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## The Effects of State and Federal Mental Health Parity Laws on Working Time

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## Abstract

This paper provides new empirical evidence on the impacts of state and federal mental health parity laws on related labor market outcomes, particularly working time. Implemented in the last two decades, these policies aim to eliminate differences in mental and physical health benefits among group health plans. The mandated benefits for mental health drive up the costs of providing health insurance substantially. In response, employers may avoid hiring more full-time workers, whose compensation includes health insurance, by increasing working time per worker and reliance on part-time employment. Employees may also have an incentive to increase their labor supply to qualify for the benefits. Using individual-level data from the Current Population Survey and exploiting policy variation by state and year, I find state parity laws increase average weeks worked by 1.4 percent. Since self-insured firms are exempt from state regulations, parity is estimated to have nearly twice as large an effect on small firms as it does on large firms. Moreover, I study two federal parity laws and find the more comprehensive one is associated with 1.7 percent more weeks worked. Overall, there is no substantial evidence that parity laws significantly affect hours worked and prevalence of coverage.

**JEL No.** I13; I18; J22

**Keywords:** State Mental Health Parity; Federal Mental Health Parity; Group Health Insurance Costs; Hours/Weeks Worked

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## 1. Introduction

Group insurance is the leading source of health coverage in the American market;<sup>1</sup> thus, the related legislation has been politically salient for decades. The regulations of the issuance, content, and price of group health plans are expected to reduce the number of uninsured persons, or further, ensure the covered population can access the appropriate level of health care. One major type of state regulation that has seen tremendous growth in the past 20 years is mandated health insurance benefits. It requires group insurance coverage to include a particular type of medical procedure or treatment, such as maternity care, diabetes supplies, cancer screening, mental illness treatment, or drug and alcohol abuse treatment. These mandates increase the well-being of workers who value such medical services because they can have better health insurance protection under the regulations.<sup>2</sup> However, compliance with mandates also means the inclusion of extra medical services, which increases the employers' group insurance provision costs. The purpose of this paper is to examine several labor market consequences of one typical mandated benefit: mental health parity laws that prohibit insurers from discriminating between coverage for mental and physical health care.

Traditionally, the benefits for mental health in group insurance plans have had more restrictions than physical health (American Psychological Association, 2010). To reinvent mental health and substance abuse care, many states have passed mental health parity laws to require

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<sup>1</sup> Two-thirds of the nonelderly population is covered by group health insurance plans related to the workplaces of their own or their family members; more than half of workers take health insurance from their employers (Henry J. Kaiser Family Foundation/Health Research and Educational Trust, 2012).

<sup>2</sup> According to Summers (1989), mandated benefits are similar to public programs financed through benefit taxes, and they can save some inefficiencies of public good provisions.

equal coverage for mental and physical illnesses for fully insured group plans.<sup>3</sup> The federal government has also taken steps to promote more comprehensive coverage for mental health in employer-sponsored plans as part of the Mental Health Parity Act (MHPA), effective in 1998, and the Mental Health Parity and Addiction Equity Act (MHPAEA), started in 2010. The MHPAEA continues and expands the MHPA and is still active in the context of the Patient Protection and Affordable Care Act (PPACA). Employer-sponsored plans, which are referred to in both federal parity laws, include fully insured plans as well as self-insured arrangements.<sup>4</sup>

For employers, complying with parity laws drives up the costs of providing group coverage substantially, because those laws require insurers to pay for the mental health care previously funded by consumers. One factor associated with the costs of parity laws is the extent of differential coverage of mental and physical health before the legislation. The Employer Health Benefits Survey of 1991 (Health Insurance Association of America) presents that more than 80 percent of workers covered by group insurance have mental health benefits, but nearly 70 percent of the group plans featuring those benefits impose stricter limitations on mental health care than on physical care. Those limitations include lower annual or lifetime dollar limits, less inpatient and outpatient services, office visits, emergency care and prescription drugs, or higher deductibles, copayments and coinsurance (United States General Accounting Office, 2000 and Henry J. Kaiser Family Foundation/Health Research and Educational Trust, 2002).<sup>5</sup> Therefore, most group health plans need to scrutinize their plan design to comply with mental health parity laws.

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<sup>3</sup> Fully insured plans refer to the plans provided by an insurance company to cover the employees and dependents and signed contracts by employers.

<sup>4</sup> Self-insured plans are the health or disability benefits provided by employers with its own funds to their employees.

<sup>5</sup> Only the 2002 survey asked a special series of questions about mental health benefits for each plan.

The determinant of parity law costs is the amount the premium increased after adding equal mental health benefits to a policy or increasing the generosity of the current benefits in a package. Many of the commonly mandated benefits significantly raise the price of individual and family coverage (The Bureau of Labor Statistics Employee Benefits Survey, 1981-1984), and mental health mandates belong to one of the highest-cost mandates (Gruber, 1994). According to the cost assessment of each state mandates provided by the Council of Affordable Health Insurance in 2009,<sup>6</sup> mental health parity is estimated to increase the average premium by 5–10 percent, even the minimum mental health benefits mandates and alcoholism/substance abuse mandates increase the premium by 1–3 percent.<sup>7</sup>

As the cost of providing group health benefits increases, several labor market outcomes may register adjustments because the labor demand for full-time workers decreases. First of all, lower wages may offset the higher-value health plans if workers are paid with the same level of compensation packages.<sup>8</sup> Secondly, when constraints limit the ability to lower wages, employers may want to substitute part-time workers who are exempted from group coverage provision for full-time workers.<sup>9</sup> Also, employers may increase working time per worker instead of adding additional workers when considering a health insurance provision as a quasi-fixed cost of

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<sup>6</sup> CAHI's independent Actuarial Working Group on State Mandated Benefits analyzed company data and their experience to provide cost range estimates (less than 1 percent, 1–3 percent, 3–5 percent and 5–10 percent) if the mandates were added to a policy that did not include the coverage. These estimates are based on real health insurance policies instead of theory or modeling.

<sup>7</sup> It is possible that employers may decrease the generosity of other benefits which are not mandated; increase the premium share of employees or other non-health fringe benefits to keep the total employment costs unchanged. But no evidence shows that there is a decrease in neither generosity nor non-health fringe benefits because of the parity laws (Anand, 2011). Although in Gruber and McKnight (2003)'s paper, they indicate that part of the increased employee contributions to premium is coming from the rising costs, but not all of the increased costs can be transferred to employees' contribution.

<sup>8</sup> Compensation package usually includes direct benefits (such as wages and bonus) and indirect benefits (such as insurance and pensions).

<sup>9</sup> According to Internal Revenue Service nondiscrimination rules require if group health insurance is offered, it should be offered to all full-time workers.

employment. Lastly, if the provision of group health insurance is voluntary, employers may choose to stop offering the health plan when the prices are too high; then, the average group coverage may be reduced.

Except for the demand side, the enactment of mental health parity laws may also impact the labor supply side in both extensive and intensive margins. The magnitude of the extensive labor supply response depends on how much the individuals value the benefits. If the mental benefits are valued, individuals may increase the labor supply to get workplace coverage and take advantage of the new benefits. As for the intensive margin, parity laws may increase the working hours/weeks. To stay in the same utility level, some full-time employees may increase their working time to obtain more consumption goods because parity may lower the previous wage compensations; part-time workers may also increase their working hours to be eligible for group health insurance provisions. In addition, improvement of mental health care access may lead to more utilization and better mental health outcomes, and there are theoretical and empirical reasons for expecting that better mental health will increase productivity.

The theoretical prediction about the change in direction of working time after mental health mandates is ambiguous, and consistent empirical evidence on that is also lacking;<sup>10</sup> thus, my paper focuses on finding new empirical evidence on the effect of parity laws on working time. To identify causal effects, I first merge state by year policy variation to the individuals in the Current Population Survey March supplements from 1992 to 2010. My results suggest that for 25 to 64-

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<sup>10</sup> Even though wages are predicted to be lower in theory, the existing studies about the effect of state mental health mandates do not find a significant negative effect on wages. Thus, I look at the effect of state mental health parity laws on hourly wages with more comprehensive policy data in a longer period, and the result is still insignificant. Then my “reserve experimental” of 2010 federal parity law also suggests a small and insignificant effect on wages. The results are shown in Appendix Table A2.



year-old workers in the private sector, there is a 1.4 percent increase in weeks worked per year in the parity states during this time period. For workers who are 35 to 44 years old, state mental health parity also increases their probability of working part-time by 1.8 percentage points, and their average hours worked per week decrease by 1.7 percent due to this employment composition change. Since self-insured firms are exempted from state mandated regulations, I also compare the effect of the parity laws on small firms and large firms as the latter are more likely to self-insure. As a result, state parity increases the weeks worked approximately 1 percent more for workers in small firms than in large firms.

I then examine the effects of two federal parity laws to see whether they confirm my previous findings. The MHPA effective in 1998 and the MHPAEA effective in 2010 can both be treated as “reverse experiments” by making states with existing state parity laws useful as a set of controls. The before-and-after comparisons of experimental states (that had not adopted their own parity laws before the year of the federal legislation) and non-experimental states (that had already adopted their own parity law before the enactment year of the federal legislation) indicate that the MHPA has little effect on working time.<sup>11</sup> However, the MHPAEA, a stronger federal law than the MHPA, increases weeks worked by 1.7 percent. The findings on these parity laws pass a pre-trend check and are robust to the inclusion of state, year, and region-by-year effects, as well as state-specific time trends.

The variables of working time (hours and weeks worked) used in my empirical analysis can be considered as equilibrium outcomes that reflect the information from the demand side of the employer combined with the supply side of the employee. One of the caveats in this paper is that

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<sup>11</sup> There are two federal laws effective in different years, so the research periods of two “reverse experiments” depends on the actual enactment years.

I cannot empirically separate them from each other. Also, the most affected population, which are workers with mental illness or with a high risk of getting sick, cannot be analyzed separately since they are not a demographically identifiable group;<sup>12</sup> thus, the increase in working weeks is an average estimate for the general workers regardless of their mental health status. According to the previous literature together with some suggestive empirical evidence discussed in the following sections, I would like to argue my findings as an “efficiency costs” rather than “equity benefits” story. This positive effect on working weeks is mainly driven by an increase in health insurance costs or a positive incentive of extensive margin of labor supply, but not the better mental health outcomes.

The rest of the paper proceeds as follows. In Section 2, I first introduce the conceptual framework for the economics about group health insurance mandates, followed by an introduction to mental health parity and the legislative variation at both the state and the federal level. After a review of previous literature in Section 3, I use Section 4 to illustrate the empirical work for the effect of state mental health parity laws. It also includes data, methodology, and results. In Section 5, I provide the “reverse experiments” of two federal parity laws following similar steps to Section 4. Section 6 checks the identification assumptions and sensitivity of the results. Section 7 provides a brief discussion of the mechanisms of the effect of parity laws on working time. And Section 8 concludes.

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<sup>12</sup> If a mandate expands benefits for a demographically identifiable group within a workplace, it is called “group-specific mandate” such as mandated maternity benefits mentioned in Gruber (1994).

## 2. Background

### **2.1 Conceptual framework about group insurance mandates and the labor market**

In this section, I discuss the conceptual framework that motivates my empirical analysis. The existing theoretical studies indicate that the implementation of health insurance mandates raises the costs of providing group health insurance. In response to it, the labor demand and labor supply may both shift, and several aspects of the labor market, such as employment, wages, working time, and group insurance coverage, may change based on the new equilibrium.

Summers (1989) considers the economics of mandated benefit proposals. His supply and demand model shows that imposing a mandated benefit requires employers to pay more for employees; if workers value the benefit, the labor supply increases while labor demand decreases. A new equilibrium outcome shows lower wages and an ambiguous change in employment. Gruber and Krueger (1991) provide a more formal model and derive that the effect of mandated benefits on the labor market depends on the elasticities of labor demand and supply, the cost of the benefits, and how much employees value the benefits.

Applying the above-analysis to health insurance, Summers suggests that mandating group health insurance should not affect the decisions about workers' hours worked because health insurance is a fixed cost, and workers do not get more group insurance with more hours worked. However, Feldman (1993) argues that the income effect created by mandated lump-sum benefits is too large to be assumed away. After imposing the mandates, health benefits improve and other consumption goods decrease. Thus, if labor supply is treated as divisible hours, mandated health benefits should cause employees to increase their working hours to obtain more consumption goods and keep the same level of utility.

Feldman provides the mechanism of increasing hours worked from employees' margins. On the other hand, Culter and Madrian (1998) emphasize the mechanism that employers also have the incentive to ask more hours from fewer workers when the fixed costs of employment increase. Their framework is briefly introduced as follows. Let  $f(H \cdot N)$  be the firm's production function, and  $C = N \cdot M(H, P)$  be the cost of hiring workers. The variable  $H$  represents the hours;  $N$  represents the number of employees. And  $M(H, P)$  is a function of total compensation which depends on the hours  $H$  and the price of benefit  $P$ . The firm chooses  $N$  and  $H$  to maximize profits:

$$\max_{H,N} \pi = f(H \cdot N) - N \cdot M(H, P) \quad (1)$$

This profit function makes the assumptions that workers and hours are perfect substitutes, and employers offer employees a wage/hours bundle instead of an hourly wage with flexible hours. After totally differentiating the two first-order conditions of equation (1) and rearranging the terms,  $dH/dP$  can be solved as:

$$\frac{dH}{dP} = \frac{\frac{M_P}{H} - M_{PH}}{M_{HH}} \quad (2)$$

And  $dN/dP$ :

$$\frac{dN}{dP} = -\frac{N}{H} \frac{dH}{dP} + \frac{M_P}{H^2 f''} \quad (3)$$

Equation (2) implies that the effect of increasing benefit price depends on the average cost of an additional hour relative to the marginal cost of an additional hour. From equation (3), increasing health insurance costs changes both hours worked and the number of workers employed. And if the effect on hours worked is positive, the effect on employment should be negative, and vice versa. To conclude: all the relevant models about the effect of benefit costs

on labor market outcomes have implications for the changes in wages, working time or employment.

## **2.2 Introduction of mental health parity laws**

Approximately 30 percent of the US population is estimated to experience some level of diagnosable mental illness or substance use disorder (Kessler et al., 1994). However, private health insurance policies in the US do not cover the treatment of mental illness and substance abuse in the same way as physical illnesses, which results in the majority not receiving appropriate treatment. Since the 1950s, mental health has been integrated into the mainstream healthcare system since the 1950s, and it has been under the spotlight in state and federal legislative sessions for decades. Efforts to improve the mental health benefits in group health insurance plans dates back to the 1970s when a few state legislatures began to establish mandatory minimum benefit levels for substance use disorder or mental illness. Until the late 1980s, the majority of legislative activities required insurers to provide only a certain level of coverage for mental health conditions, and they were more related to substance use disorder, especially alcoholism.

In the early 1990s, to further minimize the disparities between physical and mental health coverage, some states began to enact mental health parity, which requires equal coverage for physical and mental illness, for fully insured firms. To be more specific, parity laws typically prohibit insurance companies from offering insurance plans that place greater financial requirements or treatment limitations on mental illness than on physical illness.<sup>13</sup>

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<sup>13</sup> Financial requirements include deductibles, copayments, coinsurance rates, and out-of-pocket limitations. Treatment limitations include numbers of covered hospital days and outpatient office visits.

By 2010, 28 states had mental health parity laws, although these laws vary on their scope and application. Some states, such as Oregon and Vermont, have more comprehensive parity laws; they require equal coverage for mental illness including all of the broad-based mental health disorders,<sup>14</sup> and this applies to all significant policy groups. Meanwhile, some states, such as California and Massachusetts, impose parity laws containing more limits and exemptions for specific mental health conditions or certain groups.<sup>15</sup> The other states that have not adopted mental health parity can be broadly divided into three categories: mandated offering, minimum benefit mandates, and no mental health mandates. Mandated offering states require the same coverage for mental and physical illness with the condition that the insurers offer mental health coverage, or require the plan to offer an option of equal mental health coverage. Minimum benefit mandated states only mandate a minimum level of mental health coverage that is not required to be equal to other medical conditions. And no mental health mandates at all means the states do not have any regulation about mental health coverage.<sup>16</sup> From 1992 to 2010, every state except Wyoming had either parity laws or some type of mental health mandate.

Fig. 1 shows the states that enacted mental health parity laws in four different years. It indicates the roll out of state parity law legislations during the research period. The data on the regulatory regime comes from several sources, including the Substance Abuse and Mental Health Service Administration (SAMHSA), Center for Mental Health Services (CMHS) of the U.S.

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<sup>14</sup> Broad-based mental health disorders refer to a relatively broad range of mental illness including almost any psychiatric, neurological, substance abuse, developmental, or intellectual disorder.

<sup>15</sup> Specific mental health conditions usually mean major mental illness, typically defined in statute as schizophrenia, schizoaffective, disorder, psychotic disorders, bipolar disorder, major depression, panic disorders, and obsessive-compulsive disorder. Certain groups refer to large firms or state employees.

<sup>16</sup> In the following empirical analysis, I use a single dummy to identify state parity law under the generalized definition. If the state has any parity, no matter how its strength is, the dummy equals 1, if 0 otherwise even though it has mandate offering or minimum benefit. I do not consider the different effects of different types of parity laws because the boundaries for these parity laws are not well defined and the rising costs of them are similar.

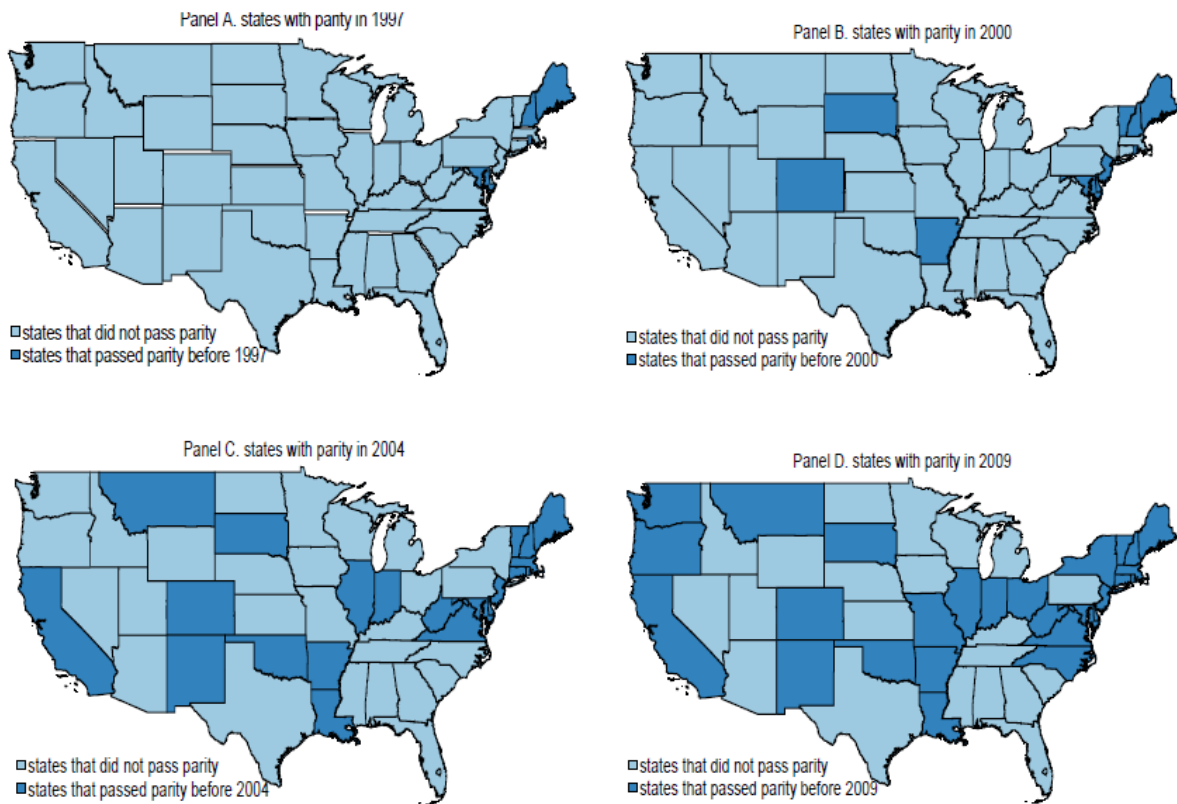
Department of Health and Human Services, the National Alliance on Mental Illness (NAMI), the National Conference of State Legislatures, the Blue Cross Blue Shield Association (BCBSA), and specific state laws and statutes.<sup>17</sup>

In addition to the growing popularity of mental health parity laws at the state level, the federal government also succeeded in pressing for mental benefit parity nationwide in 1996. The Mental Health Parity Act (MHPA, effective in January 1998) requires group insurance plans to apply the same lifetime and annual dollar limits on mental health coverage as those applied to physical health coverage. Group health insurance plans under the federal parity context include the plans provided by private and public sectors with more than 50 employees and the plans sold by health insurers to employers with more than 50 employees. Comparing the extent and scope of the MHPA to state parity legislation, the former does not go well beyond the state's full or nearly full parity because the statute only applies if mental health benefits are offered in an insurance plan. From this point of view, the MHPA could be considered as a "mandate offering" law, or even a weaker one, because it only requires the same dollar limits. However, state parity laws exempt self-insured employer-sponsored plans because of the Employee Retirement Income Security Act (ERISA). This federal preemption cuts the number of potentially affected workers with coverage by half. The MHPA fills this regulatory gap and thus reaches more employees than parity at the state level.

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<sup>17</sup> All of the data sources are reliable about the year of state mandates, but inconsistencies still exist between them. To improve the quality of policy enactment year, I use specific state laws and statutes to double check if other data sources cannot provide the consistent effective year. The specific policy coding is available upon request.

Fig. 1. States Mental Health Parity Laws



With the sunset provision of the MHPA in 2008, a new federal law called the Mental Health Parity Act and Addiction Equity (MHPAEA, effective in July 2010) took place in mandating non-discriminatory coverage for mental and physical health conditions. Continuing the parity rules required by the MHPA, the MHPAEA expands the scope of MHPA by including substance use disorders. It also expands the MHPA requirement of parity on lifetime limits and annual dollar limits by adding additional protections relating to financial requirements, treatment limitations, and out-of-network benefits. To be more specific, the financial requirements (such as deductibles, copayments, coinsurance, and out-of-pocket limitations) imposed by group plans to Mental Health/Substance Use Disorder (MH/SUD) benefits cannot be more restrictive than those



applicable to other medical benefits. Similarly, treatment limitations, and extra restrictions on frequency of treatment, number of visits, days of coverage, and scope or duration of treatment, are not allowed to apply to the MH/SUD. What is more, if a plan or insurer offers medical benefits on an out-of-network basis, it should offer the MH/SUD benefits on an out-of-network basis too.

### 3. Literature Review

As discussed earlier, the labor demand and labor supply could both be affected by rising group insurance costs and the expansion of health care access after the implementation of mandates. Previous studies primarily focused primarily on the effect of the enactment of mandated health benefits on related labor market consequences, such as employment, wages, hours and weeks worked, labor input composition or some health insurance outcomes such as group coverage and generosity of non-wage compensation.

Because mandated benefits are widely believed to increase health insurance costs, I start the discussion from a group of literature that looks at the direct effect of rising health insurance costs on labor market outcomes. The evidence that lower wages offset cost increases has already been provided by previous studies (Gruber and Krueger, 1991; Sheiner, 1999; Baicker and Chandra, 2006; Kolstad and Kowalski, 2012). But the empirical findings of the change in work hours are mixed. Culter and Madrian (1998) show that rising health costs increase the hours worked of those with health insurance by up to 3 percent. In contrast, Baicker and Chandra (2006) estimate that a 10 percent growth in health insurance premiums reduces hours worked by 2.4 percent because the likelihood of a worker being part-time increases by 1.9 percentage points.

By using the variation of state and federal level legislation on group maternity benefits, Gruber (1994) considers the labor-market effects of mandated maternity benefits and finds

substantial shifting of the costs to the wages and little effect on total labor input of the targeted group. He also investigates the presence of state regulations which mandate that group health insurance plans must include certain benefits have little effect on the rate of insurance coverage in another project (1994). Kaestner and Simon (2002) find that state-mandated health insurance benefits have no statistically significant effect on wages, weeks of work and group insurance coverage, but do increase weekly work hours from 1989 to 1998. Cseh (2008) and Lang (2013) study the effect of enacting the state mental health parity law during several years but find no evidence these mandates significantly affect labor market outcomes. The most recently study about the labor market effects of parity laws is provided by Anderson (2015). Using the state by year legislative variation between 1997 and 2001, he suggests that parity mandates improve the labor market outcomes of workers with mental distress.

Furthermore, there are some case studies on states with other mandated regulations. Hawaii has the most durable employer health insurance mandates in the United States: Hawaii's Prepaid Health Care. Hawaii's law does not lower the wages and the employment possibilities but increases the reliance on part-time workers who are exempted from the law (Thurston, 1997; Buchmueller et al. 2011). Massachusetts also has "mandated-based" health reforms. Kolstad and Kowalski (2012) show that the jobs with employer-sponsored health insurance pay lower wages because of the newly insured value group coverage.

The literature about mental health mandates is not limited to the labor market effect, their impacts on mental health care service utilization and mental health have also been broadly studied. According to most of the literature on early-stage parity laws, there is no statistically significant evidence to show that state parity improves access to mental health care (Sturm and

Pacula, 1999; Pacula and Sturm, 2000; Bao and Sturm, 2004). Maybe it is difficult to identify the causal effect of mental health parity on those access or health outcomes because the law adoption is correlated with them. To solve that, Klick and Markowitz (2006) examine the impact of mental health insurance mandates on suicide rates at the state level with two-stage least square estimators, but mental health mandates are still not effective in reducing suicide. As for more recent parity laws, an increase in mental health utilization associated with these mandates is found for small firms (Busch and Barry, 2008). And Lang (2013) presents a reduction in suicide rate also.

However, the evidence on the impact of state mental health parity on the labor market, especially working time and part-time worker employment is still lacking. My study adds to the previous literature in two ways. First, I provide a comprehensive empirical analysis of the effect of state mental health parity laws on working hours/weeks during a long time period that covers all the development of all state parity legislations. And I also show the variation in effects among different age groups, genders, and firm sizes. Second, I provide new evidence on the effects of two federal mental health parity laws (the MHPA and the MHPAEA) on working time by a “reverse experiments.” The analysis of federal mandates can further confirm my earlier findings, and provide suggestive evidence for the mechanisms of the effect on working time.

## 4. The Effect of State Mental Health Parity Laws

### 4.1 Data and methodology

The first goal of my empirical work is to identify the effect of state mental health parity laws; this analysis is based primarily on repeated cross-sectional data from 1992 to 2010 Current Population Survey’s March Supplement (IPUMS-CPS, University of Minnesota). I restrict the

sample to individuals aged 25 to 64 who were employed in the past year in the private sector and were not self-employed. Limiting the sample to prime-age employees eliminates changes in coverage due to school enrollment, parents' coverage, or retirement. Besides abundant individual characteristics (such as age, gender, race, marital status, the number of children, union status, education, firm sizes, occupation, and industry), the data indicates the usual weekly hours worked last year and weeks worked last year.<sup>18</sup>

In Table 1, I report the summary statistics for the entire sample and the states with and without access to mental health parity separately.<sup>19</sup> Workers in parity states have similar hours and weeks worked, and a slightly higher possibility of being part-time than ones in non-parity states.<sup>20</sup> Differences in other demographic characteristics between parity states and non-parity states are not very striking.

Table 1: Summary Statistics: Weighted Means

	All states (51)	Parity states (28)	Non-Parity states (23)
<b>Outcomes</b>			
Hours/week	40.576 (10.275)	40.421 (10.226)	40.791 (10.337)
Weeks/year	47.561 (10.732)	47.528 (10.757)	47.605 (10.696)
Part-time	0.069 (0.254)	0.072 (0.258)	0.066 (0.249)
Coverage	0.753 (0.431)	0.756 (0.430)	0.750 (0.433)

<sup>18</sup> After I limit my sample to workers in private sector, both the hours and weeks worked reported by them are positive numbers. There is no need to consider about "0" when I take the "log" on them in regression analysis.

<sup>19</sup> Parity states represent the states with comprehensive or limited parity laws. Non-parity states refer to all other states.

<sup>20</sup> The latest Internal Revenue Service nondiscrimination rule (Internal Revenue Bulletin: 2015-2) defines full-time employees are employees who are expected to work more than 30 hours/week. But part-year workers are also exempted from the benefits. Section 1.410(a)(-3)(e)(2) (The code from Employee Plans Division) requires 1000 hours/year of service as a condition of participation, also excludes a part-time or seasonal employee. Thus, I use 25 hours/week as a cutoff of part-time workers who are most likely to be exempted from group health insurance by assuming non-seasonal employee works at least 40 weeks/year.

<b>Demographics</b>			
Age	41.126 (10.381)	41.116 (10.372)	41.141 (10.394)
Male	0.534 (0.499)	0.534 (0.499)	0.533 (0.499)
Non-white	0.170 (0.376)	0.179 (0.384)	0.157 (0.364)
Married	0.630 (0.483)	0.624 (0.484)	0.638 (0.481)
Number of children under 5	0.197 (0.496)	0.196 (0.494)	0.198 (0.499)
Less than high school	0.117 (0.322)	0.118 (0.322)	0.117 (0.321)
High school	0.334 (0.472)	0.324 (0.468)	0.349 (0.477)
Some college	0.281 (0.449)	0.274 (0.446)	0.290 (0.454)
Bachelor or higher degree	0.268 (0.443)	0.285 (0.451)	0.244 (0.430)
N	1025094	594602	430492

Notes: Supplement weights are used. Standard deviations are reported in parentheses. The sample used is pooled CPS March supplement from 1992 to 2010. Observations restricted to workers between age 25 and 64 in private sectors.

I estimate the impact of state parity laws by accessing the change in working time of workers in states with parity from before to after policy adoption, and comparing it to the change in working time of workers in states that do not adopt mental health parity. To control for other determinants and any systematic shocks to the labor market outcomes of the treatment states that are correlated with, but not due to, the enactment of parity laws, I use the basic estimating equation as follows:

$$Y_{ijt} = \beta_0 + \beta_1 Parity_{jt-1} + \beta_2 X_{ijt} + \gamma_j + \delta_t + \pi_j \cdot \delta_t + \gamma_j \cdot t + \epsilon \quad (4)$$

In this equation, the dependent variable  $Y_{ijt}$  is one of the measures of working time for worker  $i$  in state  $j$  reported in year  $t$ . I code a state as having parity law in year  $t$  if it had been in effect by the last day of year  $t - 1$ , thus  $Parity_{jt-1}$  is a dummy variable that equals one if the

state ever had a mental health parity law, and zero otherwise.  $X_{ijt}$  indexes a set of individual level characteristics: age, gender, educational attainment, race, marital status, the number of children under five, union membership, firm size, occupation, and industry.<sup>21</sup> The regression specification includes state fixed effects  $\gamma_j$ , to control for any differences across states in working time patterns, including any working time differences between the states that adopted parity and those that did not, and year fixed effects  $\delta_t$  to capture any national trends in working hour/weeks. It also includes region-by-year effects to control for region-specific shocks over this time period which are correlated with the passage of these laws, and state-specific time trends can deal with the slow-moving trends in each state. The key coefficient  $\beta_1$  represents the effect of state mental health parity on working time.

This method requires one identifying assumption; the trends picked up by parity laws did not exist prior to the enactment. And it also requires that no contemporaneous shock affects the relative outcomes in the same state-years as parity laws. The fact that the widespread legislative activities on mental health parity change in every state by year during an extended time period makes the assumptions above fairly weak ones. In addition, there is one potential selection issue about limiting the sample to individuals who have employment because parity laws may affect the employment outcome. To relieve this concern, I examine the effect of state parity laws on employment as one of the robustness checks in Section 7.

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<sup>21</sup> CPS March supplement re-coded the occupations and industries since 2003, and I code occupations of all these years into six broad occupational categories using the previous version of definition before 2003. As for industries, I group all industry codes into 11 major categories according to “Revisions to the Current Population Survey Effective in January 2003” given by Mary Bowler, Randy E. Ilg, Stephen Miller, Ed Robison, and Anne Polivka.

## 4.2 Basic results

Table 2 illustrates the regression results of equation (4): the estimates are weighted to make the sample nationally representative. The standard errors are clustered at the state level to control for the autocorrelation within states over time. Columns (1) to (4) report the estimators of parity laws on four outcomes of interest separately: usual hours worked per week, weeks worked last year, whether the worker works part-time (less than 25 hours/week), and group insurance coverage.<sup>22</sup> Working time (such as hours and weeks) is measured in logs. The estimated effect of mental health parity on working time suggests that having a state mental health parity law leads to a 1.4 percent increase in weeks worked based on column (2) (statistically significant at 1 percent level), while columns (1) and (3) show no statistically significant effect on hours worked and the probability of being part-time workers.

As discussed above, we might expect the rising health insurance costs driven by the enactment of state parity, or the improved productivity caused by better mental health care access, to increase the number of weeks worked. But as for hours worked, the results could be ambiguous because parity laws may increase the working hours of full-time workers while simultaneously increasing the demand for low-hour workers.<sup>23</sup> Maybe that is the reason why I could not estimate any significant effect of parity laws on hours worked. In addition, according to column (4), no significant result about the impact on group coverage is found. And the covariates have their expected effects.

Table 2: The Effect of State Parity Laws on Working Time and Coverage

	(1) Log hours/week	(2) Log weeks/year	(3) Part-time	(4) ESI coverage
Parity	-0.006 (0.004)	0.014*** (0.003)	0.005 (0.003)	0.004 (0.005)

<sup>22</sup> Under this context, the better measurement of coverage prevalence is having group insurance coverage under own name, but CPS March supplement only has this information about policyholder of own name after 1996. Thus in state parity analysis, I just use group insurance coverage. In federal experiments, I use group insurance coverage of own name.

<sup>23</sup> In Culter and Madrian (1998), they limit their sample to the workers who work more than 40 weeks/year.

Age	0.012*** (0.001)	0.006*** (0.001)	-0.006*** (0.001)	0.012*** (0.001)
Age square	-0.000*** (0.000)	-0.000*** (0.000)	0.000*** (0.000)	-0.000*** (0.000)
Male	0.144*** (0.005)	0.039*** (0.002)	-0.072*** (0.003)	-0.011*** (0.003)
Non-white	0.001 (0.004)	-0.011*** (0.002)	-0.013*** (0.003)	-0.057*** (0.008)
Married	-0.019*** (0.003)	0.012*** (0.003)	0.020*** (0.002)	0.131*** (0.003)
Number of children under 5	-0.023*** (0.002)	-0.019*** (0.002)	0.022*** (0.002)	-0.003 (0.003)
Lower than high school	-0.027*** (0.004)	-0.019*** (0.005)	-0.017*** (0.003)	-0.207*** (0.012)
High school	-0.016*** (0.003)	0.006*** (0.002)	-0.016*** (0.002)	-0.053*** (0.004)
Some college	-0.020*** (0.003)	0.004* (0.002)	-0.004* (0.002)	-0.023*** (0.003)
Union member	-0.000 (0.003)	0.014*** (0.003)	-0.011*** (0.003)	0.093*** (0.008)
<i>N</i>	195534	195534	195534	195534

Note: All regression models include the following additional variables: firm sizes (5 dummy variables), industries (11 dummy variables), occupations (6 dummy variables), year dummy variables, state dummy variables, state time trends and region by year dummies. Omitted education category is "bachelor or higher degree." Omitted firm size category is "more than 1000 employees". Standard errors in parentheses \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

To further examine whether a certain age group or gender is more likely to be affected by the state mental health parity laws, I estimate equation (4) separately by genders and for four age groups (in 10-year age intervals) of workers and report the results in Table 3. As shown in column (1), state parity reduces the hours worked by 1.7 percent for workers aged 35 to 44. Column (3) provides support for the previous hypothesis that hours are reduced because more part-time workers are employed to avoid a higher fixed cost: parity increases the likelihood that a worker is employed part-time by 1.8 percentage points. Furthermore, column (2) presents which kind of employees would be more likely to increase weeks worked because of the parity law. Female



workers and older workers (at least older than 35 years old) increase their weeks worked more than others, as female and older age workers may have a higher risk of mental illness (World Health Organization).

Table 3: The Effect of State Parity Laws on Working Time for Different Types of Workers

	(1) Hours/week	(2) Weeks/year	(3) Part-time	(4) N
<b>Gender</b>				
Men	-0.008 (0.006)	0.009 (0.005)	0.003 (0.003)	102044
Women	-0.004 (0.006)	0.019*** (0.004)	0.007 (0.006)	93490
<b>Age</b>				
25-34	-0.007 (0.007)	0.006 (0.005)	0.003 (0.006)	58219
35-44	-0.017** (0.007)	0.011** (0.005)	0.018** (0.006)	63476
45-54	0.006 (0.008)	0.022*** (0.005)	-0.005 (0.007)	49687
55-64	-0.001 (0.008)	0.026*** (0.007)	-0.003 (0.008)	24152

Notes: Supplement weights are used. The sample used is pooled CPS March supplement from 1992 to 2010. Observations restricted to workers between age 25 and 64 in private sectors. Standard errors in parentheses\*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

### 4.3 The role of state parity laws in small firms

As mentioned in the state policy introduction, because of ERISA, self-insured groups are exempted from the state regulations including mental health parity laws. Thus, state parity laws do not impact the self-insured groups in the same way as fully insured ones; but the decision of being self-insured may be endogenous to state-mandated benefits. Also, the data does not contain information on whether the worker is employed in a self-insured company. Therefore, instead of the real status of the firm, I use firm size to proxy its likelihood of being self-insured: among firms with less than 500 employees, only around 20 percent of them are self-insured while more than 80 percent of larger companies with more than 500 employees are self-insured (MEPS-

IC 2012). And almost 90 percent of firms choose self-insurance when they have more than 1000 employees. I examine the effect of state mental health parity for small groups (less than 500 employees) by allowing separate parity effects on different firm sizes in this section.<sup>24</sup>

$$Y_{ist} = \alpha + \beta_1 Parity_{st-1} + \beta_2 Smallfirm_{ist} + \beta_3 Parity_{st-1} \times Smallfirm_{ist} + X\beta_4 + \gamma_j + \delta_t + \pi_j \cdot \delta_t + \gamma_j \cdot t + \epsilon \quad (5)$$

In this case,  $Smallfirm_{ist}=1$  if worker  $i$  in state  $j$  in year  $t$  works in a small firm, otherwise it equals zero. The coefficient of interest is  $\beta_3$  shown in Table 4. As expected, the effect of state parity on weeks worked per year for small firms is almost twice as large as the effect for large firms that are more likely to be self-insured. In column (2), the average increased weeks for having parity differ from small firms and large firms by 0.8 percent, with small firms having a larger effect of parity on working weeks. The covariates in the model still have their expected results.

Table 4: The Effect of State Parity Laws for Small Firms

	(1) Log hours/week	(2) Log weeks/year	(3) Part-time	(4) ESI coverage
Parityx Small firm	0.003 (0.005)	0.008** (0.003)	0.001 (0.004)	0.013 (0.012)
Parity	-0.007 (0.005)	0.010*** (0.003)	0.004 (0.004)	-0.002 (0.010)
Small firm	-0.031*** (0.002)	-0.020*** (0.002)	0.018*** (0.001)	-0.109*** (0.007)
Age	0.012*** (0.001)	0.006*** (0.001)	-0.007*** (0.001)	0.013*** (0.001)
Age square	-0.000*** (0.000)	-0.000*** (0.000)	0.000*** (0.000)	-0.000*** (0.000)
Male	0.144*** (0.005)	0.039*** (0.002)	-0.072*** (0.003)	-0.010*** (0.003)
Non-white	0.003	-0.010***	-0.014***	-0.052***

<sup>24</sup> I also drop the workers in firms with 500-1000 employees and only compare the firms with less than 500 employees and firms with more than 1000 employees using equation (6), the estimation results are quite similar.

	(0.004)	(0.002)	(0.003)	(0.008)
Married	-0.020*** (0.003)	0.012*** (0.003)	0.020*** (0.002)	0.130*** (0.003)
Number of children under 5	-0.023*** (0.002)	-0.019*** (0.002)	0.022*** (0.002)	-0.003 (0.003)
Lower than high school	-0.030*** (0.004)	-0.019*** (0.005)	-0.015*** (0.003)	-0.213*** (0.013)
High school	-0.017*** (0.003)	0.006** (0.002)	-0.015*** (0.002)	-0.055*** (0.005)
Some college	-0.021*** (0.003)	0.003* (0.002)	-0.004* (0.002)	-0.025*** (0.003)
Union member	0.005* (0.003)	0.016*** (0.003)	-0.015*** (0.003)	0.106*** (0.008)
<i>N</i>	195534	195534	195534	195534

Notes: Supplement weights are used. The sample used is pooled CPS March supplement from 1992 to 2010. Observations restricted to workers between age 25 and 64 in private sectors. Define small firm as one with fewer than 500 employees.

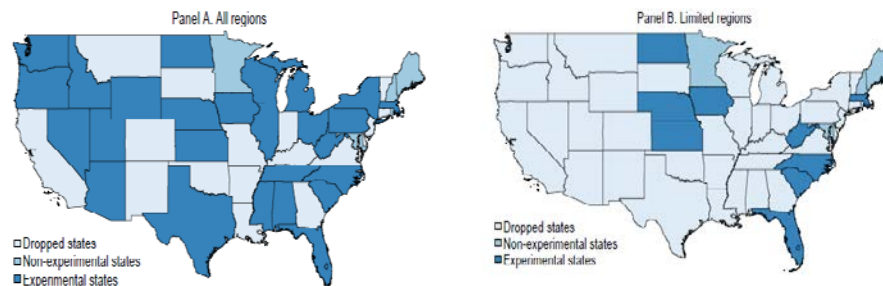
Standard errors in parentheses  
 \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 5. The Effect of Federal Mental Health Parity Laws

### 5.1 Data and methodology

The second goal of this analysis is to investigate the effects of two mental health parity laws at the federal level (effective separately in 1998 and 2010) on working time. This set of legislation provides another distinct opportunity to check the impact of mental health parity on working time; and further supports the findings from previous experiments using state parity laws.

Fig. 2. Experimental and Non-experimental states under MHPA



According to the effective year of the MHPA, I am able to use five states that had already passed parity or mandate offering laws before 1997 as non-experimental states, because their state parity laws are stronger than the federal law, and their health insurance costs are not significantly affected by the federal parity law. On the other side, the 28 states that had not enacted parity laws before 2001 are experimental.<sup>25</sup> However, the remaining 18 states with state parity law changes during 1997 to 2000 cannot be studied simultaneously to identify the impact of the MHPA, because the years 1997 to 2000 include the periods before and after the federal law was put in place (1998). In this case, the enactment of these state parity laws will provide counterfactual trends; thus, I dropped these 18 states from the sample. The experimental, non-experimental and dropped states are shown in Panel A of Fig. 2. And I use year 1997 and 1998 (before), and year 2000 and 2001 (after) the CPS March supplement to study the earlier federal law, the MHPA.<sup>26</sup>

However, for a limitation of this MHPA experiment is that only five states can be used as non-experimental states, and they are limited to three regions: New England, South Atlantic, and West North-Central. To find more powerful experimental states that are more like these five non-experimental states, I only keep 10 experimental states from New England, South Atlantic, and West North-Central, while dropping other experimental states. Thus, I have another set of experimental states that are used to compare with non-experimental states before and after the MHPA. They are shown in Panel B of Fig. 2. Table 5 contains standard demographic information by state status during the MHPA study period, for the two sets of experimental states. There are

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<sup>25</sup> Among the firms with more than 50 employees in states that do not have state parity laws, 86% of them are complying with MHPA 1996 while only 55% complied before 1996. And there is no employer drop the coverage according to a survey of US GAO (2000).

<sup>26</sup> To provide sufficient time to examine the effect of MHPA, I drop the year 1999.

not many striking differences between experimental and non-experimental states: only a small disparity on a number of children and education level.

Compared to MHPA, the MHPAEA, which is the federal law that followed, requires stronger mental health parity; thus, it may impact the labor market more substantially than the earlier law.<sup>27</sup> Furthermore, one advantage of this later “federal experiment” is that by its later enactment year (2008), over half of the states had already passed their own parity or mandate offering laws, and no states changed the law after that. Therefore, I am able to use all states to broadly represent the country. In this case, the experimental states are those that had not passed parity or mandate offering laws before 2009, and the non-experimental states are those that already had their own laws. Fig. 3 presents 18 experimental states and 33 non-experimental states. The MHPAEA went into effect in 2010. Therefore, I use the year 2009 and 2010 as pre-period and 2012 and 2013 as post-period. Column (1) and (2) in Panel A of Table 6 present the means of demographic characteristics for the MHPAEA experimental states and non-experimental states. Once again, the two sets of states are relatively similar: the experimental states have slightly lower educational levels and higher rates of non-white.

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<sup>27</sup> Even with all of the state parity laws as well as MHPA, there still exist differences in group health insurance for MH/SA. Before MHPAEA, coverage for mental health care often required a higher level of cost sharing (e.g., coinsurance of 50 percent compared with 20 percent for outpatient medical services) and treatment limits (e.g., twenty outpatient visits and thirty inpatient days per year). Thus the requirements of MHPAEA can eliminate these historical differences further and aim to create the comprehensive “mental health parity”.

Table 5: Demographic Characteristics by Treatment Status:  
MHPA1996

	Panel A: All regions		Panel B: Limited regions:	
	(1)Experimental States: 28	(2)Non-experimental States: 5	(3)Experimental States: 10	(4)Non-experimental States: 5
Age	40.813 (10.122)	40.813 (10.057)	40.981 (10.239)	40.813 (10.057)
Male	0.530 (0.499)	0.522 (0.500)	0.524 (0.499)	0.522 (0.500)
Non-white	0.149 (0.356)	0.152 (0.359)	0.154 (0.361)	0.152 (0.359)
Married	0.636 (0.481)	0.651 (0.477)	0.625 (0.484)	0.651 (0.477)
Number of children under 5	0.196 (0.496)	0.208 (0.509)	0.184 (0.478)	0.208 (0.509)
Less than high school	0.115 (0.319)	0.079 (0.270)	0.121 (0.326)	0.079 (0.270)
High school	0.354 (0.478)	0.332 (0.471)	0.354 (0.478)	0.332 (0.471)
Some college	0.281 (0.450)	0.280 (0.449)	0.276 (0.447)	0.280 (0.449)
Bachelor or higher degree	0.250 (0.433)	0.309 (0.462)	0.249 (0.432)	0.309 (0.462)
N	139670	15181	41091	15181

Notes: Supplement weights are used. Standard deviations are reported in parentheses. The sample used is pooled CPS March supplement from 1997 to 2001. Observations restricted to workers between age 25 and 64 in private sectors. Limited regions: New England, South Atlantic, West North-Central.

Fig. 3. Experimental and Non-experimental states under MHPAEA

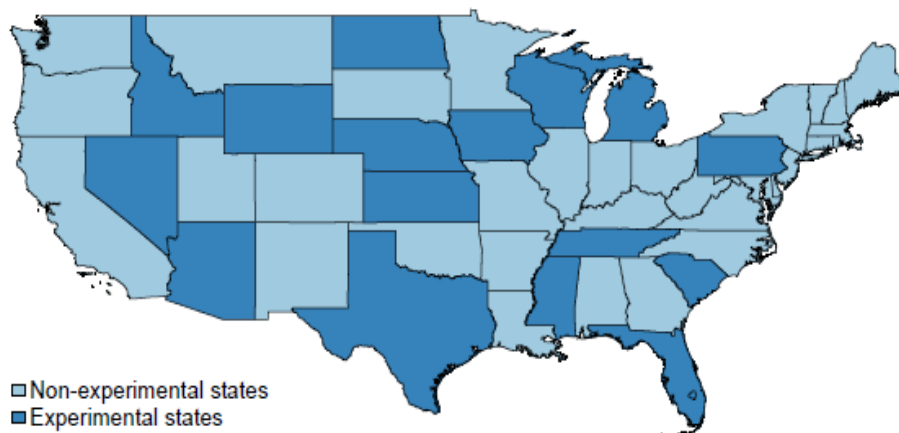


Table 6: Demographic Characteristics by Treatment Status: MHPAEA2008

	Panel A: All states by status		Panel B: Control states by firm size	
	(1)Experimental states (18)	(2)Non-experimental states (33)	(3)Large firms (>500 employees)	(4)Small firms (<500 employees)
Age	42.740 (10.982)	42.578 (10.937)	42.720 (10.908)	42.469 (10.959)
Male	0.532 (0.499)	0.532 (0.499)	0.520 (0.500)	0.541 (0.498)
Non-white	0.168 (0.374)	0.212 (0.409)	0.232 (0.422)	0.197 (0.398)
Married	0.607 (0.488)	0.600 (0.490)	0.606 (0.489)	0.596 (0.491)
Number of children under 5	0.179 (0.482)	0.180 (0.477)	0.183 (0.481)	0.177 (0.475)
Less than high school	0.100 (0.300)	0.095 (0.293)	0.058 (0.234)	0.123 (0.329)
High school	0.311 (0.463)	0.290 (0.454)	0.260 (0.439)	0.313 (0.464)
Some college	0.298 (0.457)	0.281 (0.450)	0.291 (0.454)	0.274 (0.446)
Bachelor or higher degree	0.291 (0.454)	0.334 (0.472)	0.391 (0.488)	0.290 (0.454)
N	104638	202912	87275	115637

Note: Supplement weights are used. Standard deviations are reported in parentheses. The sample used is pooled CPS March supplement from 2009 to 2013. Observations restricted to workers between age 25 and 64 in private sectors.

The effects of the MHPA and MHPAEA on working time can both be estimated from the equation as follows:

$$Y_{ist} = \alpha + \beta_1 \text{Experiment}_s * \text{Post}_t + X\beta_2 + \gamma_j + \delta_t + \pi_j \cdot \delta_t + \epsilon \quad (6)$$

In this equation,  $\text{Experiment}_s$  equals one if the state is experimental and zero otherwise.  $\text{Post}_t$  is a dummy for the after-law period (1 if post-federal, 0 if pre-federal). Along with demographic covariates, it also contains state and year fixed effects and region-by-year effects.  $\beta_1$  captures the variation in outcomes specific to the experimental states in the years after the enactment of federal parity laws. It is the difference-in-differences estimate of the extent of shifting of the costs of federal parity laws to working time. The underlying assumption for a valid

identification is that without federal parity laws, the working time or other related labor market outcomes should follow similar trends for both experimental states and non-experimental states during the post-period. The relevant assumption and robustness checks will be provided in Section 7.

As discussed above, the federal parity law fills the regulatory gap created by ERISA. Contrary to state mental health parity laws, federal parity law can influence the behavior of self-insured firms if they provide mental health coverage with discriminations. However, separately estimating the effects for fully insured and self-insured firms in experimental states is not feasible because both types of firms are simultaneously affected by federal parity. Nevertheless, among the 33 non-experimental states that had already adopted state mental health parity before 2009, the MHPAEA is supposed to have a more sizeable impact on self-insured firms. Limiting the sample to those non-experimental states, I use large firms (more than 500 employees, more likely to be self-insured) as the treatment group and other firms as the control group, to further investigate the effect of the MHPAEA using a difference-in-differences estimation.<sup>28</sup> Column (3) and (4) in Panel B of Table 6 report the means of demographic characteristics for large firms and small firms.<sup>29</sup> The regression framework has the following form:

$$Y_{ist} = \alpha + \beta_1 Largefirm_{ist} + \beta_2 Largefirm_{ist} \times Post_t + X\beta_3 + \gamma_j + \delta_t + \pi_j \cdot \delta_t + \epsilon \quad (7)$$

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<sup>28</sup> I also drop the workers in firms with 500-1000 employees to only compare the firms with more than 1000 employees and firms with less than 500 employees. The estimators of the key variables are similar with results reported in Table 9.

<sup>29</sup> The similar methodology can be also used in “MHPA experiment” to identify the effect of the earlier federal law for self-insured firms. But there are only five non-experimental states in “MHPA experiment,” and the pre-trends in labor market outcomes between large firms and small firms are not very similar. Therefore, I do not report the results in this section.



In equation (6),  $Largefirm_{ist}=1$  if worker  $i$  in state  $j$  in year  $t$  works in a large firm, otherwise it is 0. The key variable is  $\beta_2$ , which measures the effect of the MHPAEA on working time among self-insured firms. The remaining part of this regression has a similar analogy with equation (5).

## 5.2 The results of the MHPA experiment

Panel A in Table 7 reports the estimation results of the key variable in equation (5) when comparing 28 experimental states and five non-experimental states in all regions. The insignificant coefficients of the interaction term from column (1) to (4) imply that the MHPA, the 1996 federal parity law, does not significantly change these labor market outcomes. In addition, I re-estimate the effect of the MHPA using another set of experimental states. These ten states are limited to three specific regions where the original five non-experimental states are located. The results are presented in Panel B of Table 7. Once again, it still shows that the MHPA has little effect on working time.

There are two reasons to believe that the MHPA has limited ability to impact working time. First, the MHPA is a relatively weak federal parity law compared to other state parity laws; the requirement of its mandated benefits may not be binding with the existing group health plan design, especially in large firms. In this scenario, the costs of providing group health insurance coverage may not substantially increase after the implementation of the MHPA. Second, as a major symbolic accomplishment, the MHPA prompts state legislatures to step into more comprehensive parity laws. One disadvantage is that several parity law enactments have been pushing around the approved and effective year of the MHPA (1997 to 2001). Then, I lost many observations in the empirical work of the MHPA since these states are dropped to rule out these

counterfactual factors. But the MHPAEA enacted in 2008 should be able to fix this issue, and the relevant results are provided as follows.

Table 7: The Effect of MHPA1996 on Working Time and Coverage

	(1) Log hours/week	(2) Log weeks/year	(3) Part-time	(4) ESI own coverage
Panel A: All regions				
Experimental States×Post	-0.000 (0.007)	-0.006 (0.006)	0.003 (0.005)	0.013 (0.017)
<i>N</i>	27575	27575	27575	27575
Panel B: Limited regions				
Experimental States×Post	-0.000 (0.007)	-0.005 (0.006)	0.002 (0.005)	0.012 (0.017)
<i>N</i>	10517	10517	10517	10517

Note: Both regression models include demographic characteristics, firm sizes (5 dummy variables), industries (11 dummy variables), occupations (6 dummy variables), year dummy variables, state dummy variables, and region by year dummies. Omitted education category is “bachelor or higher degree.” Omitted firm size category is “more than 1000 employees”. Standard errors in parentheses

### 5.3 The results of the MHPAEA experiment

The 2008 federal law known as the MHPAEA can be studied within the same DD framework used in the empirical work to study the MHPA, with changes in choosing experimental and non-experimental states, as well as pre-post periods. The results are shown in Table 8. There is evidence of increasing weeks worked/year associated with MHPAEA enactment. In column (2), the treatment effect of MHPAEA is: having federal law increases the weeks worked by 1.7 percent and is significant at the 99 percent level. The magnitude is quite similar to the effect of state mental health parity laws. However, there is still no significant effect on hours worked/week, the probability of being part-time workers, and group insurance coverage of own name.<sup>30</sup> Overall, to the extent that the effect of the MHPAEA on working time is correctly estimated, this 2008

<sup>30</sup> I use coverage of own name in both of the federal law experiments because of the data availability.

federal law is stronger than the MHPA; thus, it causes costs to rise more and makes the labor demand and labor supply shift more. And the experiment of the MHPAEA is thus able to support the previous findings of state parity laws; mental health parity laws do increase the weeks worked.

The estimated results of the key variable in equation (6) are shown in Table 9. The estimators show no significant treatment effect of the MHPAEA on working time for large firms compared to small ones. This lack of an effect may be because the health plans offered by large firms already had comprehensive coverage for mental health care, even in the absence of parity laws. This federal mandate is not binding for large firms; the health plan benefits and their generosity do not need to redesign much to comply with the requirements of the MHPAEA.

Table 8: The Effect of MHPAEA2008 on Working Time and Coverage

	(1) Log hours/week	(2) Log weeks/year	(3) Part-time	(4) ESI own coverage
Experimental States×Post	0.007 (0.007)	0.017*** (0.004)	-0.007 (0.005)	0.015 (0.010)
<i>N</i>	36162	36162	36162	36162

Note: The regression models include demographic characteristics, firm sizes (5 dummy variables), industries (11 dummy variables), occupations (6 dummy variables), year dummy variables, state dummy variables, and region by year dummies. Omitted education category is “bachelor or higher degree.” Omitted firm size category is “more than 1000 employees”.

Standard errors in parentheses

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

Table 9: The Effect of MHPAE2008 for Large Firms

	(1) Log hours/week	(2) Log weeks/year	(3) Part-time	(4) ESI own coverage
Large firm× Post	0.007 (0.012)	-0.013 (0.008)	-0.002 (0.010)	0.015 (0.012)
<i>N</i>	23752	23752	23752	23752

Notes: The samples are limited in 33 non-experiment states of “MHPAEA experiment.” Define large firm as one with more than 500 employees.

Standard errors in parentheses

## 6. Robustness Checks

### 6.1 The effect of mental health parity laws on employment

I restrict my sample to individuals who have employment in the above econometric analysis because they are the most affected by parity laws. However, there is a concern that the estimators would be biased if mental health parity laws also significantly change employment itself. As discussed in the previous literature, the labor supply may increase if the employees value the mental health coverage. On the other hand, employers may decrease the labor demand of health insurance covered workers while becoming more reliant on part-time workers to avoid higher fixed costs. Thus, the effect of mental health parity laws on employment equilibrium is uncertain. In light of this potential sample selection problem, I check whether state or federal mental health parity laws have impacts on employment and labor participation with similar regression specifications used above. The results of state mental health parity laws, the MHPA federal law (for two sets of experimental states) and the MHPAEA federal law, are shown separately in Table 10 and Table 11. There is no evidence of significant effects on employment or labor participation.<sup>31</sup>

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<sup>31</sup> The pre-post trends in employment and labor participation are shown in Appendix. Both the experimental states and non-experimental states have roughly similar patterns before and after the enactment of MHPA/MHPAEA.

Table 10: The Effect of Parity Laws on Employment and Labor Participation

	(1) Employment	(2) Labor participation
Parity	0.003 (0.002)	-0.001 (0.001)
Age	0.004*** (0.000)	0.003*** (0.000)
Age square	-0.000*** (0.000)	-0.000*** (0.000)
Male	0.008*** (0.002)	0.007*** (0.000)
Non-white	-0.026*** (0.002)	-0.002*** (0.000)
Married	0.030*** (0.001)	0.001** (0.000)
Number of children under 5	-0.006*** (0.001)	-0.003*** (0.000)
Lower than high school	-0.050*** (0.003)	-0.005*** (0.001)
High school	-0.015*** (0.001)	-0.001*** (0.000)
Some college	-0.009*** (0.000)	-0.001*** (0.000)
<i>N</i>	1392406	1392406
<i>Mean of Dep. Var.</i>	0.752	0.793

## 6.2 Identification assumptions

In considering the identification strategy of studying the effect of federal parity laws on working time, the interpretation of the preceding results is based on one fundamental assumption: in the absence of federal parity laws, the labor market outcomes I check in Section 6 would have similar trends during the post-period. This section seeks to verify this assumption by providing the pre- and post- trends of outcomes of interest for both the 1996 and 2008 federal laws.

Table 11: The Effect of Federal Parity Laws on Employment and Labor Participation

	MHPA: All states		MHPA: Limited regions		MHPAEA	
	(1) Employment	(2) Labor participation	(3) Employment	(4) Labor participation	(5) Employment	(6) Labor participation
Experimental States×Post	-0.001 (0.005)	0.001 (0.002)	-0.001 (0.006)	0.001 (0.002)	0.004 (0.003)	-0.000 (0.001)
Age	0.004*** (0.001)	0.003*** (0.000)	0.004*** (0.000)	0.003*** (0.001)	0.004*** (0.000)	0.002*** (0.000)
Age square	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Male	0.007*** (0.001)	0.006*** (0.001)	0.006** (0.002)	0.005*** (0.001)	0.002 (0.003)	0.004*** (0.000)
Non-white	-0.023*** (0.003)	-0.003*** (0.001)	-0.021*** (0.006)	-0.002** (0.001)	-0.031*** (0.002)	-0.001** (0.000)
Married	0.021*** (0.002)	0.001 (0.001)	0.017*** (0.002)	-0.001 (0.001)	0.043*** (0.002)	0.001** (0.000)
Number of children under 5	-0.004** (0.002)	-0.003*** (0.0006)	-0.002 (0.002)	-0.003** (0.001)	-0.005*** (0.001)	-0.002*** (0.0003)
Lower than high school	-0.039*** (0.003)	-0.004** (0.002)	-0.032*** (0.003)	-0.007** (0.003)	-0.062*** (0.005)	-0.003*** (0.001)
High school	-0.010*** (0.002)	-0.001** (0.001)	-0.007*** (0.001)	-0.001 (0.001)	-0.029*** (0.002)	-0.001** (0.000)
Some college	-0.005*** (0.001)	-0.000 (0.001)	-0.007*** (0.002)	-0.001 (0.001)	-0.018*** (0.001)	-0.001*** (0.001)
<i>N</i>	206419	206419	75799	75799	421183	421183
<i>Mean of</i>	0.773	0.803	0.791	0.817	0.717	0.779
<i>Dep. Var.</i>						

Note: All regression models include the following additional variables: industries (11 dummy variables), occupations (6 dummy variables), year dummy variables, state dummy variables, region by year dummies. Omitted education category is “bachelor or higher degree”.

Standard errors in parentheses

\*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Fig. 4 compares the trends of experimental states with non-experimental states in four labor market outcomes of interest before and after the implementation of the MHPA (I use a one-year lag for the actual effective year to provide a longer time for behavior adjustment). Panel A-Panel D report four labor market outcomes of interest: usually hours worked per week, weeks worked

last year, percent of part-time workers and ESI coverage under own name. The pre-trends of two sets of states before 1999 are a little noisy, and there is no substantial increase or decrease in any of the outcomes after 1999. The comparisons of experimental states and non-experimental states in limited regions are also provided in Fig. 5. They have similar patterns with the plots using all regions. According to these plots, it is inconclusive as to whether the MHPA impacts the outcomes, which is consistent with the results of previous econometric regressions.

Fig. 4. Trends in four outcomes for MHPA

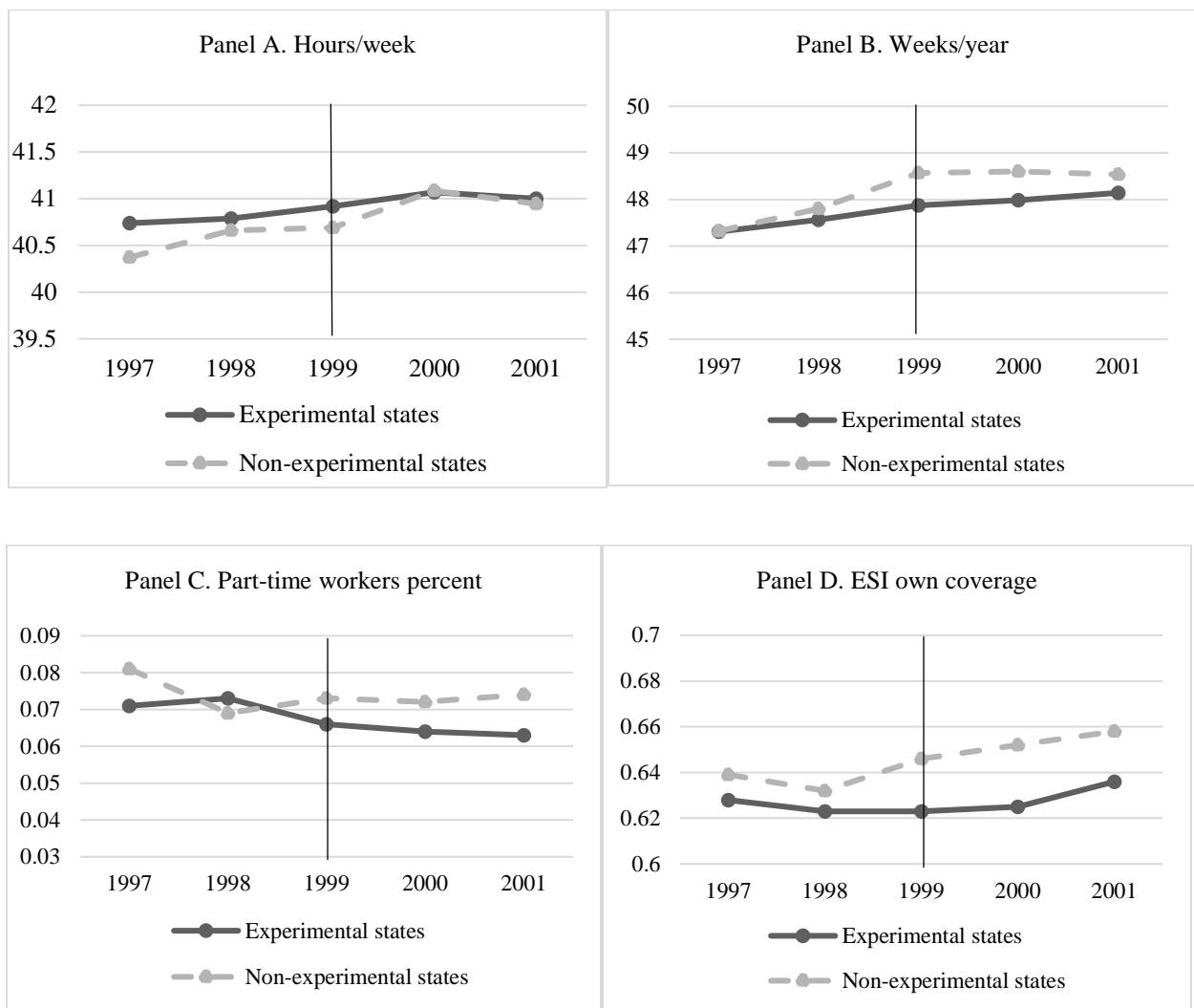
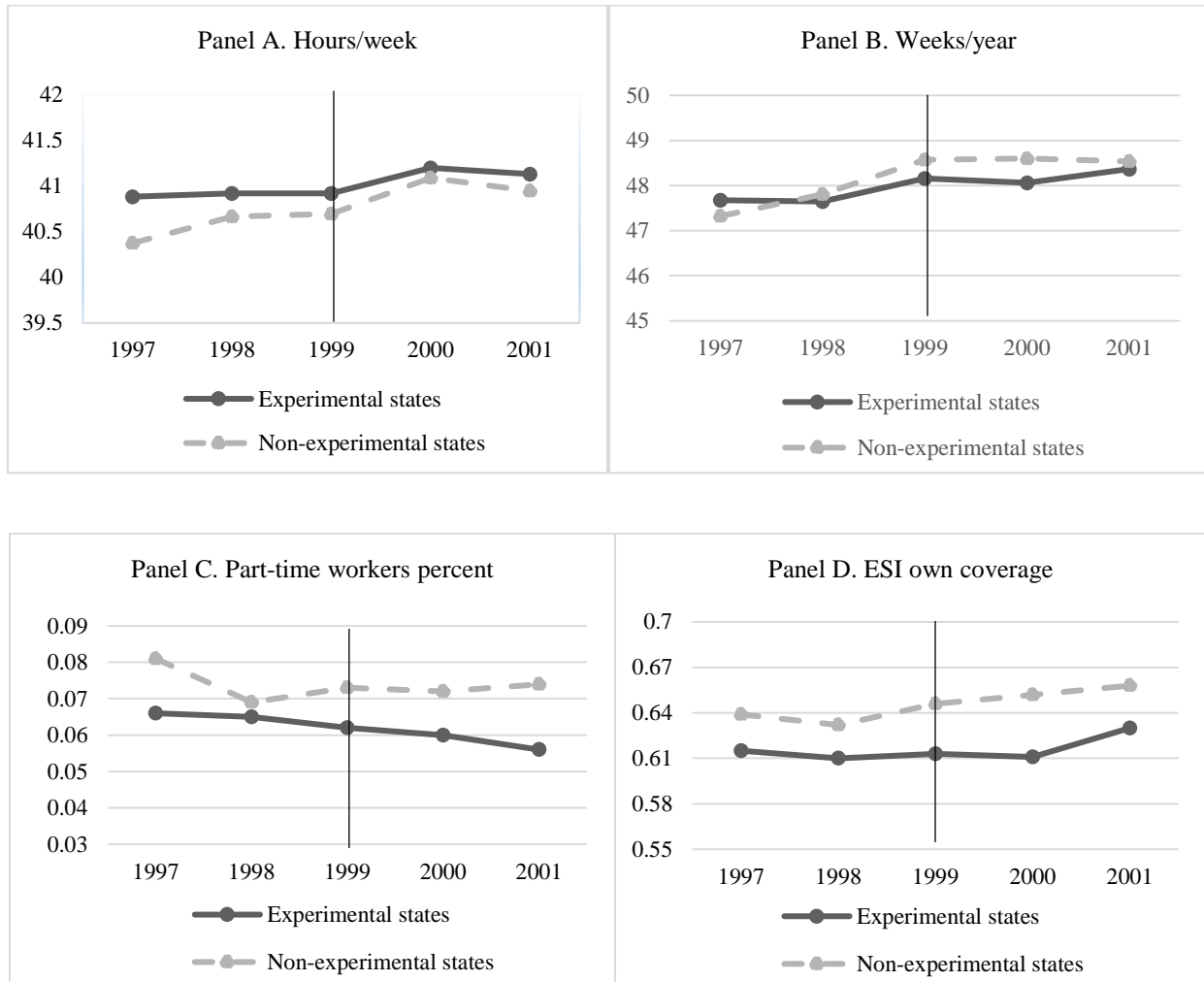


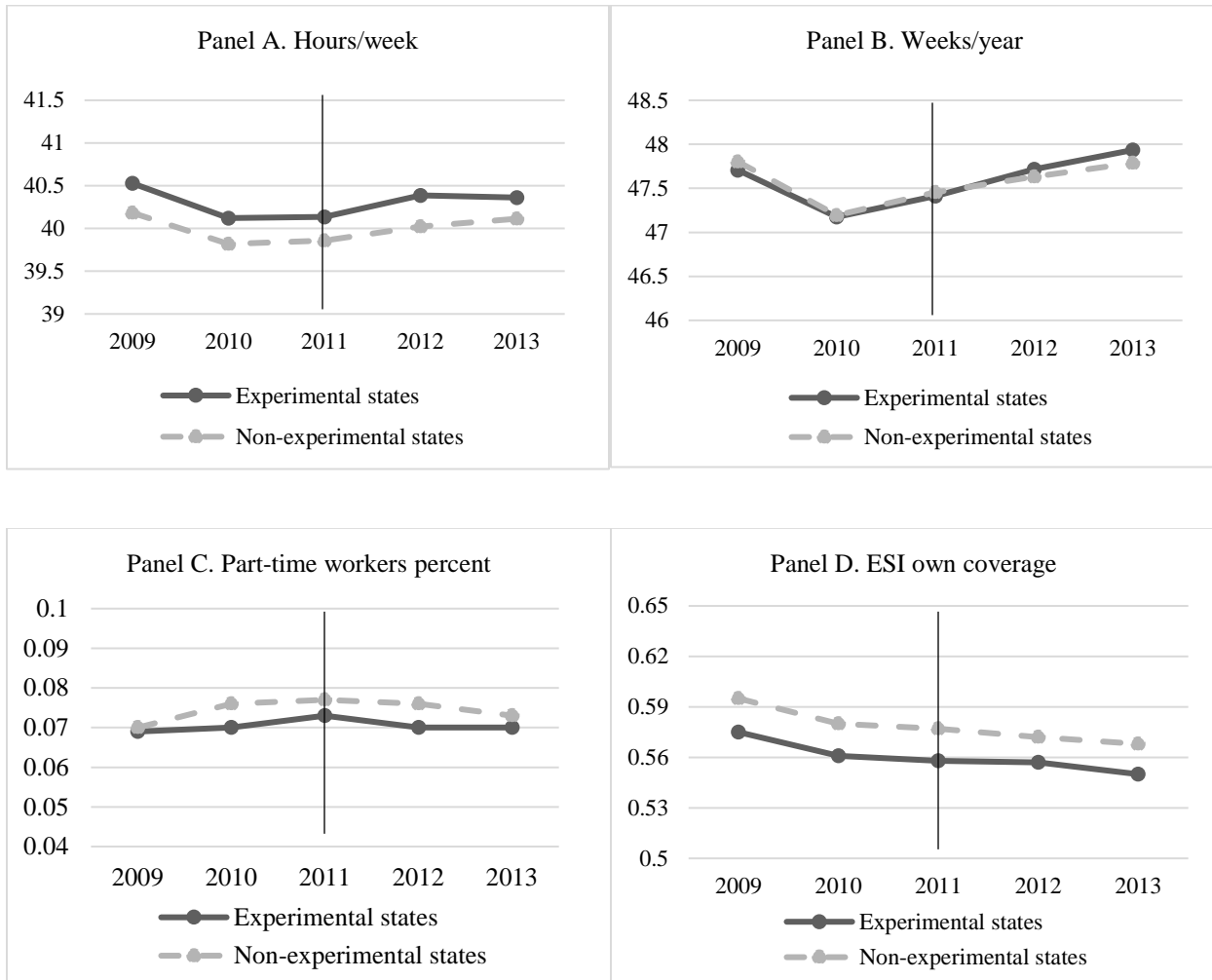
Fig. 5. Trends in four outcomes for MHPA in the limited regions



The MHPAEA provides better experimental and non-experimental states for estimating the DD estimator. Using a regression framework, I find this later federal parity increases the weeks for the experimental states. The pre-trends are reported in Fig. 6 and very similar trends in every outcome before the MHPAEA (the year 2011) are found, but a slightly increasing trend for experimental states compare to non-experimental states shortly after MHPAEA was implemented. Thus the concern that the increased weeks worked is coming from pre-existing patterns can be relieved.

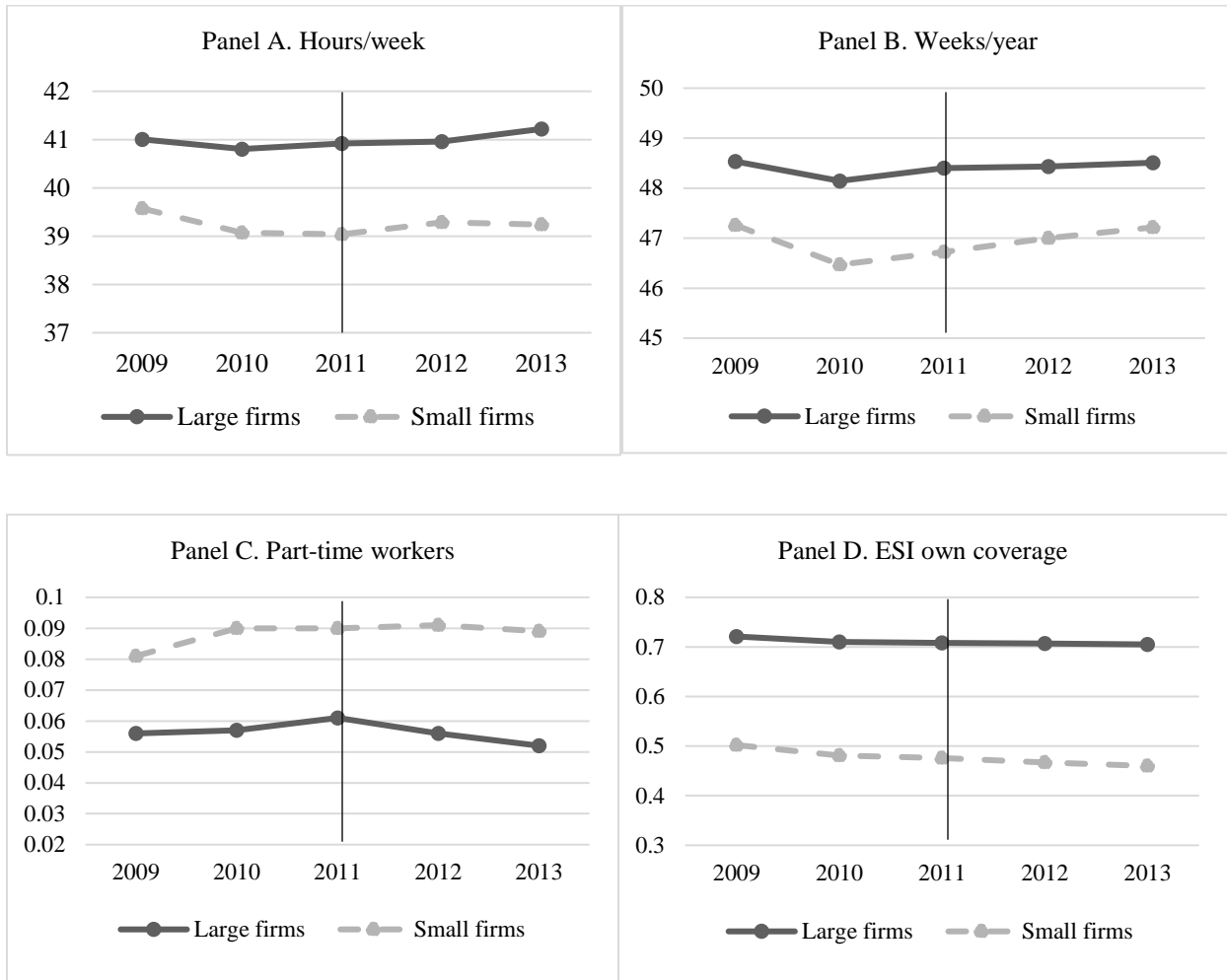


Fig. 6. Trends in four outcomes for MHPAEA



Along with the trend comparisons between experimental states and non-experimental states, I also plot the pre- and after- trends of large firms (>500 employees) and small firms (<500 employees) in non-experimental states. Fig. 7 indicates that between 2009 and 2013, all four outcomes of large firms and small firms exhibit roughly similar trends before and after the implementation of the MHPAEA. It is also consistent with the regression results that no much of the change is driven by the MHPAEA in the analysis above.

Fig. 7. Trends in four outcomes for MHPAEA in non-experimental states



## 7. Discussion about the mechanisms of increasing working time

In this section, I would like to revisit and discuss the mechanisms related to the causal effect of mental health parity laws on working time. Recall that the whole story can be separated into the labor demand side and the labor supply side. An increase in health insurance costs caused by the implementation of parity may decrease labor demand, and provide further incentives for employers to ask for longer working time when the costs cannot transfer to wages completely. On the other side, extensive and intensive labor supply may both increase if employees want to take advantage of the new mandated benefits. The first order effect on the labor demand and

labor supply is not the whole story; workers could also work for a longer time if mental health parity laws improve their mental health outcomes. Because of data limitation, the estimates of mental health parity laws cannot imply which channel is the most significant mechanism for increased weeks empirically.

Theoretically, although increasing mental health coverage is a necessary precondition for improvement of mental health care utilization and mental health outcomes, the expansions in benefits may not translate into increased utilization and better health. Most of the literature does not find substantial evidence on the effect of parity on either mental health care utilization or mental health outcomes, especially for the early-stage parity laws.<sup>32</sup> The state and federal experiments show similar positive effects on working weeks whether mental health outcomes have improved or not. Thus, if the evidence on the impact of mental health parity laws on health service utilization and mental health is lacking, the possibility that workers increase their working time because they have better mental health associated with parity laws is small.

Additionally, mental health is also found to have a significant influence on employment while the effect is limited to working time (Ettner et al, 1997). Because even though employees can obtain better mental health care utilization and mental health because of parity laws, their working time may not increase. One of the possibilities is that, in this scenario, better access may make covered employees spend more time on psychological therapy or psychologist visits and reduce the working time.

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<sup>32</sup> See Section 3 for more details about the existing literature on the effect of parity on mental health care access and mental health conditions.

To provide more suggestive evidence for the mechanisms, I re-estimate the effect of state mental health parity laws on working time and group insurance coverage by allowing separate effects on metropolitan and non-metropolitan counties. Metropolitan areas usually own a high degree of economic and social interaction, and of course, significantly more mental health services, such as community mental health centers, community hospitals with psychiatric units and state-operated hospitals.<sup>33</sup> Rural counties have the fewest average mental health professionals per capita (Ellis, Konrad, Thomas and Morrissey, 2009). If the increased working weeks are coming from better mental health, the areas with more mental health services should be more likely to be affected by the parity dummy.<sup>34</sup> Table 12 reports the results and shows there is no significant difference between the effects on metro-county and non-metro-county. Thus, I would like to assume that the working time increased by parity laws implies either an increase in health insurance costs or an outward shift in the labor supply curve, but not an improvement of mental health outcomes. The results cannot be served as evidence on the benefit side of parity laws at least for the general population.

Table 12: The Effect of Parity Laws for Metropolitan Area

	(1) Log hours/week	(2) Log weeks/year	(3) Part-time	(4) ESI coverage
Parity	-0.001 (0.006)	0.011* (0.006)	0.005 (0.005)	0.006 (0.011)
Metrox Parity	-0.005 (0.006)	0.004 (0.005)	-0.0007 (0.004)	-0.002 (0.010)
Metro	0.001 (0.003)	0.005 (0.005)	0.0005 (0.003)	0.021*** (0.005)
<i>N</i>	195534	195534	195534	195534

Note: Metropolitan area includes central city, outside central city and central city status unknown. Standard errors in parentheses. \*  $p < 0.1$ , \*\*\*  $p < 0.01$

<sup>33</sup> These are the primary resources that individuals with mental illness can get medical supports from in the US.

<sup>34</sup> My results of interaction terms of parity laws and firm size can also imply similar conclusions. Because the health plans of large firms often have more access to mental health services, but the effect is still greater for small firms.

## 8. Conclusions

The evidence in this study supports that the implementation of mental health parity laws does increase the intensive labor supply margin: weeks worked. With well-supported identification assumptions, my findings of the effects of state and federal parity laws are robust to a variety of specifications of the regulations. First of all, the development of state legislatures about mental health parity provides abundant state-by-year variation from 1992 to 2010. Furthermore, the MHPA, effective in 1998, and the MHPAEA, effective in 2010, also offer opportunities to do “reverse experiments.” By comparing the states that had already adopted state parity before the federal laws and states that had not, the effect of federal parity laws can be examined and the previous findings of state parity can have further support. Last but not least, the self-insured firms (most of the large firms) are exempted from the regulations of state mandates while federal parity laws fix this regulatory gap created by ERISA. Thus, the effects of state and federal parity laws on working time should vary by different firm sizes. I also estimate the effect of state parity laws for small firms and the effect of federal parity laws on large firms separately, by adding the interaction term of parity legislation and firm size.

The estimates indicate weeks worked per year increase significantly because of the implementation of state mental health parity and federal mental health parity, the MHPAEA. Comparing to self-insured firms, this effect of state mental parity for fully insured firms is more substantial. Additionally, even though there is no evidence to imply that having mental health parity laws significantly impacts hours worked for the whole sample, it decreases the hours worked while it increases the probability of working part-time for workers aged 35 to 44. These results support the convention that adding requirements of equal coverage of mental health and

physical health does increase the fixed costs of providing group coverage, and the employers who are affected by parity laws are more likely to ask their workers to work a longer time to compensate the higher fixed costs. Also, workers value the benefits and would like to work longer to take advantage of them.

These results on mental health parity laws have suggestive implications for other policies designed to cover the uninsured and mandate comprehensive benefits. It is also necessary to highlight that federal parity law, the MHPAEA, is still effective after the full implementation of the Patient Protection and Affordable Care Act (PPACA). This new health care reform, which was passed by Congress and signed into law by President Barak Obama in 2010, specifies that the PPACA will extend the applicability of the MHPAEA.<sup>35</sup> Based on the experiment of this federal parity law, one of the policy implications can be to illustrate that the effect of the PPACA, which can be considered as a full mandate for health insurance coverage. Compliance with the PPACA may increase the fixed costs of hiring covered workers or motivate ineligible employees to work for a longer time. Thus, it may impact relevant labor market outcomes more substantially than other types of single mandated benefit.

At last, this analysis focuses only on the intensive margin of labor force participation; the goal of the paper is not trying to study the incidence of mental health parity laws completely. I have focused purely on the hypothesis that working time will be longer when employers encounter a higher fixed cost of employment and employees value their health benefits. The results of my analysis detect a similar effect found by Cutler and Madrian (1998), although they focus on hours

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<sup>35</sup> The PPACA expands the reach of MHPAEA to three main types of plans: qualified health plans, Medicaid non-managed care benchmark and benchmark-equivalent plans, and plans of individual market.

worked and I only find evidence in weeks. Because they only look at the full-year workers and I include all types of workers. In addition, I solely look at the effect of mental health parity law on the financing side and efficiency costs instead of the potential benefits of these mandates. The benefit and cost analysis of mental health parity laws remains an area of priority for future policy research.

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## Appendix

Table A1: The effect of state and federal mental health parity laws on hourly wages

	(1) Log hourly wage (state parity)	(2) Log hourly wage (2010 federal parity)
Parity	0.010 (0.009)	
Experimental States×Post		0.008 (0.015)
N	194842	36067

Note: The hourly wage is calculated from information in the CPS on wage and salary income in last year divided by weeks worked and hours worked last year. Drop the missing wages and wages less than \$1 or more than \$400. Thus the sample sizes in Table A2 are 0.4percent smaller than in Table 2 and 8.

Fig. A1. Trends in employment and labor participation for MHPA

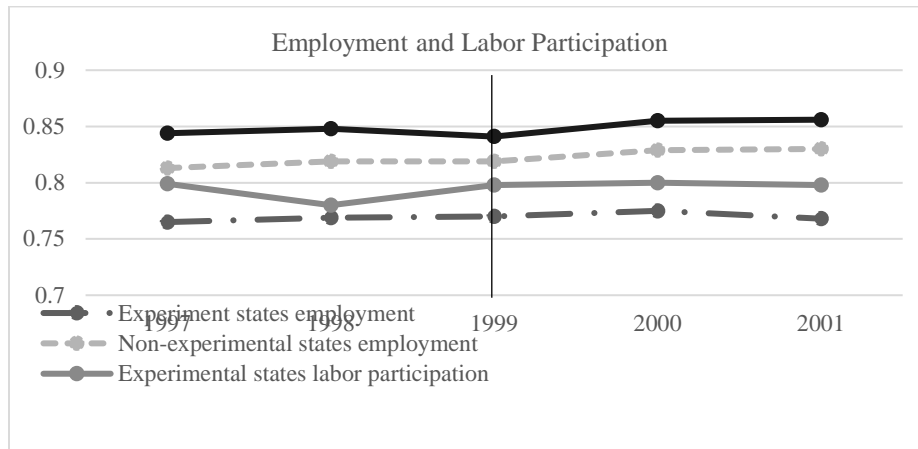


Fig. A2. Trends in employment and labor participation for MHPA in limited regions

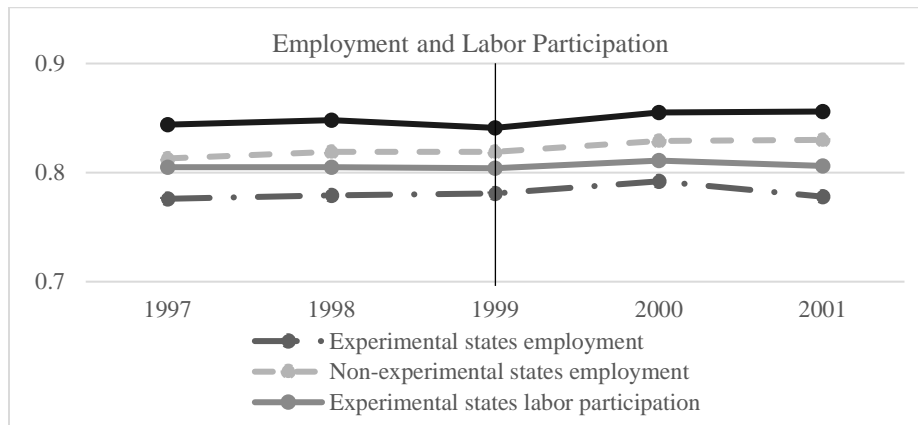


Fig. A3. Trends in employment and labor participation for MHPAEA

