	state	state	state	state	state	state
Controls	x	x	x	x	x	X

The model is specified in Eq. (1). Controls include age, gender, education, marital status, metropolitan area of residence, ethnicity, income categories, a weekend dummy, monthly state-level unemployment rates, and state, month, and year fixed effects. Standard errors are clustered at the state level. ATUS weights are applied. Labor supply is measured in minutes per day, preserving the diary format. Employment probabilities are measured on a 0 (not employed) to 1 (employed) scale. Part-time is a dummy variable equal to 0 (full-time) or 1 (part-time), constructed using only the sample of workers. Statistical significance is denoted as: $p<0.10$ = *, $p<0.05$ = **, $p<0.01$= ***

Table 7 Heterogeneity analysis: ethnicity

Outcomes	Whites Min. of work, if min.>0	Non-Whites Min. of work, if min.>0	Whites Empl.	Non-Whites Empl.	Whites Part-time	Non-Whites Part-time
	(1)	(2)	(3)	(4)	(5)	(6)
Ypov*StateMed*Post14	−84.99	−166.38***	0.02	0.02	0.08	0.09
	(70.87)	(59.43)	(0.12)	(0.08)	(0.12)	(0.17)
Ypov*StateMed*Post15	−119.29*	−79.45***	−0.09	−0.01	0.31**	0.03
	(66.23)	(24.90)	(0.09)	(0.07)	(0.14)	(0.10)
Premium*Post14	1.87	−9.86	0.08**	0.03	−0.03	0.04
	(17.95)	(35.63)	(0.04)	(0.05)	(0.03)	(0.07)
Premium*Post15	−8.63	−24.97	0.02	−0.04	0.02	0.05
	(21.49)	(24.13)	(0.03)	(0.05)	(0.04)	(0.06)
Observations	3,147	1,658	6,659	3,758	3,147	1,658
R-squared	0.22	0.26	0.25	0.26	0.26	0.26
Years	12–15	12–15	12–15	12–15	12–15	12–15
Cluster level	state	state	state	state	state	state
Controls	x	x	x	x	x	x

The model is specified in Eq. (1). Controls include age, gender, education, marital status, metropolitan area of residence, ethnicity, income categories, a weekend dummy, monthly state-level unemployment rates, and state, month, and year fixed effects. Standard errors are clustered at the state level. ATUS weights are applied. Labor supply is measured in minutes per day, preserving the diary format. Employment probabilities are measured on a 0 (not employed) to 1 (employed) scale. Part-time is a dummy variable equal to 0 (full-time) or 1 (part-time), constructed using only the sample of workers. Statistical significance is denoted as: $p<0.10$ = *, $p<0.05$ = **, $p<0.01$ = ***

Table 8 Heterogeneity analysis: education

Outcomes	No College Min. of work, if min.>0	College Min. of work, if min.>0	No College Empl.	College Empl.	No College Part-time	College Part-time
	(1)	(2)	(3)	(4)	(5)	(6)
Ypov*StateMed*Post14	−74.34*	−67.94	0.02	0.19	0.10	0.05
	(39.11)	(53.22)	(0.08)	(0.12)	(0.09)	(0.13)
Ypov*StateMed*Post15	−83.21	−19.66	−0.04	0.07	0.16	−0.04
	(64.14)	(64.42)	(0.05)	(0.16)	(0.14)	(0.25)
Premium*Post14	−5.26	19.11	0.09***	0.05	−0.01	−0.04
	(17.10)	(27.05)	(0.03)	(0.05)	(0.03)	(0.05)
Premium*Post15	−10.89	−2.71	−0.02	0.02	0.01	−0.01
	(17.15)	(38.72)	(0.04)	(0.05)	(0.04)	(0.07)
Observations	2,801	2,004	6,528	3,889	2,801	2,004
R-squared	0.19	0.31	0.24	0.29	0.20	0.35
Years	12–15	12–15	12–15	12–15	12–15	12–15
Cluster level	state	state	state	state	state	state
Controls	x	x	x	x	x	x

The model is specified in Eq. (1). Controls include age, gender, education, marital status, metropolitan area of residence, ethnicity, income categories, a weekend dummy, monthly state-level unemployment rates, and state, month, and year fixed effects. Standard errors are clustered at the state level. ATUS weights are applied. Labor supply is measured in minutes per day, preserving the diary format. Employment probabilities are measured on a 0 (not employed) to 1 (employed) scale. Part-time is a dummy variable equal to 0 (full-time) or 1 (part-time), constructed using only the sample of workers. Statistical significance is denoted as: $p<0.10$ = *, $p<0.05$ = **, $p<0.01$ = ***

already noted, our study is the first, to the best of our knowledge, to investigate the labor market effects of the ACA Premium Tax Credit.

6 More outcomes: other uses of time

As individuals increase or reduce the time devoted to paid work, other uses of time will vary in opposite directions, given the overall time constraint of having only 24 h a day. In particular, we focus on household work and leisure activities.[17] This helps us gather the full picture of the effects of the ACA pillar considered on Ameri- cans' daily life. The results of the estimation are reported in Table 9.

We find that access to public health insurance (the Medicaid expansion pillar) increased household work by over a quarter of an hour per day, on average. The time spent on household management activities (which include financial management, doing administrative practices, etc.) also went up, by about ten minutes per day, on average. Caring for individuals from other households (remember, we consider childless households), and also volunteering activities, increased by over a quarter of an hour per day, on average. Leisure time was not affected significantly, except for playing sports, which fell by about ten minutes per day.

[17] See Appendix A3, Table A3 for details of the time use outcomes.

Table 9 Time use

Outcomes	Voluntary Activities	House work (main)	House work (Management)	Leisure	Sports
	(1)	(2)	(3)	(4)	(5)
Ypov*StateMed*Post14	−2.42	5.04	7.36*	24.06	−8.60*
	(6.85)	(10.80)	(4.07)	(38.23)	(5.09)
Ypov*StateMed*Post15	17.38*	16.24*	10.21*	3.82	−4.79
	(9.89)	(9.60)	(5.88)	(28.07)	(6.49)
Premium*Post14	3.30	−4.45	0.64	−27.65*	−2.72
	(3.67)	(4.87)	(1.90)	(14.09)	(3.82)
Premium*Post15	3.73	−2.41	0.44	−8.79	−2.02
	(3.37)	(6.11)	(1.79)	(12.61)	(3.47)
Observations	10,417	10,417	10,417	10,417	10,417
R-squared	0.05	0.12	0.05	0.17	0.07
Years	12–15	12–15	12–15	12–15	12–15
Cluster level	state	state	state	state	state
Controls	x	x	x	x	x

The model is specified in Eq. (1). Controls include age, gender, education, marital status, metropolitan area of residence, ethnicity, income categories, a weekend dummy, monthly state-level unemployment rates, and state, month, and year fixed effects. Standard errors are clustered at the state level. ATUS weights are applied. Activities are measured in minutes per day, preserving the diary format. Statistical significance is denoted as: $p<0.10$ = *, $p<0.05$ = **, $p<0.01$ = ***

In contrast, access to private health insurance (via the ACA Tax Credit pillar), did not affect household work or care for other households and volunteering, but overall reduced leisure time by about half an hour per day.

7 Discussion and conclusion

A vast literature has examined the economic effects of health care reforms. In this study we investigate the time allocation effects of the Obama Care reform, also known as the Affordable Care Act (ACA), which dramatically expanded access to both public and private health care in the United States. In particular, we investigate the impact on labor supply of two ACA pillars: the Medicaid expansion to households with income below 138% of FPL, which was implemented at different points in time by different states and the Premium Tax Credit, which was implemented in all states in 2014, but whose income eligibility threshold varied, depending on whether states had already implemented the Medicaid expansion.

We focus on direct beneficiaries of the Medicaid expansion including civilian non-disabled childless households aged 27–64 years old, who were not eligible for public health care before ACA, and we use data drawn from the ATUS daily diaries, to estimate a triple differences model that identifies the effects at stake by exploiting variations across states, over time and by income eligibility thresholds.

We find that the ACA Medicaid expansion reduced the hours worked by eligible individuals by over an hour per day, especially so for women, older workers aged above 50, and those without a college degree. In line with this, part-time work increased by about 14%, especially so for Whites. We also find that the reduction in hours worked went together with an increase in household work (by about a quarter of an hour per day, on average), and especially in household management activities (which went up by an extra ten minutes per day, on average). The time spent caring for other households and volunteering also increased (by over a quarter of an hour per day, on average), while playing sports dropped by almost ten minutes per day, but other leisure activities were not significantly impacted.

On the contrary, our findings suggest that the introduction of the Premium Tax Credit Pillar can be associated with an increase in employment by about 7% points, and a reduction in leisure time by almost half an hour per day. These findings are robust to several robustness checks.

Overall, our findings confirm earlier literature linking the Medicaid expansion to reduced working hours and increased part-time employment; moreover, our work shows that the reduction in working hours reflects an increase in other uses of time – especially housing chores and voluntary activities.

From an empirical point of view, this paper strengthens earlier literature using an alternative dataset (i.e., ATUS) able to provide a more fine-grained view of work as well as other uses of time. At the same time, our empirical strategy simultaneously accounts for the introduction of the Premium Tax Credit, as well as the Medicaid expansion leveraging a triple difference in difference estimates – thereby providing results that may preserve both strong robustness and potentially higher external validity if compared to differences in discontinuity around the 138% FPL threshold leveraged by Aslim (2022).

The effects of the ACA reform on the labor supply emerging from our analysis might be driven by two possible mechanisms. First, workers might reduce their labor supply as they might now be able to afford cheaper access to healthcare coverage. This mechanism would suggest that within the US welfare system healthcare has been effectively used as a workfare policy. In other words, despite access to healthcare being widely considered as a fundamental human right, in the US context, it might generate sub-optimal labor supply decisions and lower quality job matches, which in turn might negatively affect productivity.

From a theoretical perspective, labor market matching models (e.g. Mortensen & Pissarides, 2011) maintain that high levels of risk aversion may exacerbate workers' search costs and thus undermine the efficiency of the job matching process. The literature refers to this phenomenon as "job lock" which may cause a significant reduction in labor market productivity and economic growth (Madrian, 1994; Aslim, 2022). This argument suggests that increasing access to healthcare coverage by modifying the eligibility threshold might produce higher matching efficiency, and thus productivity gains over the longer term.

Second, workers might as well adjust their labor supply to ensure they are eligible for the Medicaid expansion. If this were the case, the US welfare system would force workers into a detrimental trade-off whereby they might either maximize their income or secure access to healthcare. This strategic working hours adjustment also has detrimental effects on labor market performance as it limits the optimal number of working hours chosen by an individual (Nakajima and Tuzemen, 2016, Heim et al., 2021).

Both mechanisms suggest that raising the means-tested threshold for public healthcare access might improve labor market efficiency, even if it temporarily increases part-time work. Notably, only universal healthcare coverage may be able to fully eliminate the perverse incentives embedded in strict means-tested systems. Indeed, universal healthcare coverage may be desirable not just due to moral concerns around making healthcare access dependent on employment status, but it could also enhance overall labor markets' performance.

In sum, while our analysis focuses on short-term outcomes, a fuller understanding of the costs and inequities arising from stratified healthcare access requires examination of long-term consequences. Overall, the evidence supports the view that expanding public healthcare access can yield positive effects on labor market performance.

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