Labor Policy in a Healthcare Market: Provider Responses to the Home Care Rule

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Abstract

Many markets have a large public payer, which may complicate firms' responses to cost shocks such as wage regulation. One such market of growing importance is the home care industry, which serves 15 million older adults and people with disabilities, many of whom pay for their care through Medicaid. We use the 2013 extension of minimum wage, overtime, and travel pay requirements to home care workers to study home care agencies' responses to wage regulation, with attention to its interaction with Medicaid price setting. The new wage regulation increased the cost of providing home care in many states, but some states had already included home care in their own laws and experienced less of a change. Using a difference-in-differences strategy, we find that personal care agency payrolls were 19% lower after enforcement began, due to a combination of slower growth in employment and hourly wages. Theory suggests that agencies' cutbacks would not be distributed evenly between the private market, where home care agencies adjust their prices to account for the new costs, and the Medicaid market, where the state Medicaid agency determines the price of services, and we find that services changed differently in these two markets. Older adults with Medicaid are 9 percentage points less likely to use paid helpers, receiving 11 fewer hours of paid care per month on average, while older adults without Medicaid do not see meaningful changes in type or hours of care. Medicaid price regulations may have contributed this difference in outcomes. We estimate that Medicaid recipients were 2.7 to 5 percentage points more likely to use paid helpers when the Medicaid reimbursement rate increased by \$1/hour, suggesting that agencies reduced services to Medicaid clients when reimbursement rates did not keep up with cost increases from the 2013 labor regulations.

The 2013 extension of the Fair Labor Standards Act (FLSA) to include home health and personal care aides extended federal minimum wage, overtime, and travel pay protections to approximately 2 million workers. This policy, referred to as the home care rule, constituted the first extension of overtime to a new industry in the US in over 40 years. While some states had included these workers in their own wage and hour laws, personal care aides in 35 states gained some or all of these protections for the first time. Although the minimum wage was unlikely to be binding for home care workers, most travel between work locations and a substantial minority work long hours, making travel and overtime pay a potential way to increase earnings and make the job more attractive to workers, more of whom will be needed to care for an aging population.

Canonical models of overtime predict that payrolls and employment should either stay the same or increase in response to an overtime premium. In these models, firms may hire more workers to spread out hours and avoid paying overtime premia (Ehrenberg 1970), or they may keep workers and hours the same but reduce straight-time wages such that weekly pay remains the same in spite of the travel hours and overtime premia (Trejo 1991). These predictions are complicated, however, by the structure of the home care market, where agencies serve both clients in both a competitive market where clients pay out-of-pocket and a price-regulated market where Medicaid pays a fixed rate for services. This uncommon industry structure allows us to explore questions about cost-shifting between these markets, the impact of price regulation in an industry's adjustment to labor cost shocks, and the interaction between federal labor policy and state Medicaid policy.

We leverage pre-existing state policies that extended coverage to home care aides in a difference-in-differences strategy to evaluate how agencies respond to this labor cost shock in both the regulated and the unregulated market. Unlike many designs that rely on state policy variation, we do not rely on differences in the timing of policy adoption; rather, the state policies generate differences in how much of a cost shock agencies faced. While enforcement of the existing state wage and hour laws was surely imperfect, we can consider

the states with no such laws more impacted by the home care rule. This is similar to designs that evaluate the effects of the minimum wage using a change in the federal minimum wage and variation in how affected (or unaffected) different states are based on how much lower (or higher) their state minimum wage was than the new federal standard. Since we are not using staggered policy timing, we avoid many concerns around two-way fixed effects in that design.[1] A common concern when using state policies is that states do not select policies at random. In this case, the state policies themselves were enacted before 2000 and targeted domestic work broadly; they were not focused specifically on the home care industry and were enacted before much of its growth. It is therefore unlikely that states selected into these policies based on how their home care industries would respond to a federal policy change years later.

Our paper makes three main contributions. First, we evaluate the direct impact of the home care rule, a rare change to US overtime and travel pay policy with state variation that can be exploited for identification. Figure 1 shows the evolution of annual payroll at personal care agencies by states' pre-existing policies. Payrolls begin growing more slowly in the states experiencing the policy change after its announcement in October 2013, and the difference only grows more pronounced after enforcement of the policy began in January 2016. Averaged over the post-enforcement period, we estimate that payrolls are 19% lower in states newly gaining coverage, a decline likely driven by a combination of slower growth in both employment and straight-time wages. These findings suggest that price and scale, two margins of adjustment the canonical models abstract away from, may be crucial in this setting.

Second, we trace lower personal care agency payrolls through to declines in the use of paid helpers by older adults who are likely to need home care. This is a population that is 65 or older and struggles with at least one activity that a personal care aide might assist them with so that they can continue to live independently at home. Focusing on the consumer

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[1]See de Chaisemartin and D'Haultfoeuille (2022) for an overview of concerns with two-way fixed effects estimators and methods for addressing them.

of home care allows us to distinguish between services paid for privately in the competitive market and services paid for by state Medicaid programs. After the policy, older adults without Medicaid continue to use paid helpers at the same rate, while older adults with Medicaid are 9 percentage points less likely to use a paid helper and receive, on average, 11 fewer hours of paid help per month. Children increase the hours of care they provide at home, but there is suggestive evidence that Medicaid recipients are 2 to 4 percentage points more likely to be in residential care after the policy. The residential care estimates should be interpreted cautiously, as they are not significant at standard levels. The decline of service for Medicaid clients implies that cost-shifting is limited in this setting - agencies do not appear to be increasing their private-pay prices in order to subsidize their Medicaid clients.

Third, we explore the potential role of price regulation in producing the different effects that we observed in the Medicaid and private-pay markets. Medicaid's hourly reimbursement rate for personal care services is $4.55 lower on average than the median price agencies charge private-pay clients, so increases in the Medicaid reimbursement rate after the labor cost shock may alleviate some of the effects. We estimate that when the Medicaid reimbursement rate increases by $1 over the course of the post-announcement period, older adults with Medicaid are 5 percentage points more likely to use a paid helper than when there is no increase in the reimbursement rate. While this estimate is not based on exogenous variation in the reimbursement rate and draws on a smaller sample of states, and it suggests a possible policy option for states attempting to expand use of Medicaid personal care programs.

The rest of this paper is organized as follows. Section 1 provides relevant industry and policy context. Section 2 presents a conceptual framework for considering the potential effects of the home care rule. Section 3 introduces the data on which we will rely for our analysis and Section 4 presents the difference-in-differences methodology we will use for identification. Section 5 documents our findings on agency responses, use of paid helpers, and the potential mediating role of price regulation. Section 6 concludes.

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1 Background

1.1 Industry

Long term care in the United States has traditionally been provided for in two ways: (1) residential care (primarily nursing homes, which are highly regulated, provide 24-hour skilled care and are used by 1.3 million people with ADL difficulties) and (2) informal care, often from family members (Mudrazija and Johnson 2020). However, the past few decades have seen the emergence of professional home care as a growing option. Employment in personal care agencies has grown by over a million workers since 1998, as shown in Figure 2, and employment in personal care and home health is expected grow 33% over the next decade (U.S. Bureau of Labor Statistics 2022).

Medicaid is the largest public payer for long term care in the US, due to the fact that Medicare does not cover long-term care.[2] Among long-term are options, state Medicaid programs are only required to cover nursing home care, but a variety of state and federal reforms over the last few decades have enabled and encouraged Medicaid programs to cover home and community-based care as an alternative. The share of long-term care funding that Medicaid spends on home and community-based care has increased fourfold since 1990, as shown in Figure 3. Almost 60% of Medicaid spending on long-term care went towards home and community-based services in 2019, amounting to $95 billion, compared to under 20% in 1990.

Despite providing much funding for personal care services, Medicaid does not play a large role in regulating how these services are delivered. Personal care agencies are not required to accept clients with Medicaid, and Medicaid certification of personal care agencies is limited. In some states, Medicaid imposes training requirements for personal care aides (PCAs), but these are typically minimal - in over half of states, there is no training requirement for PCAs, and only 15 states require 40 or more hours of training (Marquand 2013). PCAs often have

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[2]Medicare will cover short nursing home stays and some home health or personal care after a surgery, but it does not cover long-term supportive services.

Certified Nursing Assistant (CNA) or equivalent certificates and are typically paid slightly more if they do, but Medicaid imposes few barriers to entry for either workers or agencies.[3]

Medicaid may play a larger role in the industry through setting reimbursement rates for services. Medicaid pays personal care agencies a fixed, state-wide hourly rate for services provided to approved Medicaid clients.[4] This rate is set by each state's Medicaid agency, either through an annual process based on cost reports submitted by agencies or at the state Medicaid agency's discretion. While some states adjust their reimbursement rates annually, many go through multi-year stretches during which the reimbursement rate remains unchanged. Rates vary considerably among states; as Figure 4 shows, reimbursement rates in 2020 ranged from under $10 per hour to over $30 per hour, with as many below $15 as above $30.

By setting these reimbursement rates, Medicaid creates two distinct markets that personal care agencies may serve: a private-pay market where they can freely set their prices, and a Medicaid market where the state sets their price. Parallel markets are somewhat common in the health industry, where Medicaid and Medicare split the bill with private insurers, and private insurers will often pay providers at the same rate as Medicare when they have the bargaining power to do so (Clemens and Gottlieb 2017). However, most private insurance does not cover in-home personal care, and long-term care insurance that would cover it is relatively rare. Consequently, for personal care, the alternative to Medicaid is not insurance but paying out-of-pocket, creating a competitive free market where agencies can adjust their prices without bargaining with insurance companies. This creates a unique opportunity to study the effects of the Medicaid price regulation on how personal care agencies react to a labor cost shock.

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[3]Typical job ads offer a $1/hr wage premium for those with a CNA certification.

[4]The two exceptions to this are New York, where reimbursement rates are agency-specific, and Michigan, where reimbursement rates were county-specific until 2019.

1.2   Policy

In October 2013, the Department of Labor announced a change to its interpretation of the companionship exemption in the Fair Labor Standards Act. The companionship exemption had waived requirements that employers provide such FLSA protections as minimum wage, overtime, and travel pay protections to "any employee employed in domestic service employment to provide companionship services for individuals who (because of age or infirmity) are unable to care for themselves (as such terms are defined and delimited by regulations of the Secretary)" (U.S. Code 29 Section 213a15 n.d.). The exemption was added in a 1974 amendment to the FLSA which was designed to extend protection to domestic workers such as maids, janitors, gardeners, and chauffeurs. According to a U.S. Senate report, lawmakers added the exemption to exclude casual labor; their vision was that the FLSA would apply to "all employees whose vocation is domestic service," but exclude those who "are not regular breadwinners or responsible for their families' support" (Sonn et al. 2011). However, the exemption was subsequently interpreted more broadly by the Department of Labor (Goldberg 2015). A 2016 survey of home care workers by the National Employment Law Project found that only half reported receiving time-and-a-half pay for overtime when they had worked more than 40 hours in a week (Christman and Connolly 2017).[5]

The 2013 interpretation, referred to as the home care rule, defines the term companionship services in the FLSA to mean "the provision of fellowship and protection for an elderly person or a person with an illness, injury, or disability who requires assistance in caring for himself or herself" (U.S. Department of Labor Wage and Hour Division 2013). Under this definition, some assistance with ADLs or IADLs may be provided in the course of providing fellowship or protection, but the companionship exemption does not apply if a worker spends more than 20% of their workweek assisting with ADLs or IADLs. Further, under the new

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[5]This is likely an underestimate of compliance with overtime regulations, as a worker may have worked more than 40 hours in a week but split those hours among multiple employers. The question was retrospective and likely captured mostly the experience of the workers before enforcement of the home care rule began in January 2016.

interpretation, personal care agencies or other third-party employers that provide workers to households cannot claim the companionship exemption, regardless of whether the 20% threshold is exceeded (U.S. Department of Labor Wage and Hour Division 2013).

The home care rule was initially proposed in December 2011, after policy advocacy from organizations such as the National Employment Law Project, PHI, and Service Employees International Union, the primary union that represents home care workers. The rule was hotly contested throughout its public comment period by home care agency organizations and disability rights advocates like ADAPT and was eventually challenged in court by the Home Care Association of America, a national industry group for home health and personal care agencies (Goldberg 2015).[6] The Department of Labor and groups in favor of the change argued that the costs of implementing it would be small, citing states that already extended some or all of the protections to home care workers and large companies that paid overtime despite not being required to do so. They expected the changes to increase employment, decrease turnover, and attract high-quality workers who could provide high-quality care. Groups opposed to the change argued that the additional cost would result in changes to long-hour and short-hour care, leaving some with little recourse except institutionalization, and that workers might leave personal care agencies to work directly for households, where they would have fewer labor protections (Goldberg 2015, Munson 2016).

The Department of Labor had stated that the home care rule would go into effect January 1, 2015, but due to the litigation, it did not go into effect until January 1, 2016. From the time the home care rule was issued until it became effective, the Department of Labor engaged with states and personal care agencies in efforts to educate them about the new requirements and to come into compliance in advance of the enforcement. The nature of the industry, with many small firms and a vulnerable workforce that may not be documented and may have limited recourse to legal remedies, led to concerns about the enforcement of

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[6]This is, of course, a generalization: some home care agencies supported the new regulation and some disability advocates argued that improving conditions for workers would improve conditions for consumers.

the home care rule.[7] After the home care rule became effective, however, the Wage and Hour Division led an enforcement drive focused on enforcing the new rule at personal care and home health agencies. As shown in Figure 5, investigations into personal care and home health agencies increased sharply in 2016 and 2017; by 2017, there were nearly three times as many investigations as there had been at the prior peak in 2012. Although the presidential administration that had championed the home care rule was replaced in 2017, enforcement continued, largely because the new head of the Wage and Hour Division was not sworn in until April 2019 and the agency continued to enforce its prior directives in the absence of new leadership. During the peak enforcement period of 2016-2018, 91.6% of investigations found violations.

The minimum wage requirements may not have had much bite in the industry, as wages were typically above the state minimum; from 2008-2019, even 10th-percentile wages for PCAs in the Occupational Employment and Wage Statistics were consistently above the state's minimum wage.[8] Overtime and travel pay requirements, on the other hand, had the potential to create substantial costs for personal care agencies. Some clients require long-hours care, which is often most easily provided by a single aide with whom the client has developed a relationship. While some PCAs may work overtime only occasionally, 14% of PCAs in the American Community Survey report working more than 40 hours in a typical work-week. Other clients only need help for a few hours each week, and aides may serve many of these clients and travel between multiple residences each day. Counting travel hours may also interact with overtime pay requirements, with previously-unaccounted-for travel hours pushing full-time workers into overtime. In enforcement cases beginning during the peak enforcement period, overtime violations made up 85% of the back wages owed, and the median agency that was investigated owed back wages solely for overtime violations.

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[7]Among PCAs in the American Community Survey, 24% were born outside the US. According to the Statistics of US Businesses, 58% of personal care agencies have 20 or fewer employees.

[8]Minimum wage violations are made even less likely by the fact that, in about half of states newly gaining coverage, only the federal minimum wage of $7.25 per hour would be enforceable, as PCAs would still not qualify for protections under state minimum wage laws.

Not all states were equally affected by the home care rule. 15 states, shown in Figure 6, had already extended their state's minimum wage, overtime, and travel pay protections to PCAs. In these states, PCAs were eligible either because the state minimum wage law had been initially written without any domestic labor exemptions or because the state removed its domestic labor exemption.[9] Domestic labor exemptions were removed primarily in the 1970s and 1980s, and none of these states changed their exemptions relevant to PCAs more recently than 2000 (Goldberg 2015). While many of these states made the explicit choice to qualify domestic workers for their state's minimum wage and overtime laws, these changes affected a much broader set of workers than just home care workers and occurred before the relatively recent and rapid growth of the professional home care industry. It is therefore unlikely that states chose these policies because of existing or desired dynamics in their state's personal care industry. States retaining exemptions for PCAs tend to have a domestic work exemption or do not have their own minimum wage or overtime law. For 13 states, when PCAs became eligible for federal wage and hour protections, they also became eligible for state wage and hour protections because the state law directly references the FLSA (National Employment Law Project 2016).

2 Conceptual Framework

How might we expect overtime and travel pay to affect the labor market for PCAs and who uses their services? In all but the simplest models, the labor market effects of overtime and travel pay are unclear and depend upon how firms and workers can contract with one another, scale effects, the cost of hiring and substitutability of workers and hours, how firms had previously assigned hours to workers, and workers' supply of labor. Different assumptions about these features will yield different predictions of the policy's effect, and

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[9]Some PCAs may still be exempted in this state because they do live-in work or because they are employed by private households, which typically do not to meet the required number of employees to be subject to state minimum wage or overtime standards. Nevertheless, all PCAs employed by personal care agencies are covered in these states.

different settings will vary in which features are most important.

The two canonical overtime models are laid out in Ehrenberg (1970) and Trejo (1991). Ehrenberg (1970) focuses on hiring and the substitution of hours for more workers. Firms produce a set amount of output Q and choose a number of workers L and hours per worker H to minimize:

$$\min_{L,H} \ cL + w_1 LH + w_2 L(H - \bar{H}) \ \ s.t. \ \ Q = F(L, H)$$

where c are fixed per-worker costs (e.g. ongoing training, insurance), w_1 is the straight-time wage, w_2 is the wage including overtime premium, and $\bar{H}$ is the hours threshold for overtime premium. The firm strikes a balance between paying extra for the overtime hours of a smaller workforce, or hiring more employees and incurring their hiring and training costs. This model would predict that, if the fixed, per-worker costs of labor are not too high, employment should increase. Given the minimal training requirements for PCAs and the fact that many work only part-time, therefore not qualifying for employer-provided health insurance, fixed costs per worker are likely to be low and this model would predict an increase in employment.

However, the direction of the effect was only clear in this model because it is greatly simplified, and the introduction of scale effects (the quantity choice assumed away by a cost-minimization framework) or substitution between capital and labor generate indeterminate predictions (Hamermesh 1996). For example, if the cost of an additional hour increases, then additional hours become more expensive relative to new hires, but also labor becomes more expensive relative to capital - there is pressure to increase employment from the first and to decrease it from the second (Costa 2000). While very little capital is substitutable with labor in the personal care setting, scale effects are a key concern. As the service becomes more expensive to provide, personal care agencies may provide less of it.

On the other hand, Trejo (1991) points out that changes to workers or hours may not be necessary if there is sufficient flexibility in how employers and workers can contract. Suppose an industry is required to provide overtime premia for the first time, and that

employees working more hours than the overtime threshold were previously paid their base wage for those hours. If the employee previously worked $40 + h$ hours at hourly wage w, then the employer could maintain their same weekly pay by reducing their base wage to $w' = w \cdot \frac{40+h}{40+1.5h}$. The worker does the same work for the same weekly pay as before, and no real change occurs. This is not feasible if the base wage would need to be lowered below a required minimum wage, and it may not be desirable for workers if there is uncertainty about whether they will indeed work the promised overtime hours. This model would predict a decline in straight-time wages for PCAs with no change in employment or hours.

Empirical work on overtime requirements in the US is difficult because the policy has been nearly constant and quite nationally uniform; in fact, the home care rule represents the first extension of overtime pay to a new industry in 40 years. Summarizing recent international evidence on overtime provisions, Brown and Hamermesh (2019) conclude that it is likely the FLSA's overtime provisions slightly reduce hours, slightly lower base wages, and slightly increase employment, while keeping workers' total pay and the total hours used by the firm relatively constant. These predictions, and other prior work, have been largely consistent with the predictions from the Ehrenberg (1970) and Trejo (1991) models.

Another recent change in overtime policy was a rule issued in 2016 which raised the salary threshold at salaried workers became ineligible for overtime pay. Quach (2021) finds that this change caused an increase in earnings as firms moved workers above the overtime threshold and that employment declined slightly just below the threshold. These are movements not predicted by prior models, largely because prior models had no outlet other than hours reductions that firms could use to circumvent overtime pay requirements. The home care rule provides a more traditional setting in the sense that salaries cannot be increased to avoid overtime, but the influence of Medicaid policies - particularly prices - on a large share of the personal care market may complicate our predictions about its effects.

As described in Section 2.1, while a personal care agency can set its own prices for private-pay customers, one in three customers has Medicaid and the state Medicaid agency

pays personal care agencies a fixed hourly rate for their services. While consumer prices are an unusual margin of adjustment to consider in the overtime literature, the parallel to other labor cost shocks that feed through into consumer price increases is clear. For example, while the employment effects of minimum wages are hotly contested, the relatively few papers on prices charged by affected firms nearly uniformly find that prices modestly increase following a minimum wage increase (Lemos 2008).

Another potentially complicating factor is the presence of Medicaid itself, which generates parallel private-pay and Medicaid markets. Parallel markets of this sort have been studied primarily in the context of hospitals, where researchers have focused on the possibility that hospitals increase private insurance prices to make up lost revenue when Medicare reduces what it pays for a service. Evidence is mixed: for example, Cutler (1998) finds cost-shifting in the 1980s but not in the 1990s, when Medicare cuts led to decreased hospital profits and cost-cutting. It is difficult to theoretically generate cost-shifting, as it requires both that the firm had the market power to raise prices and that it had not used that power before. This may well be the case if a firm is not maximizing profits, as with non-profit providers (Ginsburg 2003). In the personal care setting, there may be limited ties between prices for the Medicaid and private-pay markets because of the combination of little market concentration (agencies tend to be small and numerous rather than large and concentrated) and the fact that no agency is required to serve a particular client. We discuss how the presence of Medicaid and its price regulation affect adjustment to the labor cost shocks in the next section.

2.1 Adjustment to the Home Care Rule with Price Regulation

Consider a simplified account of an agency's cost to serve a client who needs h hours of care per week, shown in Figure 7. Before the home care rule, the cost of an additional hour is the same regardless of whether it is the first, twenty-first, or forty-first hour - it is essentially

the wage, w.[10] If the competitive price of personal care services is above the wage, then the agency will serve private-pay clients, and similarly for the Medicaid reimbursement rate and Medicaid clients.

Once the home care rule goes into effect, costs are added to low-hour and high-hour clients. Notably, a low-hour client is unlikely to be served by a dedicated aide who travels only to the client. The aide is likely to travel between clients during the day, thereby incurring portal-to-portal travel time that must be paid at the rate of their hourly wage. For high-hour clients, they are likely to be served by only one PCA and thereby avoid portal-to-portal travel costs, but if they exceed the threshold of forty hours per week, their PCA may begin incurring overtime premia. Low-hour and high-hour clients can be served only if the market price or Medicaid reimbursement rate rises. While the private-pay price may increase organically if the competing agencies are all facing a similar labor cost shock, the Medicaid reimbursement rate must be adjusted by the state Medicaid agency. For example, in Figure 7, the price is shown as a horizontal grey line and the cost of serving a client who needs less than 2 or more than 66 hours is greater than the price.

The other margin in Figure 7 that agencies might, in aggregate, adjust in response is the wage. Both travel pay and overtime premia scale with the straight-time wage, so to the extent that agencies can lower wages, they can do so to cut costs while maintaining the same services, as in Trejo (1991). Cutting straight-time wages may be difficult due to downward nominal wage rigidity (see e.g. Fehr and Goette (2005)), but engaging in slower wage growth during a period where wages in the industry increase relatively rapidly may accomplish similar ends. As with the price, this behavior arises not necessarily from monopsony power over workers, but from a mass of agencies competing for PCAs but undergoing the same industry-wide cost shock.

Might agencies use the private-pay market to subsidize the Medicaid market, or vice versa? If the market is perfectly competitive, then agencies will not engage in any cost-

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[10]Here we abstract away from the fixed costs of taking on an additional client, such as occasional supervisory visits from a nurse.

shifting. If an agency increased its private-pay price to subsidize Medicaid clients, then any agency that didn't take Medicaid clients could offer private-pay clients the same service at a lower price. And if Medicaid clients were used to subsidize private-pay clients, then the agency would still be losing money on those private-pay clients. In the perfectly competitive framework, it does not make sense for an agency to serve any client on whom they lose money.

If it becomes unprofitable to serve clients under the home care rule who had previously been served, it follows that agencies would serve fewer clients and therefore need fewer PCAs, but they may still engage in some hiring to spread hours and travel across multiple workers. The employment prediction is then ambiguous, rather than an unambiguous increase. The scale effect considered here generates a novel prediction - that payroll at the agency may decline, due to a combination of reduced hours, ambiguous effects on employment, and reduced straight-time wages. Under Ehrenberg (1970) and Trejo (1991), payrolls would only ever increase or stay the same when a new overtime pay requirement is put into place.

3 Data

To test these hypotheses, we use several source of data about personal care aides and their clients. PCAs are not captured well in any single set of data, so we use data from a variety of sources to understand not only the effects of the home care rule on personal care agencies, but also the effects on Medicaid and private-pay consumers of personal care. We will combine imperfect but complementary measures to construct a coherent story.

3.1 Data on Labor Market Outcomes

Our primary source of personal care agency outcomes is the Statistics of U.S. Businesses (SUSB), which contains annual, state-industry-level observations of employment, payroll, and establishments aggregated from the Census Bureau's Business Register. The data cover

all business establishments with paid employees and exclude private households and most government employees. While PCAs who work at a personal care agency will be counted in the SUSB, those who are hired directly by an individual household or who work through a state self-directed care program will not be counted.[11] Because they are industry-level aggregates, numbers in the SUSB include not only PCAs but also everyone in the employ of a personal care agency, such as managers, social workers, and supervising nurses. However, most workers in the industry are PCAs; in the 2018 Occupational Employment and Wage Statistcs, 66% of workers in the Personal Care Services for the Elderly and Disabled industry (NAICS 624120) were PCAs. No other occupation constitutes nearly so large a share of the industry; the next largest, Home Health Aides, made up 8.49% of the industry's employment. The SUSB will overestimate employment of PCAs in agencies, and insofar as PCAs are the lowest-paid workers at an agency, it will also overestimate total pay for PCAs.

The SUSB gives us information on the industry of interest while combining multiple occupations, so we turn to the Occupational Employment and Wage Statistics (OEWS) for information on the occupation of interest while combining multiple industries. The OEWS estimates state-occupation-level employment and wages (excluding overtime premia) through a survey of approximately 1.1 million establishments. Employment and wages are estimated annually, but each establishment is surveyed by the Bureau of Labor Statistics only once every three years. The Personal Care Aide occupation (SOC 39-9021) includes workers from a variety of industries, so employment and wages estimated by the OEWS will include not only PCAs working for agencies but also those who work at residential or nursing facilities. PCAs working for agencies tend to be the lowest-paid among these groups (Kim 2022). OEWS does not survey individual households or governments, so like the SUSB these data also exclude PCAs working for an individual household or state self-directed care program. Insofar as PCAs working at personal care agencies tend to make less than those working for

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[11]Some states conduct payroll for their self-directed Medicaid programs through a fiscal intermediary, which may be a personal care agency. In this case, the workers would be counted as employees of the agency, and we would capture some of the employment in Medicaid self-directed personal care programs. The states with the largest self-directed programs, e.g. California, do not use fiscal intermediaries.

residential facilities, we will see them at the bottom of the wage distribution estimated by the OEWS.

For information that combines both occupation and industry, we supplement our analyses from the SUSB and OEWS with analyses in the American Community Survey (ACS). The ACS may not identify all respondents who work as PCAs; the ACS only asks about a respondent's primary job, and PCAs commonly hold multiple jobs.[12] However, the ACS has the advantage that it counts aides employed by individual households and Medicaid self-directed programs. We can also distinguish between employment in agencies and for individual households in the ACS, allowing us to test hypotheses about changes in formal and informal work arrangements for PCAs. The sample of PCAs in the ACS is relatively small, so results are noisy but provide qualitative support to our findings from the SUSB. A description of PCAs in the ACS can be found in Table 1.

Finally, we obtain data on the price that personal care agencies charge private-pay consumers from the Genworth Cost of Care Survey. Genworth, a long-term care insurance company, conducts an annual survey of 17-18% of personal care agencies nationwide to develop estimates of the cost of long term care. They call agencies to receive quotes for the cost of assistance with ADLs at home, excluding holiday rates or overtime charges. Their reports share the median, minimum, and maximum price recorded in each state. We draw from their 2010-2015 and 2018-2019 reports, during which the definition of care requested was consistent. Genworth generously provided state-level data underlying the 2018 and 2019 reports. Earlier reports were found using the Internet Archive, and public versions for 2016-2017 did not include hourly rates as in earlier reports and the later data provided by Genworth.

For the SUSB, OEWS, and ACS, we use data from 2008-2019. Beginning our time series in 2008 gives us a five-year pre-period before the announcement of the home care rule. We end in 2019 because the COVID-19 pandemic in 2020 is likely to have substantially disrupted

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[12]Christman and Connolly (2017) estimate that 1 in 3 home care workers currently holds multiple jobs, and that half of home care workers are looking for other work in addition to their home care job.

the operations of personal care agencies.

3.2 Data on Use of Home Care

To learn more about how changes at agencies affected the use of personal care and to distinguish between effects in the Medicaid and private-pay markets, we turn to the Health and Retirement Study (HRS) and its restricted-access geographical information. The HRS is a longitudinal panel survey of older adults, who are typically first surveyed at age 50-56 and every two years thereafter. About 10,000 individuals respond every survey year. The survey includes detailed questions about what ADLs and IADLs an older adult needs assistance with and from whom they get that care, including their relationship to their, their helper's usual hours, and whether their helper is paid through Medicaid. We can examine not only the use of paid non-relative helpers, who are typically employed through agencies, but also whether there are changes in care from other sources, such as children. Crucially, we can use the information on Medicaid coverage to understand whether changes in utilization are occurring in the private-pay market, the Medicaid market, or both. We use the 2002-2018 HRS surveys, as some questions about care-giving changed in 2000, and we restrict our sample to respondents aged 65 or older who have difficulty with at least one ADL or IADL, that is, a sample of older adults likely to need personal care services. Descriptive statistics for the full HRS sample and our sample of respondents with ADL or IADL difficulties are presented in Table 2.

Older adults are not the only consumers of personal care services, as many people with disabilities rely on these services to supplement care from family members or live independently. We do not have systematic data on the use of personal care services by people with disabilities and will not be able to address whether care changed for them in this paper, though it is an important area for future study.

3.3 Data on State Policies

Data on pre-existing state policies about overtime premia and travel pay for PCAs come from the National Employment Law Project. We gathered novel data on Medicaid reimbursement rates for personal care services from state Medicaid websites or by contacting state Medicaid offices directly. We collected 2020 rates for 42 states, and historical rates, typically annual from 2010 to 2020, from 22 states. While most states use the same code for personal care services (T1019), others do not; in these cases, we have collected the rate for the service with the closest description. In all cases, we have collected the reimbursement rate for one hour of personal care services delivered by an entry-level worker.

4 Methodology

We use a difference-in-differences methodology that exploits differences in pre-existing state policies regarding minimum wage, overtime, and travel pay for PCAs. Several states already granted some or all of these protections to PCAs and had for many years before the home care rule was issued in 2013. These protections were typically extended when a state amended its minimum wage or overtime law to include domestic workers such as maids or nannies, usually during the 1970s and 1980s and none more recently than 2000 (Goldberg 2015). These states instituted a broader definition of employment that would capture more workers, but the protections extended to PCAs in these states do not seem to have been part of an effort to reach these workers in particular. The home care industry was much smaller at that time and it is unlikely such legislation was passed because the home care industry was struggling or thriving in those states. While the home care rule in theory brought states to the same policy, the shock to labor costs implied would not have affected states with pre-existing policies. We then have a group of states that experienced no policy change with the announcement of the home care rule in 2013, and a group of states that did experience a policy change.

Whether states with pre-existing protections are a good counterfactual for states newly gaining coverage will depend on whether the personal care industry in these two groups of states would have continued to evolve similarly in the absence of the policy change. We will demonstrate that the personal care industry in these two sets of states was evolving similarly prior to the issuance of the home care rule and use the method from Rambachan and Roth (2022) to bound the sensitivity of our estimates to potential deviations from linear parallel trends.

Due to the nature of the industry, it may be the case that pre-existing state policies mandating the minimum wage, overtime premia, and travel compensation for PCAs were poorly enforced. This would imply that the states with existing coverage were also, in practice, gaining coverage. To the extent that this was true, it would bias our results towards finding no effect. We interpret our results as being comparisons between a more-treated and a less-treated group.

Our primary specification for state-level data estimates coefficients for each year relative to 2012, the year before the home care rule was issued. We estimate the following model:

$$Y_{st} = \alpha_s + \gamma_t + \beta_t GainedCoverage_s + \epsilon_{st} \tag{1}$$

where Y_{st} is an outcome (employment, payroll, wage, establishments) in state s in year t, $GainedCoverage_s$ is an indicator for whether state s newly gained coverage for PCAs in 2013, α_s are state fixed effects, γ_t are year fixed effects, and ϵ_{st} is the error. β_t then provides an estimate for the difference between the two groups of states in year t. We also generate a static difference-in-difference using the announcement and enforcement dates to define the post period, which allows us to find the average effect over each time period:

$$\begin{aligned} Y_{st} = \alpha_s + \gamma_t + \beta_{Announce} PostAnnouncement_t \times GainedCoverage_s \\ + \delta PostEnforcement_t \times GainedCoverage_s + \epsilon_{st} \end{aligned} \tag{2}$$

where all variables are defined as before, $PostAnnouncement_t$ is an indicator for a year after and including 2013, and $PostEnforcement_t$ is an indicator for a year after and including 2016. We will also present the effect post-enforcement relative to 2012, which is given by:

$$\beta_{Enforce} = \beta_{Announce} + \delta \qquad (3)$$

For individual-level data from the HRS, we use a static difference-in-differences approach and include a battery of demographic, health, and family structure variables. We fully interact our difference-in-differences variables with an indicator for Medicaid recipiency so that we can distinguish the effects in the Medicaid and private-pay markets. We estimate, for an individual i in state s at year t:

$$
\begin{aligned}
Y_{ist} = {} & \alpha_s + \gamma_t + \delta Demographics_i + \zeta Health_{it} \\
& + \eta FamilyStructure_i + \theta PostMedicaidExpansion_{st} + \kappa Medicaid_{it} \\
& + \lambda Post_t \times Medicaid_{it} + \mu GainedCoverage_s \times Medicaid_{it} \qquad (4) \\
& + \beta_{PrivatePay} Post_t \times GainedCoverage_s \\
& + \beta_{TripleDiff} Post_t \times GainedCoverage_s \times Medicaid_{it} + \epsilon_{ist}
\end{aligned}
$$

where Y_{it} is an outcome such as an indicator for use of a paid helper to assist with ADLs or IADLs. The full contents of the Demographics, Health, and Family Structure vectors can be seen in Table 2. Since many of our outcomes are binary, we present logit estimations of equation 4 in Appendix Table D5. The logit coefficients are similar in statistical significance and magnitude. Many states chose to expand Medicaid access through the Affordable Care Act, and we may be concerned about changes in the size and composition of Medicaid in states that expanded. State fixed effects address factors that are constant over time that might lead a state to choose to expand Medicaid access, and we include in our HRS specification an indicator for whether a state expanded Medicaid, interacted with the appropriate time period for after their expansion to address the expansion itself. We present our SUSB

and OEWS results including this indicator in Appendix Table D4. We lose some statistical precision because of the substantial overlap in time periods but the point estimates are not much affected by the inclusion.

We frequently compare the difference-in-difference effects in the Medicaid and private-pay markets. The difference-in-differences effect in the private pay market is captured by the coefficient $\beta_{PrivatePay}$ in equation 4. The difference-in-differences effect for Medicaid recipients is given by:

$$\beta_{Medicaid} = \beta_{PrivatePay} + \beta_{TripleDiff} \tag{5}$$

For all analyses, we cluster standard errors at the state level. While we have 50 clusters of equal size, we have relatively few treated clusters, which can lead clustered standard errors to over-reject the null hypothesis if any clusters are extreme. To assess the potential for the sensitivity to extreme clusters in our main results, we follow MacKinnon et al. (2022).

5 Results

We begin by investigating the overall effects of the home care rule on personal care agencies before addressing changes in use of personal care and the potential for different effects in the Medicaid and private-pay markets. We then analyze changes in prices and how Medicaid price regulation interacted with the new labor policy.

5.1 Effects on Personal Care Agencies

We begin our analysis of personal care agencies by examining annual payroll as a summary metric. If agencies simply ate the cost increase and paid out travel and overtime without making other changes, we would expect payroll increases; if agencies adjusted straight-time wages to maintain workers' weekly pay as in Trejo (1991), then we would expect to see no change in payroll.

Figure 1 shows the average of annual payroll by state policy. We scale by the number of

older adults for two reasons: first, to put states of different sizes into similar magnitude, and second, to give a sense of service provision relative to demand for the service. Total annual payroll relative to population 65 and older was growing at similar rates through 2012 despite the different minimum wage, overtime, and travel pay policies across states. While states that already had coverage then continued to expand annual payrolls at roughly their prior rate, payroll growth slowed in states affected by the 2013 announcement of the home care rule and continued to fall behind the always-covered states through 2019. These differences are statistically significant and the estimated coefficients from equation 1 are displayed in Figure 8. If pooled together into a single pre-post difference as in equation 2 and displayed in Table 3, these results suggest that payrolls in states gaining coverage lagged behind by an average of 0.5% ($229 per 100 older adults) for the 2013-2019 period (post-announcement), or 19% ($7,883 per 100 older adults) for the 2016-2019 period (post-enforcement). Scaling by the share of older adults with likely to need home care, this means that states gaining coverage had payrolls $238 lower per older adult with ADL or IADL needs.[13] This indicates that agencies must have adjusted in some manner, and that they did not fully re-contract straight-time wages - a real change must have occurred rather than an accounting exercise.

It is not clear simply from payroll whether the change is driven by employment, wages, hours, or some combination thereof. Employment relative to population age 65 and up, the trends for which are displayed in Figure 9, appears to flatten out for states gaining coverage in 2013 even as it continues to expand in the states that were always covered. The difference-in-differences coefficients for employment shown in Figure 10 are less precise than for annual payroll but exhibit the same pattern, and the confidence intervals rule out increases of more than 7.6% of the 2012 mean, or 0.18 workers per 100 people age 65 or older. This is inconsistent with models of overtime premia that generate employment increases as the firm spreads out hours across more workers.

The SUSB only captures employment at personal care agencies, and a key concern

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[13]Calculated assuming that 33% of people over 65 report difficulty with at least one ADL or IADL, as found in the HRS.

expressed by opponents of the home care rule was that PCAs would leave agencies to work directly for households in informal arrangements. While the classification of industries in the ACS is imperfect, we contrast our results from the SUSB with employment in agencies and employment in private households from the ACS in Figure 11. The point estimates for employment of PCAs in agencies track with those from the SUSB, particularly in the post-enforcement period, and we do not see a substantial increase in the estimates of PCAs working for private households.

Slower wage growth may also be part of the slower growth of payrolls. The OEWS data observe PCAs in several employment situations, but results from the ACS suggest that PCAs who work for personal care agencies make less than aides who work for other employers such as nursing homes or assisted living facilities (Kim 2022). We therefore use the lower percentiles of PCA wages in the OEWS to get a sense of wages for PCAs employed at personal care agencies, though we include the 50th and 75th percentiles for comparison. The years 2008-2019 saw a steady increase in hourly wages for PCAs, with national median wages rising from \$9.41/hour to \$12/hour. Within this substantial wage growth, 25th percentile wages, and to a lesser extent median wages, fell behind trend in states affected by the home care rule. This can be seen in the difference-in-difference coefficients in Figure 12, which contains estimated coefficients for 25th, 50th, and 75th percentile wages. States gaining coverage saw 25th-percentile wages increase, on average, 37 cents less in the 2016-2019 period, a difference of 14% of the 2008-2019 increase. Meanwhile, 75th percentile wages continued to grow at the same rate in both affected and unaffected states throughout the full time period.

We do not have data on how the internal workings of agencies changed in response to the policy, such as whether agencies engaged in more efficient routing of PCAs among clients to reduce travel time or whether they reduced worker hours to avoid overtime. Although they are too imprecise to draw conclusions, we present results on hours from PCAs in the ACS in Appendix Table D1. We also have limited information on whether personal care agencies closed in response to the policy. Appendix Figures D2 and D3 show the results for

the number of establishments in the SUSB, which shows a small and imprecise decrease in personal care establishments after enforcement began.

Together these results suggest that employment did not expand much in response to the policy, that agencies lowered base wages to help mitigate increases in the cost of labor, and payrolls decreased, likely due to a combination of reductions in wages, hours, and the size of the workforce. The slower growth of personal care agencies may not, however, translate into changes in the care received by older adults if PCAs switched to informal arrangements with households that were not reported as their primary employment in the ACS or if agencies substituted toward workers with less legal recourse (e.g. undocumented workers) whom they did not report in surveys. To assess whether these apparent changes at agencies translate into changes in what care older adults receive and to disentangle the effects of the policy on the Medicaid and private-pay markets, we turn to the HRS.

5.2 Effects on Care Utilization

Any reduction in care provided by agencies is most likely to appear in the use of paid non-relative helpers, who are typically hired through agencies or directly by households through state self-directed care programs. We therefore begin by analyzing changes in whether older adults with home care needs are using paid helpers. Table 4 shows the results of estimating equation 4 with an indicator for whether a respondent has a paid helper as the dependent variable. The interaction between the indicators for post-announcement years and states that gained coverage summarizes the average effect among people without Medicaid, that is, the private-pay market. In the private-pay market, our estimate is precise enough to rule out a decrease of more than a percentage point or an increase of more than 3 percentage points. The Medicaid market, however, behaves very differently. The difference-in-differences effect for the Medicaid market indicates that the share of Medicaid recipients using paid helpers fell by 9 percentage points, about half of the pre-period mean.

The Medicaid market is not fixed, so the changes described in Table 4 could be influenced

by changes in how many people, or which people, take up Medicaid coverage. If the home care rule affected how attractive Medicaid was, we might expect to see differential changes in the number of Medicaid recipients. Column (1) of Table 5 shows that the share of older adults with Medicaid does not differentially change between states gaining and not gaining coverage over time. The selection concerns may be not only about quantity, however, but also about unobservable characteristics related to care needs. We therefore test this result with two alternate definitions of Medicaid recipiency which are less likely to be manipulated after the policy. Column (2) estimates equation 4 using Medicaid recipiency at the time of entry to the panel rather than current Medicaid recipiency, and column (3) uses an indicator for whether an older adult has income below 150% of the federal poverty level. The differenece-in-differences effects are similar in magnitude and marginally significant when we use initial Medicaid recipiency as our measure of Medicaid coverage, and our results are attenuated but still statistically significant when we use the income-based measurement. Finally, to test whether Medicaid recipients changed behavior rather than personal care agencies, we examine Medicaid recipients' use of helpers whom they pay out-of-pocket rather than through the state Medicaid program. As we found among older adults without Medicaid, use of out-of-pocket helpers is not meaningfully affected, even among Medicaid recipients. This suggests that the effect among older adults with Medicaid is not about changes in the Medicaid population but about the market for Medicaid-funded personal care.

If Medicaid recipients shifted away from using paid helpers, did they switch to other sources of care? Figure 13 displays that difference-in-differences effects on use of different sources of care for Medicaid and private-pay clients. Older adults who do not have Medicaid do not show any meaningful trends in use of help from relatives, help at home more generally, help from institutional aides, or nursing home residency. Among respondents on Medicaid, there is a statistically insignificant 6.3 percentage point increase in the share not receiving any help at home, whether from relatives or paid helpers. They may still be receiving help from an institutional helper, such as at an assisted living facility or nursing home, and we

estimate a 4.2 percentage point increase in use of institutional helpers, though it is not statistically significant. We see a similarly-sized effect on the question about nursing home or assisted living residency, which is another measure of the same phenomenon. We do not see a large shift toward using care from relatives, though we cannot rule out an increase of 7 percentage points or a decrease of 9 percentage points. This may be because care from paid helpers often supplements help from relatives rather than replacing it.

On the intensive margin, we can look at the number of hours of care received from different sources, as examined in Table 6. We estimate that Medicaid recipients received 11 fewer hours or paid care per month on average, while hours of care for private-pay recipients were not statistically different. The change in monthly hours overall is negligible or even positive in part because of a large shift in hours from relatives; relatives of Medicaid recipients provide 35 more hours of care per month on average after the home care rule.

To better understand where in the distribution of hours changes are occurring, we divide hours of care received at home into bins of no help at home, 1-20 hours per week, 21-40 hours per week, 41-60 hours per week, and more than 60 hours per week. Figure 14 plots the difference-in-differences effects among Medicaid and private-pay clients along with the thresholds for no care and overtime care (i.e. more than 40 hours per week). Once again, we can rule out any substantial changes in the private-pay market. Two shifts are evident in the Medicaid market. First, an 8.7 percentage point reduction in having 1-20 hours partially offset by a 6.3 percentage point increase in having no helper at home. This shift is consistent with an attempt to reduce travel costs or select away from clients who can't provide many hours. If aides have to travel portal-to-portal to several clients who do not need much care, they incur a lot of travel time without serving many billable hours, and the agency may only want to serve clients who will have enough hours to offset the cost of travel time to their home. The second shift is a statistically significant 6.4 percentage point reduction the share receiving 41-60 hours of care per week. This care is just over the 40-hour-week overtime threshold, and indeed we see a 4.1 percentage point increase in those receiving 21-40 hours

of care per week, i.e. who are just under the overtime threshold. The increase in full-time but not overtime care is significant only at the 10% level but suggests cutting down on hours among those who could feasibly avoid overtime penalties. There is no significant change among those receiving long-hours (more than 60 hours per week) care; older adults who need this type of care may need constant monitoring and their hours could not safely be reduced.

While analysis at the agency level indicated that agencies were scaling back, the individual-level analysis of the HRS shows that reduction in services was not distributed evenly. The private-pay and Medicaid markets experienced the home care rule very differently, as customers without Medicaid experienced, on average, no substantial changes to the type or amount of care they received. Medicaid recipients, on the other hand, received less care from paid helpers. Hours were primarily reduced among older adults who needed only a few hours per week or who received care just above the overtime threshold, which matches the areas where the home care rule imposed additional labor costs. While relatives increased their hours of care, there is suggestive evidence that Medicaid recipients were more likely to use residential care.

5.3   Private-Pay Prices and Medicaid Reimbursement Rates

How did private-pay clients experience no change when fewer Medicaid recipients were receiving services? One key difference between these markets is whether personal care agencies can adjust their prices. Price data is incomplete and limited, but we will examine whether private-pay prices increased after the home care rule and whether increases in the Medicaid reimbursement rate - in a sense, the price agencies receive for serving Medicaid clients - mitigate some of the declines in services for Medicaid clients.

Our source of data for private-pay prices, the Genworth Cost of Care Survey, reports only the minimum, median, and maximum hourly rate they were quoted in each state, and these statistics are not available for 2016 and 2017. However, we can still see price movements that

suggest the lowest-priced providers had to adjust their prices. First, it is worth noting that prices are higher in states that were always covered, which is consistent with a higher cost of doing business because of travel and overtime pay. In spite of the level difference, median and maximum prices continued to develop in parallel in states gaining and not gaining coverage, as seen in Figure 15. The lowest prices, however, increased between 2015 and 2018, and much more in states gaining coverage than those not gaining coverage. Figure 16 shows these prices. Between 2015 and 2018, minimum prices went up by almost $2 per hour on average in states gaining coverage, and about 75 cents on average in states not gaining coverage. 2018 and 2019 are the only years for any of our price measurements in which the prices in states gaining coverage exceed those in the already-covered states. Estimates of the post-announcement and post-enforcement effects from equation 2 are given in Table 8.

Minimum prices in states that already included PCAs in their labor laws are unlikely to be a pure counterfactual for the states newly gaining this coverage. Many of the observed minimum prices are barely consistent with paying PCAs the minimum wage, and it is likely that some agencies were ignoring relevant state labor laws in order to charge prices this low. It is likely the threat of federal enforcement also encouraged some more compliance in states that were theoretically already covered, and it is important to interpret this difference as between a more-treated and less-treated group rather than between a treated and untreated group. Further, the price changes here are purely suggestive - none of the differences here are statistically significant, in part because the minimum price recorded in an annual survey has a great deal of random variability.

Price may have been a potential mechanism through which agencies adjusted to the home care rule in the private-pay market, but this mechanism is unavailable in the Medicaid market, where the state sets the Medicaid reimbursement rate. States were aware of the home care rule before its official announcement, and the Department of Labor engaged in specific outreach to states to help bring their consumer-directed programs, in which the state is sometimes considered a joint-employer, into compliance. States engaged in a

variety of initiatives to reduce the cost of overtime and travel pay in their consumer-directed programs, including limiting workers to 40 hours per week and budgeting additional funds to cover overtime and travel costs. Some may also have increased their reimbursement rates in response. We observe more and larger rate increases after 2013 than before 2013 - before 2013, 20% of states increased their rate in a given year, and the median change among states adjusting their rates was a decrease of 5 cents. After 2013, 46% of states increased their rates in a given year, and among those changing their rates, the median change was an increase of 72 cents. But even with the increased frequency and amount of rate changes, it is not clear that these relatively small changes would keep up with the likely amount of the price increase among the lowest-priced providers.

We do not have exogenous variation Medicaid reimbursement rates, and we cannot rule out that states changed these rates in direct reaction to the policy, in ways potentially correlated to expected outcomes. Nevertheless, we can take a descriptive approach to see whether outcomes for a state's Medicaid recipients varied with increases in a state's Medicaid reimbursement rate for personal care services. We estimate the association of rate increases with the home care rule's effects by interacting the difference-in-differences terms of equation 4 with the amount that the state increased its reimbursement rate for personal care services over the course of the 2013-2017 period. We then add together and scale the appropriate coefficients to estimate the difference-in-differences effects in the Medicaid and private-pay markets for states that did not increase their reimbursement rates and states that increased their rates by the median amount. These difference-in-differences effects are shown in Figure 17. We estimate that in a state that did not increase its reimbursement rate at all after the home care rule, Medicaid recipients would be 13.9 percentage points less likely to use a paid helper. In a state that increased its reimbursement rate by \$1.47 in total over the course of the post-period, we predict that Medicaid recipients would be only 6.2 percentage points less likely to use a paid helper, a difference in the effect on Medicaid recipients of 5 percentage points per dollar of rate increase is statistically significant at the 5 percent level.

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The estimate above is constructed in part using variation from rate increases among states that were not gaining coverage. For example, it compares newly-covered states that did not increase their rates to already-covered states that did not increase their rates. If the already-covered states who were faring best did not increase rates, then this might lead us to attribute more of the effect to the choice of rate change than would be accurate. As an alternate measure, we construct an estimate compares states gaining coverage that did not change rates to states gaining coverage that did, using the private-pay market in these states as a control group. With this strategy, we estimate that the effect of the home care rule on Medicaid recipients is 2.7 percentage points larger per dollar of rate increase, significant at the 5 percent level.

Both of these estimates should be taken with caution, as we have a time-series of rates available for only 17 states. We have used heteroskedasticity-robust standard errors instead of clustered standard errors to avoid issues of over-rejection when there are few clusters, but the effective sample of the experiment is quite small. States that increase their reimbursement rates may also be taking other actions to affect their personal care markets. We have limited data on other state actions, but we can calculate similar regressions with indicators of whether a state limited workers in their self-directed programs to 40 hours per week and whether a state budgeted additional funds toward their self-directed programs' travel and overtime expenses. Results from these regressions can be seen in Appendix Table D2; no other policy included here produces results similar to the rate increase.

6   Discussion

While none of the results in Section 5 is sufficient on its own to understand the effects of the home care rule, together they paint a coherent picture. Although personal care agencies in states with and without wage and hour protections for PCAs had been growing at the same rate before the rule was announced, growth in payrolls, employment, and straight-time wages

slowed in the states facing this shock to their labor costs. Despite fears of PCAs switching to informal work or unreported work, such a shift does not appear in the ACS, and it could not have been large enough to substantially offset the reduction in use of paid helpers by older adults. Agencies may have raised prices and cut costs where they could (e.g. redistributing hours or travel, less growth in straight-time wages) to continue serving private-pay clients as before the policy, but cost cuts in employment were borne more by older adults paying for helpers through Medicaid, for which agencies lack a price channel. Indeed, increases to a state's Medicaid reimbursement rate for personal care services appear to have alleviated some of the effects on use of paid helpers among their Medicaid beneficiaries.

These results have important implications for models of overtime and cost-shifting. First, canonical models are constructed in a cost-minimization framework, wherein there is no option to produce less, and so they cannot generate reductions in output. They also do not consider that competitively-determined prices may also need to adjust following a shock to labor costs. Our results suggest that these are two important margins to consider when contemplating the potential effects of a change in overtime. Second, the reduction in use of paid helpers by Medicaid beneficiaries indicates that cost-shifting in personal care is not large enough to make up for the shock to labor costs. This lends credence to the view that cost-shifting may only be possible where there is substantial price-setting power, which the average personal care agency is unlikely to possess.

Our results also highlight the messy and inconsistent landscape of data available for the study of personal care agencies and personal care aides. As professional care at home becomes a more common part of the lives of aging Americans, efforts to understand the industry and improve services would benefit greatly from a more systematic collection of data about this workforce.

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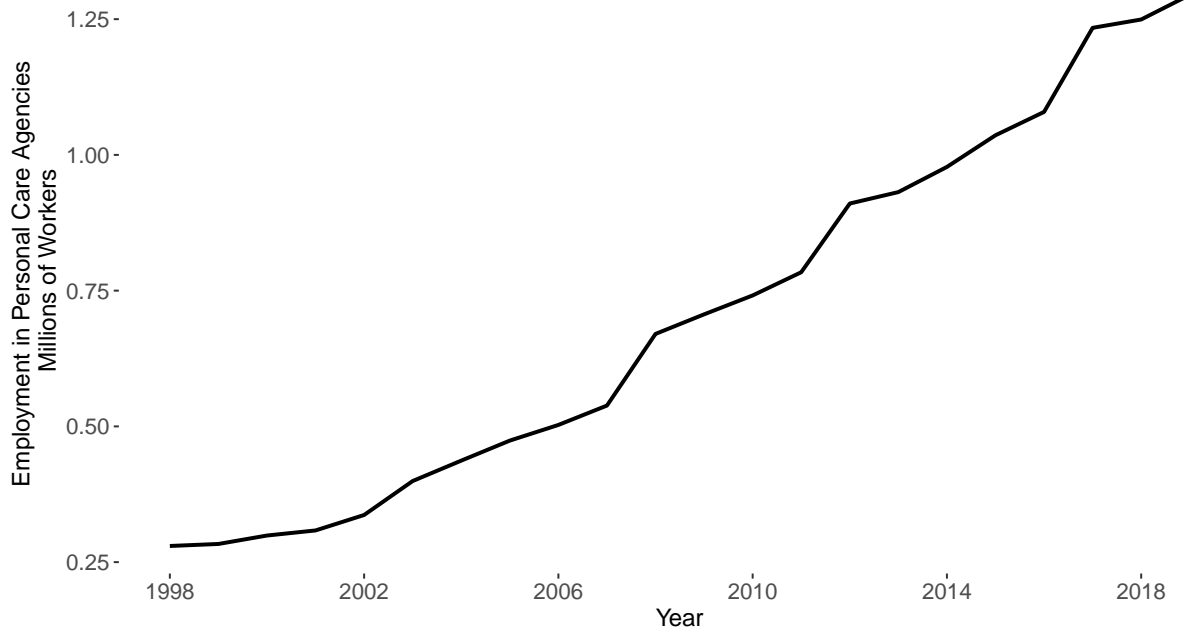
A   Figures

Figure 1: Annual Payroll at Personal Care Agencies per 100 population age 65+
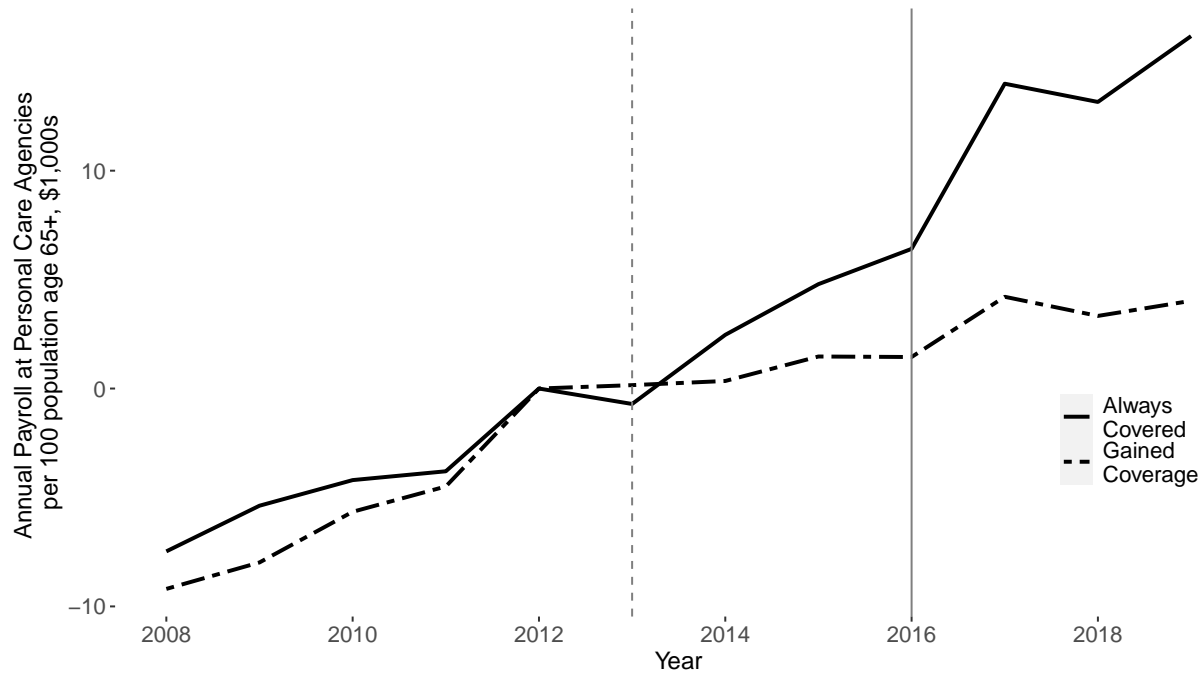
Plot of the average of a state's total annual payroll at personal care agencies, as measured in the SUSB, by state policy status. Annual payroll is measured in $1,000s per 100 population age 65+. Means are normalized to 0 for 2012.

Figure 2: Employment at Personal Care Agencies

Plot of total national employment at personal care agencies, as measured by the SUSB, NAICS 624120.

Figure 3: Share of Medicaid Spending on Long-Term Supportive Services That Going Towards Home and Community-Based Services
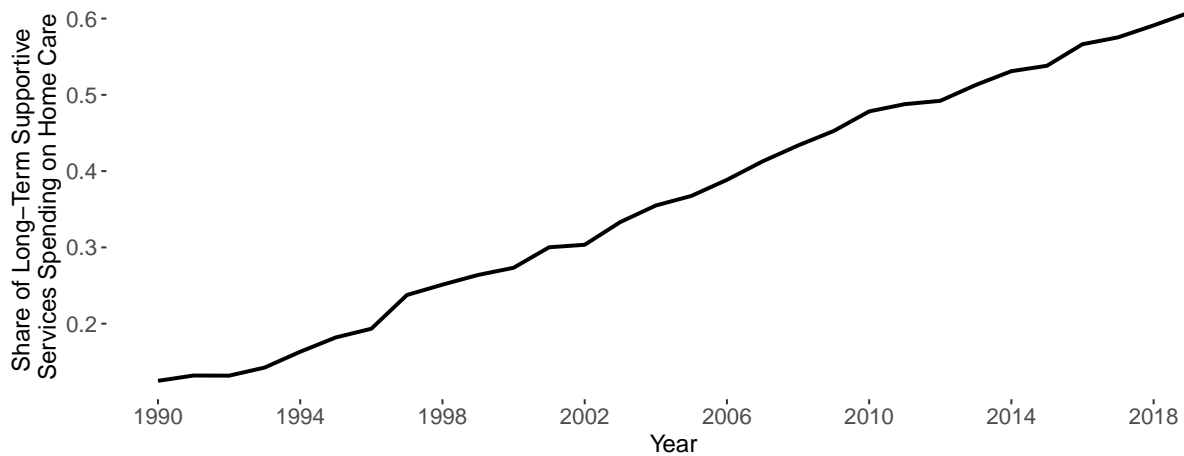
Plot of share of Medicaid long-term care spending going towards home and community-based services.

Figure 4: Medicaid Reimbursement Rates for Personal Care Services
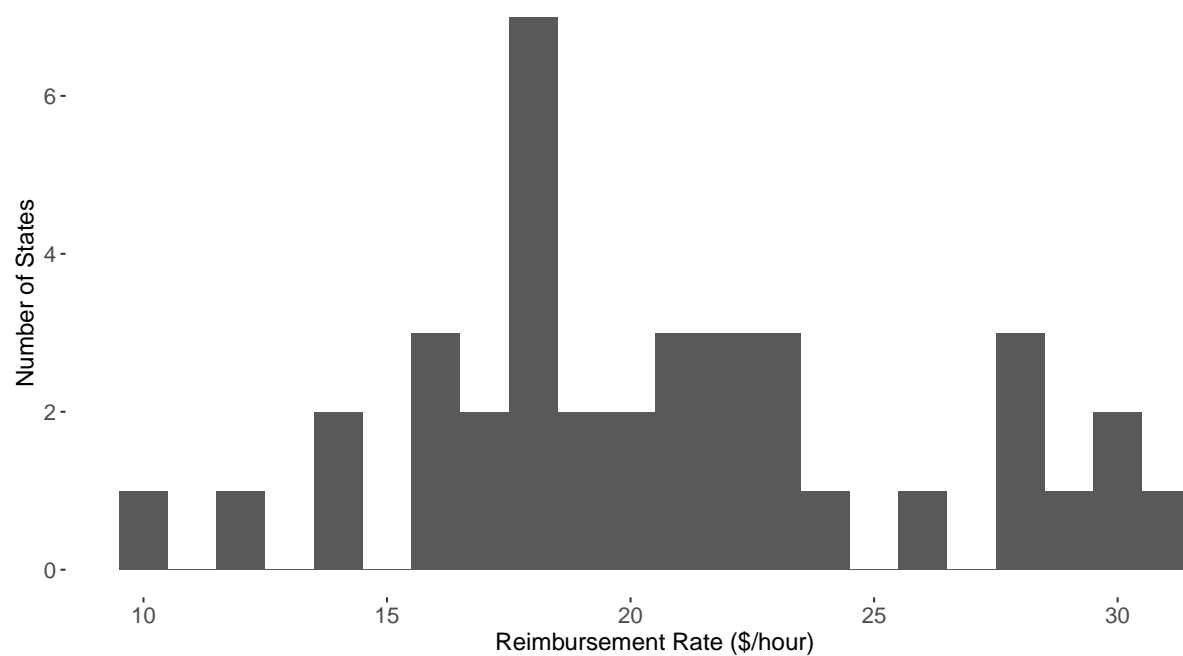
Histogram of the rate state Medicaid agencies pay personal care agencies per hour of personal care services. The rate displayed for each state is the rate effective at the end of 2020. The rate covers T1019 services, or the equivalent code used in the state.

Figure 5: Wage and Hour Investigations by Establishment Type
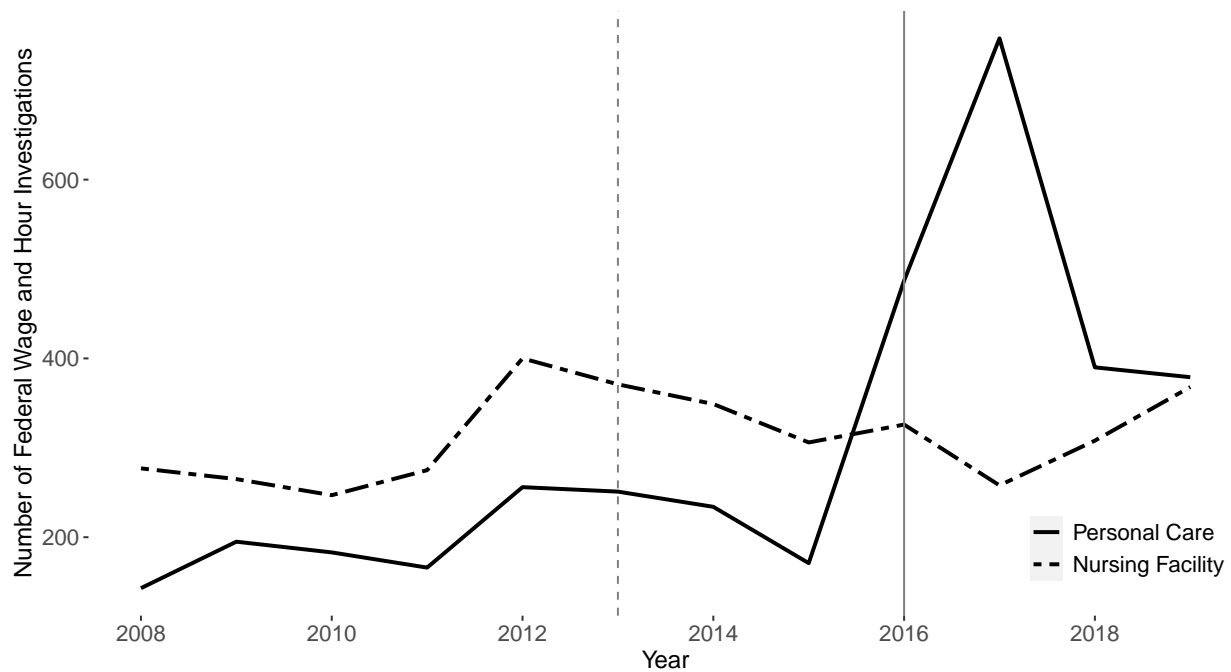
Plot of the number of Department of Labor Wage and Hour Division investigations into the personal care and nursing home industries by year. Data from the WHD WHISARD database of completed investigations. Year indicates the year the investigation began and was added to the publicly available records by FOIA request.

Figure 6: Pre-Existing State Policies for PCA Wage and Hour Protections

No Exemption   Partial Exemption   Full Exemption/No Relevant Law
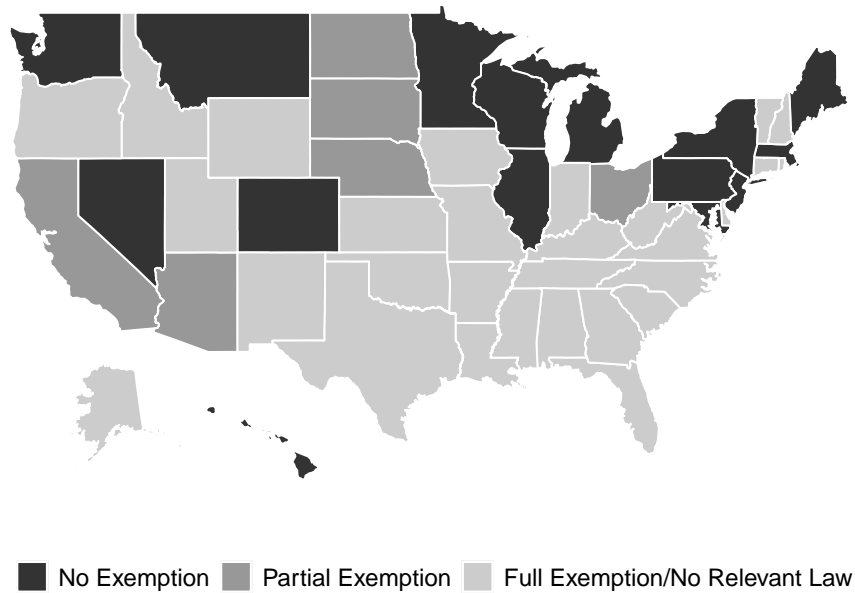
Map of states by their pre-existing policy regarding whether PCAs are exempt from state minimum wage, overtime, and travel protections. In states with no exemption, PCAs are eligible for all three protections. In states with a partial exemption, PCAs are eligible for minimum wage protections but may not be eligible for overtime or travel pay protections. In states with a full exemption or no minimum wage or overtime pay law, PCAs are not eligible for any of the three protections. Data from the National Employment Law Project.

Figure 7: Stylized Agency Costs Before and After Home Care Rule
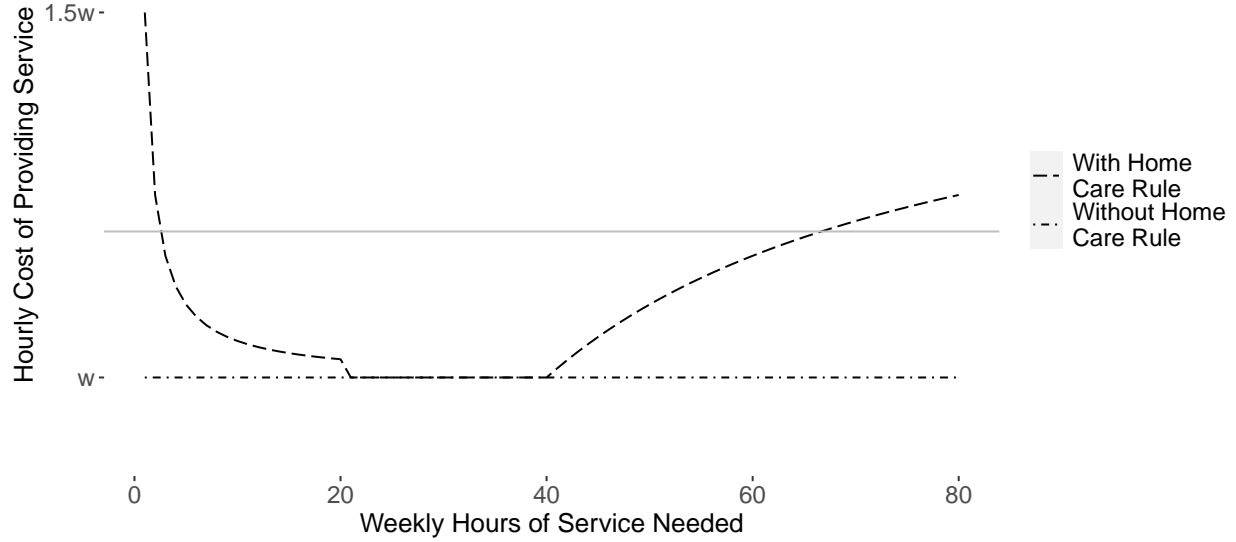
Figure represents the cost per hour to an agency of providing service to a client who needs the number of hours of care per week denoted on the x-axis. Costs per hour before the home care rule are shown with the dot-dashed line, while costs after the home care rule are shown with the long-dashed line. Costs after the home care rule assume that PCAs serving a client who needs less than 20 hours per week also serve other clients and incur 30 minutes travel time. The grey horizontal line represents a potential market price or Medicaid reimbursement rate.

Figure 8: Difference-in-Differences Coefficients: Annual Payroll
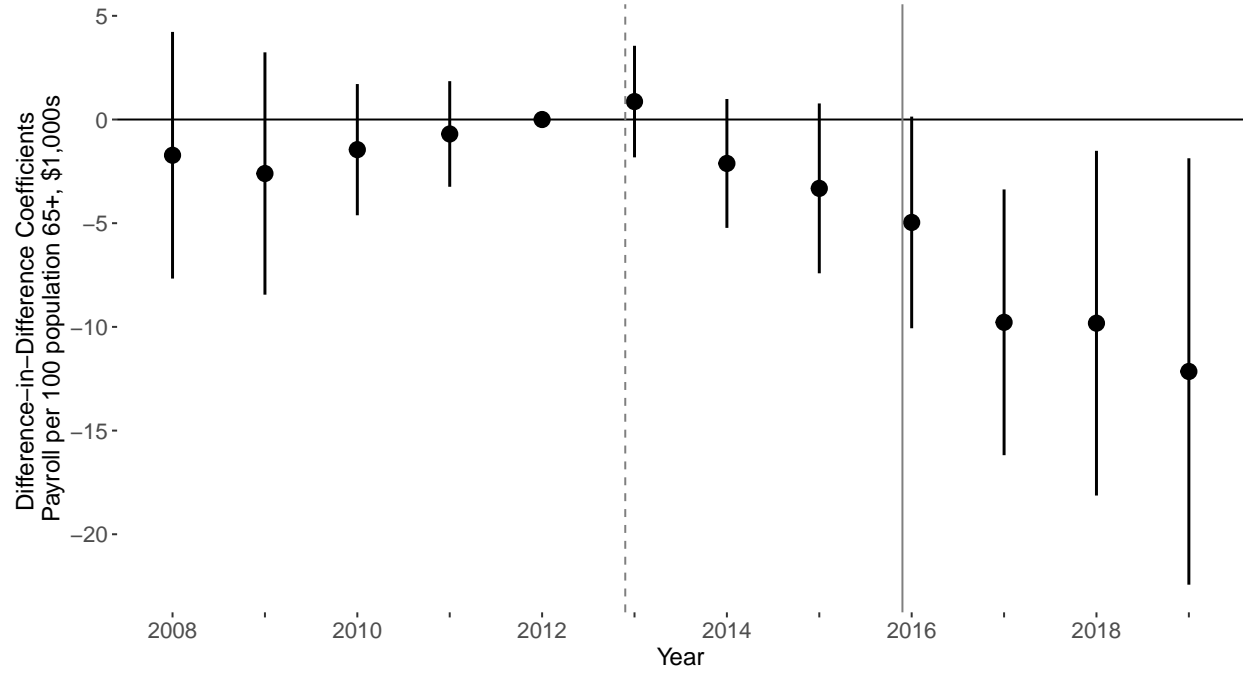
Plot of results of estimating equation 1 with annual payroll from the SUSB as the dependent variable, measured in $1,000s per 100 people age 65 and up. Points represent estimated coefficients for the interaction between year and policy indicators, and attached lines show the 95% confidence interval for the coefficient. Standard errors are clustered at the state level. All coefficients are relative to 2012 values.

Figure 9: Employment at Personal Care Agencies per 100 population age 65+
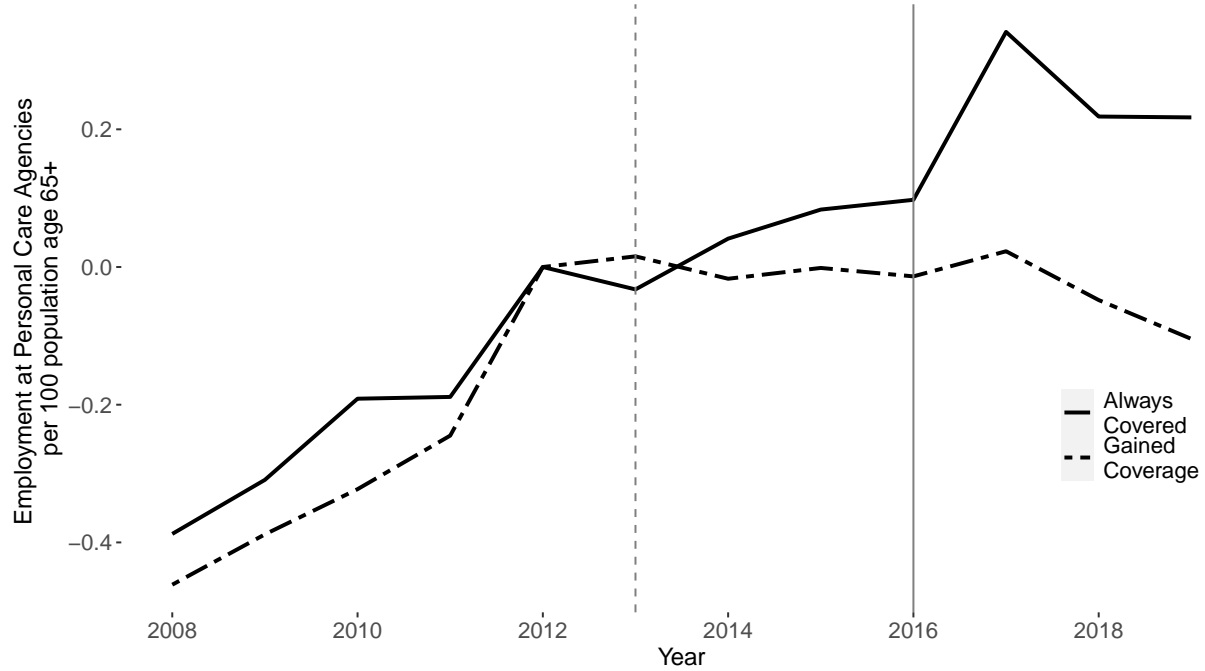
Plot of the average of a state's total employment at personal care agencies by state policy status. Employment is measured in workers per 100 population age 65+. Means are normalized to 0 for 2012.

Figure 10: Difference-in-Differences Coefficients: Employment
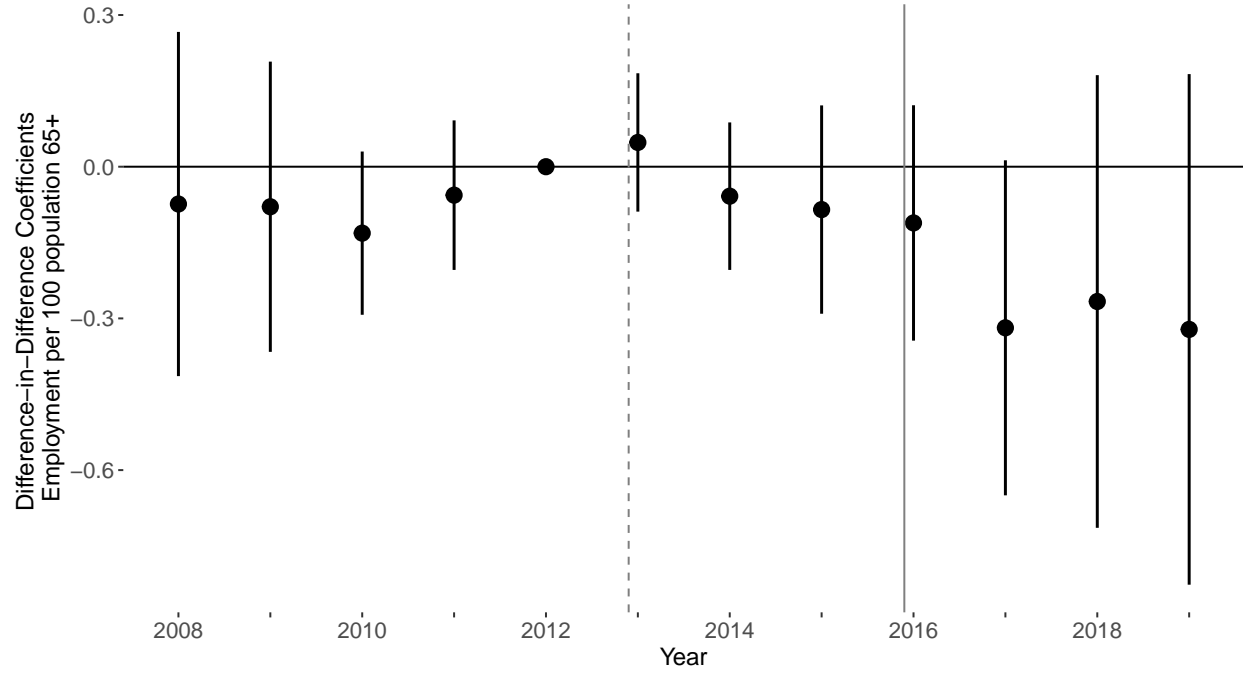
Plot of results of estimating equation 1 with employment as the dependent variable. Points represent estimated coefficients for the interaction between year and policy indicators, and attached lines show the 95% confidence interval for the coefficient. Standard errors are clustered at the state level. All coefficients are relative to 2012 values.

Figure 11: Difference-in-Differences Coefficients: SUSB and ACS Employment
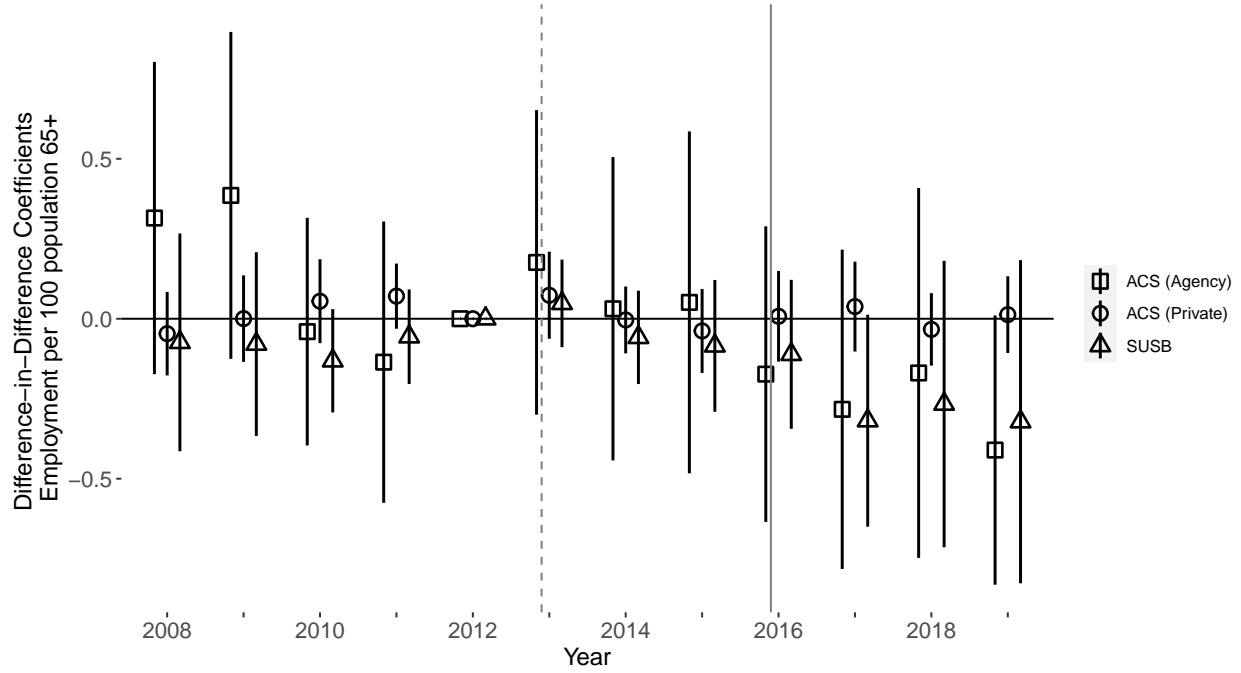
Plot of results of estimating equation 1 with different measures of employment as the dependent variable. ACS (Agency) is the number of PCAs employed at agencies per 100 population 65 or older, as measured in the ACS. ACS (Private) is the number of PCAs employed by private households per 100 population 65 or older, as measured in the ACS. SUSB is the number of PCAs employed by agencies, as measured by the SUSB. Points represent estimated coefficients for the interaction between year and policy indicators, and attached lines show the 95% confidence interval for the coefficient. Standard errors are clustered at the state level. All coefficients are relative to 2012 values.

Figure 12: Difference-in-Differences Coefficients: Hourly Wage
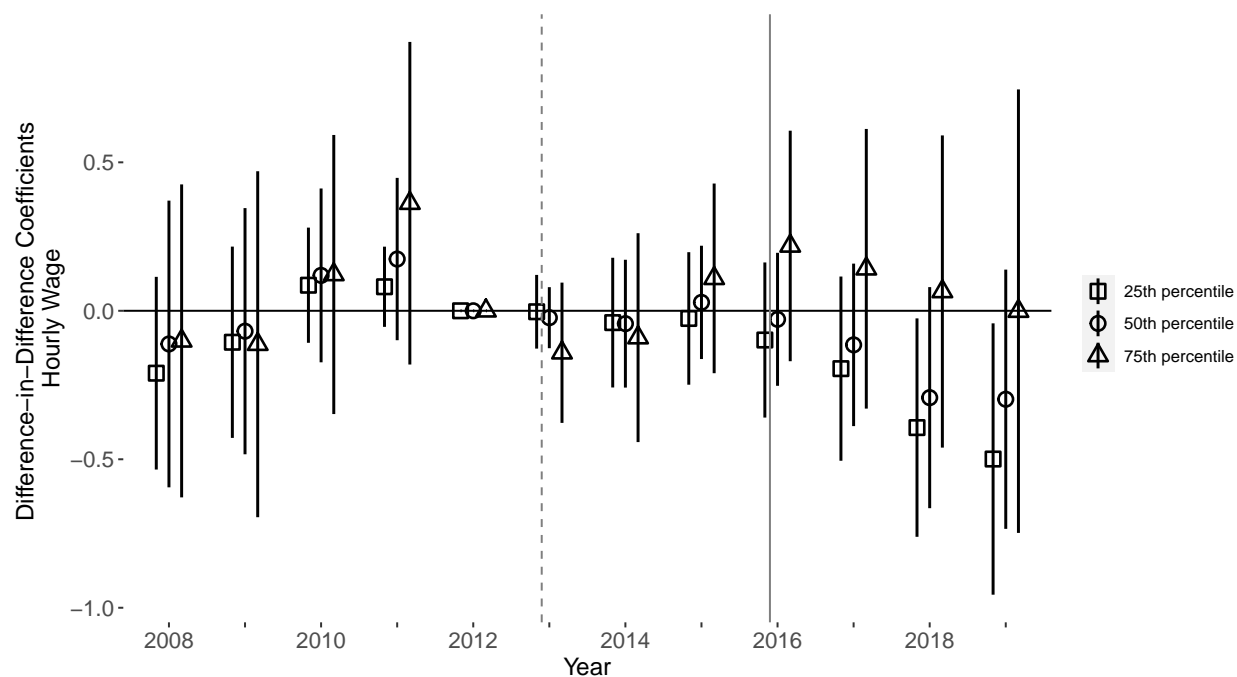
Plot of results of estimating equation 1 with the 25th percentile hourly wage, median hourly wage, or 75th percentile hourly wage from the 2008-2019 OEWS as the dependent variable. Points represent estimated coefficients for the interaction between year and policy indicators, and attached lines show the 95% confidence interval for the coefficient. Standard errors are clustered at the state level. All coefficients are relative to 2012 values.

Figure 13: Difference-in-Differences Effects: Use of Different Care Sources
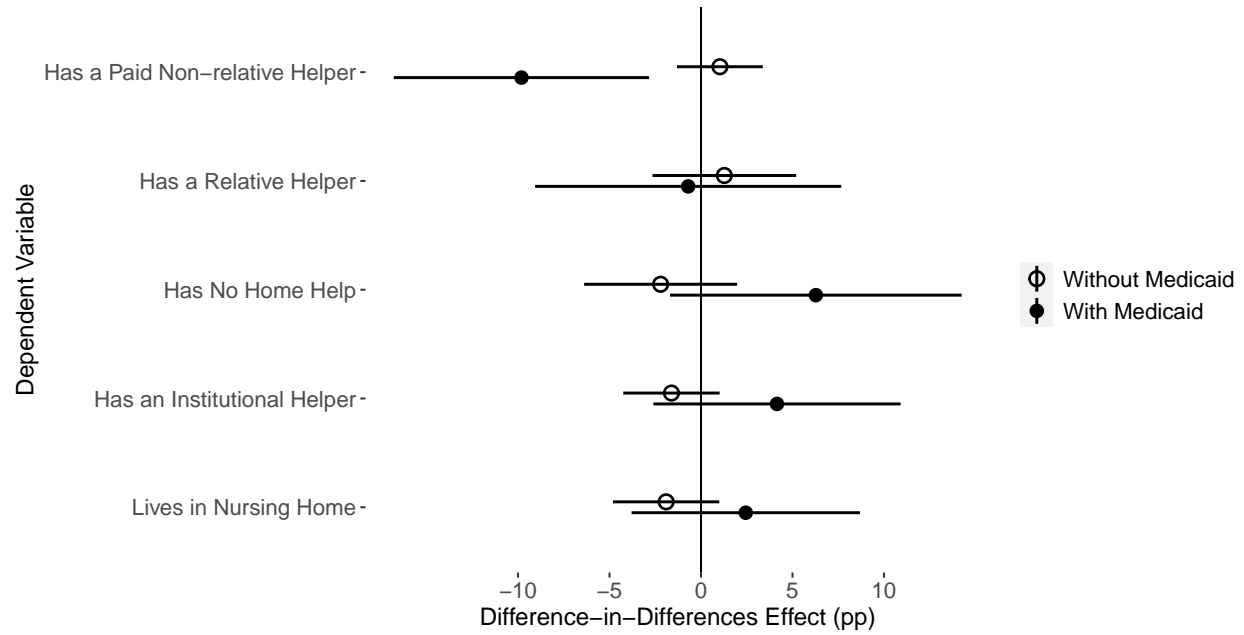
Plot of results of estimating equation 4 with indicators for having a paid non-relative helper, having a relative helper, having no home helper, having an institutional helper, and living in a nursing home as the dependent variable. Points represent $\beta_{PrivatePay}$ from equation 4 and $\beta_{Medicaid}$ from 5, and attached lines show the 95% confidence interval.

Figure 14: Difference-in-Differences Effects: Hours of Care at Home
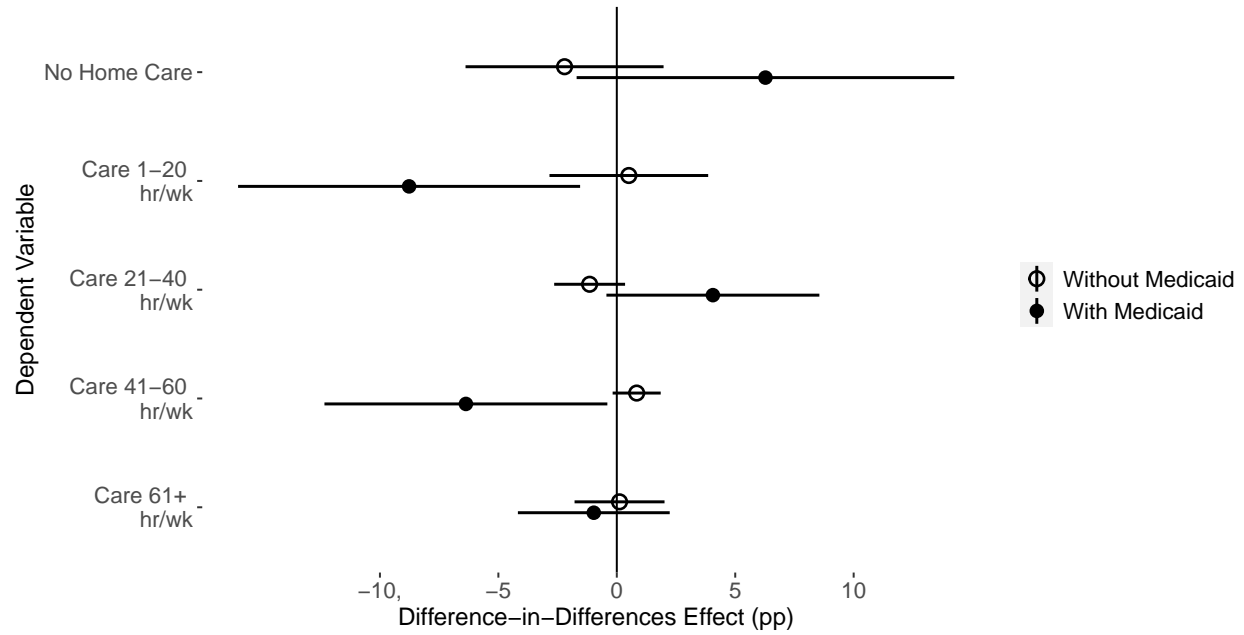
Plot of results of estimating equation 4 with indicators for having no home helper, receiving 0-20 hours of care at home per week, receiving 21-40 hours of care at home per week, receiving 41-60 hours of care at home per week, and receiving more than 60 hours of care at home per week as the dependent variable. Points represent $\beta_{PrivatePay}$ from equation 4 and $\beta_{Medicaid}$ from 5, and attached lines show the 95% confidence interval.

Figure 15: Private-Pay Prices for PCA Services: Median and Maximum
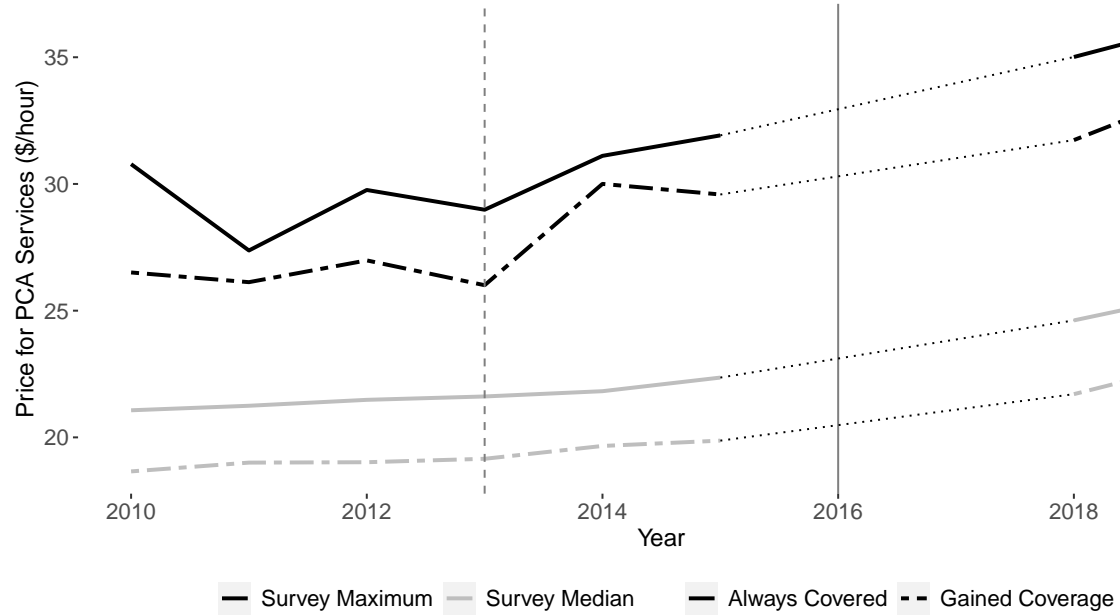
Plot of the average median and maximum hourly prices personal care agencies quoted to Genworth's Cost of Care Survey for ADL assistance, by pre-existing state policy.

Figure 16: Private-Pay Prices for PCA Services: Minimum
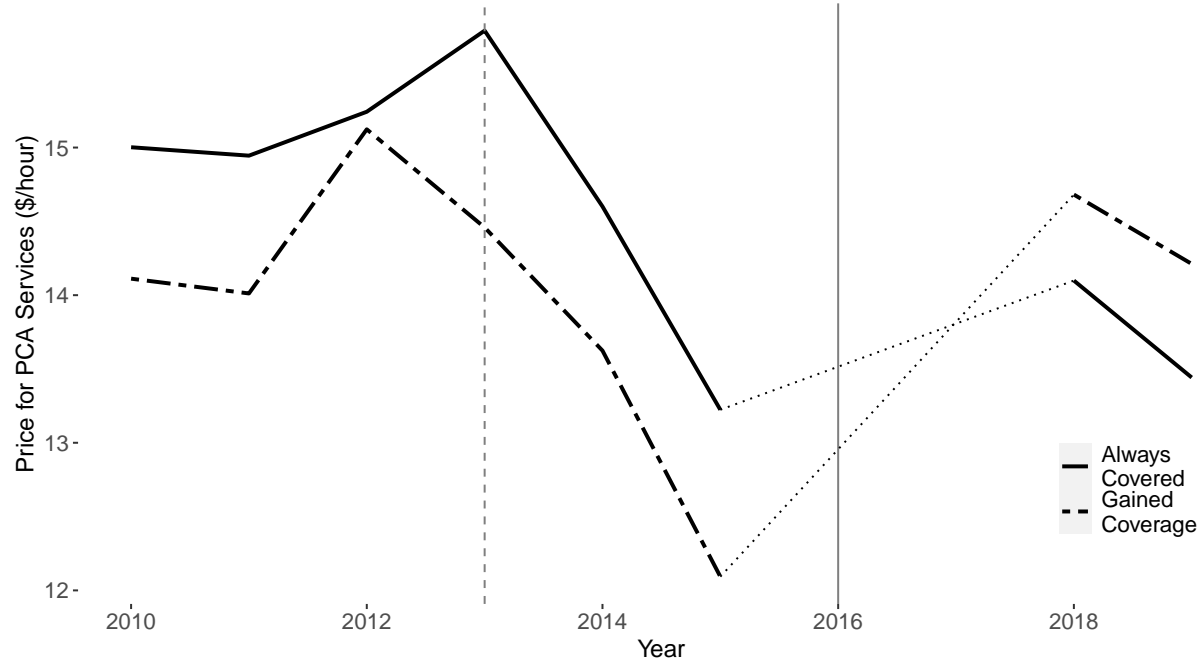
Plot of the average minimum hourly prices personal care agencies quoted to Genworth's Cost of Care Survey for ADL assistance, by pre-existing state policy.

Figure 17: Difference-in-Differences Effects by Medicaid Rate Increase
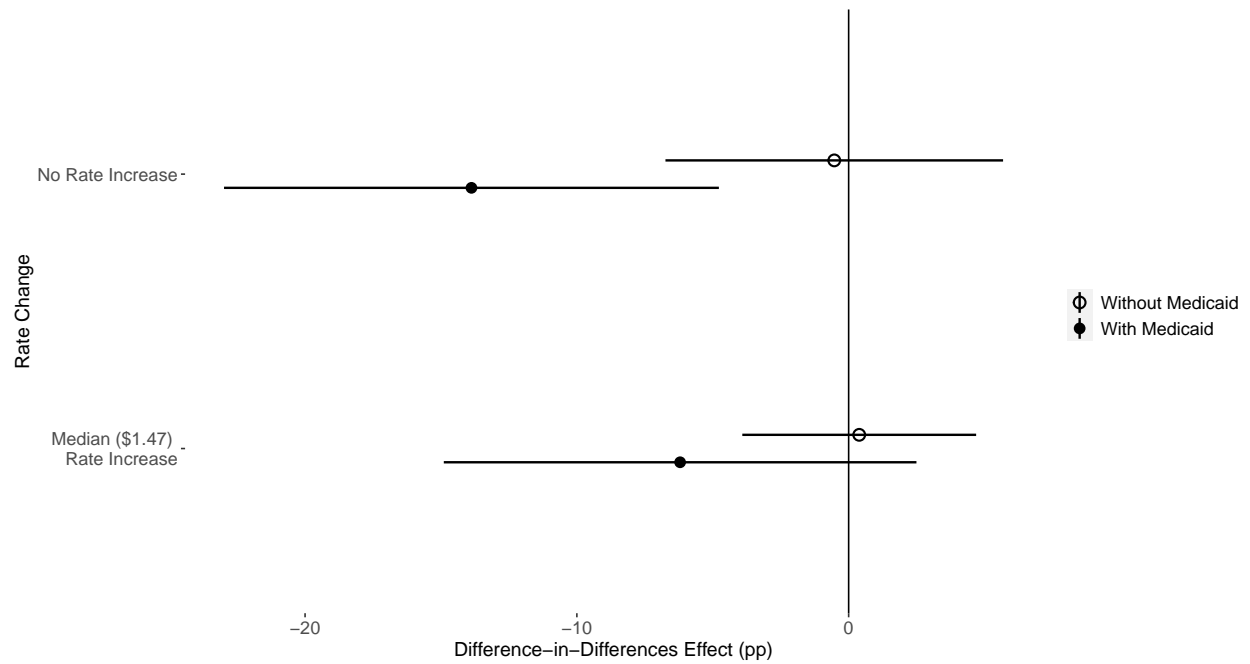
Plot of estimating equation **??** with an indicator for whether a respondent uses a paid helper as the dependent variable. Data are from the 2002-2018 HRS for states with non-missing Medicaid reimbursement rate histories.

B Tables

Table 1: Description of PCAs in the ACS

	All PCAs		PCAs at Agencies	
	Mean	SD	Mean	SD
Demographics				
Age	45.56	15.65	46.57	15.37
Female	0.84	0.36	0.86	0.35
White	0.52	0.50	0.49	0.50
Black	0.20	0.40	0.20	0.40
Asian-American/Pacific Islander	0.02	0.13	0.02	0.15
American/Alaskan Native	0.09	0.28	0.09	0.29
Hispanic/Latino	0.17	0.38	0.20	0.40
Born Outside of US	0.24	0.43	0.26	0.44
Education				
Less than HS Degree	0.17	0.37	0.19	0.39
HS Degree or Equivalent	0.35	0.48	0.35	0.48
Some College, No Degree	0.28	0.45	0.27	0.45
Associate's Degree	0.08	0.27	0.08	0.27
Bachelor's Degree or Higher	0.12	0.33	0.11	0.32
Employer				
Works at Home Care Agency	0.54	0.50	1.00	0.00
Works for State Program	0.07	0.26	0.00	0.00
Works for Residential Facility	0.05	0.22	0.00	0.00
Works for Private Household	0.09	0.29	0.00	0.00
Works for Another Industry	0.25	0.43	0.00	0.00
Hours and Income				
Usual Weekly Hours	33.09	15.53	31.85	15.68
Usually Works Part-Time	0.36	0.48	0.41	0.49
Usually Works Full-Time	0.50	0.50	0.45	0.50
Usually Works Long Hours	0.14	0.35	0.14	0.35
Wage and Salary Income	17,232	21,899	15,966	21,505
Income (Part-Time Workers)	8,672	17,072	8,560	17,568
Income (Full-Time Workers)	20,291	20,350	19,362	20,364
Income (Long-Hours Workers)	28,194	29,106	26,931	27,462
Observations	139,385		74,713	

Means and standard deviations from the 2008-2019 American Community Survey. All variables are indicators except for Age, Usual Weekly Hours, and Income variables. Part-time workers are those who usually work fewer than 30 hours per week, full-time workers are those who usually work 30-40 hours per week, and long-hours workers are those who usually work more than 40 hours per week.

Table 2: Description of HRS Respondents

| | All Respondents 65+ | | With ADL/IADL Difficulty | |
	Mean	SD	Mean	SD
Demographics				
Age	75.71	7.672	78.93	8.49
Female	0.58	0.49	0.58	0.49
White	0.74	0.44	0.70	0.46
Black	0.14	0.35	0.17	0.37
Hispanic/Latino	0.09	0.29	0.11	0.31
Mixed Race/Other	0.02	0.16	0.03	0.16
Education				
HS Degree or Less	0.58	0.49	0.66	0.47
More than HS	0.38	0.48	0.31	0.46
Health and Function				
Cognitive Score 7-11	0.19	0.39	0.23	0.42
Cognitive Score ≤ 6	0.059	0.24	0.103	0.304
Had a Stroke	0.095	0.29	0.18	0.38
Has Lung Disease	0.12	0.32	0.17	0.37
Has Heart Disease	0.32	0.47	0.42	0.49
Has Diabetes	0.25	0.43	0.304	0.46
Number of ADL Difficulties	0.54	1.28	1.63	1.77
Number of IADL Difficulties	0.49	1.007	1.48	1.26
Number of Mobility Difficulties	1.48	1.48	2.63	1.45
Family Structure				
Has Male Partner	0.25	0.44	0.18	0.38
Has Female Partner	0.32	0.47	0.31	0.46
Has Daughter	0.80	0.40	0.79	0.40
Has Son	0.80	0.39	0.78	0.40
Medicaid and Use of Helpers				
Has Medicaid	0.10	0.30	0.18	0.39
Has Paid Helper	0.031	0.17	0.09	0.29
Has Relative Helper	0.15	0.35	0.44	0.50
Has Institutional Helper	0.031	0.17	0.094	0.29
Is In Residential Care	0.04	0.20	0.11	0.32
Observations	97,401		32,238	

Means and standard deviations from the 2002-2018 Health and Retirement Study, among respondents who are 65 or older and have non-missing values for all listed variables. All variables are indicators except for Age and Number of Difficulties (0-6 for ADLs, 0-4 for IADLs and Mobility).

Table 3: Pooled Difference-in-Differences Results

VARIABLES	(1) Annual Payroll	(2) Employment	(3) 25th Percentile Wage	(4) Median Wage	(5) 75th Percentile Wage
Gain x Post Announcement	-0.229 (2.205)	0.0364 (0.103)	0.00654 (0.118)	-0.0355 (0.163)	-0.0948 (0.213)
Gain x Post Enforcement	-7.654** (3.329)	-0.223 (0.169)	-0.274** (0.123)	-0.171 (0.114)	0.146 (0.240)
Post-Enforcement Effect	-7.883** (3.370)	-0.186 (0.155)	-0.267 (0.170)	-0.206 (0.209)	0.0515 (0.276)
Dependent Variable Mean	41.183	2.258	8.821	9.468	11.177
Observations	600	600	593	593	593
R^2	0.937	0.929	0.913	0.921	0.904
State FEs	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes

Regression results from estimating equation 2 with the column variable as the dependent variable. The dependent variables for columns (1)-(3) come from the 2008-2019 SUSB, and columns (4)-(6) from the 2008-2019 OEWS. Annual payroll is measured in \$1,000s per 100 population 65 or older. Employment is measured as workers per 100 population 65 or older. Establishments are measured as establishments per 100 population 65 or older. Wage variables are measured in dollars per hour. Standard errors are clustered at the state level. Significance is indicated as: * 10%, ** 5%, *** 1%.

Table 4: Use of Paid Helpers

VARIABLES	(1) Has a Paid Helper
Demographics	
Female	0.008
	(0.012)
Age 70-74	-0.002
	(0.006)
Age 75-79	0.011*
	(0.006)
Age 80-84	0.007
	(0.006)
Age 85-89	0.028***
	(0.008)
Age 90-94	0.067***
	(0.012)
Black	0.006
	(0.010)
Hispanic	0.003
	(0.009)
Other	0.015
	(0.018)
More than HS Education	0.033***
	(0.006)
Health and Function	
Cognitive Score 7-11	0.021***
	(0.005)
Cognitive Score ≤ 6	0.028**
	(0.011)
Has Had a Stroke	0.022**
	(0.010)
Has Lung Disease	0.013**
	(0.005)
Has Heart Disease	-0.001
	(0.004)
Has Diabetes	-0.007
	(0.007)
Number of ADL Difficulties	0.024***
	(0.002)
Number of IADL Difficulties	0.028***
	(0.002)
Number of Mobility Difficulties	0.007***
	(0.002)
Family Structure	
Has a Male Partner	-0.033***
	(0.009)
Has a Female Partner	-0.043***
	(0.010)
Has a Daughter	-0.010
	(0.007)
Has a Son	-0.006
	(0.006)
Difference-in-Differences Variables	
Has Medicaid	0.030
	(0.039)
Gain x Has Medicaid	0.016
	(0.045)
Medicaid x Post Announcement	0.046
	(0.031)
Gain x Post Announcement	0.010
	(0.011)
Gain x Medicaid x Post Announcement	-0.108***
	(0.035)
Medicaid Effect	-0.098***
	(0.035)
Observations	31,261
R^2	0.113
State FEs	Yes
Year FEs	Yes

Regression results from estimating equation 4 with an indicator for whether the respondent has a paid helper as the dependent variable. Data come from the 2002-2018 HRS, for older adults age 65+ with at least one ADL or IADL difficulty. Standard errors are clustered at the state level. Significance is indicated as: * 10%, ** 5%, *** 1%.

Table 5: Alternate Medicaid Specifications

VARIABLES	(1) Has Medicaid	(2) Paid Helper (Medicaid=Initial)	(3) Paid Helper (Medicaid=Income Threshold)	(4) Out-of-Pocket Helper
Has Medicaid		0.0504	0.019	-0.070***
		(0.046)	(0.014)	(0.011)
Gain x Has Medicaid		0.014	-0.012	0.019*
		(0.052)	(0.019)	(0.011)
Medicaid x Post Announcement		0.070	0.034**	0.005
		(0.052)	(0.015)	(0.014)
Gain x Post Announcement	0.011	0.0039	0.0059	0.004
	(0.011)	(0.014)	(0.010)
Gain x Medicaid x Post Announcement		-0.11**	-0.061***	-0.012
		(0.054)	(15.48)	(0.016)
Medicaid Effect		-0.11*	-0.055**	-0.008
		(0.056)	(0.021)	(0.015)
Observations	31,261	31,261	25,793	31,261
R^2	0.19	0.12	0.11	0.07
State FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes

Regression results for alternate specifications to address the endogeneity of selection into Medicaid. Column (1) estimates a difference-in-differences with an indicator for whether the respondent has Medicaid as the outcome variable. Columns (2)-(4) estimate equation 4 with an indicator for whether the respondent has a paid helper as the dependent variable for columns (2) and (3), and an indicator for whether the respondent has a paid helper they pay out-of-pocket for column (4). For column (2), Medicaid recipiency is measured when the respondent first appears in the HRS. For column (3), Medicaid recipiency is measured as an indicator for having an income below 1.5 times the federal poverty level. For all columns, data come from the 2002-2018 HRS, for older adults age 65+ with at least one ADL or IADL difficulty. Standard errors are clustered at the state level. Significance is indicated as: * 10%, ** 5%, *** 1%.

Table 6: Monthly Hours of Care at Home

VARIABLES	(1) Total Hours/Month	(2) Paid Helper Hours/Month	(3) Relative Hours/Month
Has Medicaid	8.18	9.76	7.57
	(7.23)	(11.79)	(9.55)
Gain x Has Medicaid	2.012	-7.30	3.87
	(10.301)	(12.45)	(10.99)
Medicaid x Post Announcement	-18.90	5.25	-22.85*
	(13.49)	(4.89)	(12.75)
Gain x Post Announcement	3.402	3.69*	-1.81
	(4.44)	(2.14)	(2.27)
Gain x Medicaid x Post Announcement	14.91	-15.05**	37.03**
	(16.12)	(6.34)	(15.48)
Medicaid Effect	18.31	-11.35*	35.22**
	(15.23)	(5.83)	(14.79)
Observations	27,348	27,348	27,348
R^2	0.35	0.13	0.21
State FEs	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes

Regression results from estimating equation 4 with the dependent variable described by the column. Data come from the 2002-2018 HRS, for older adults age 65+ with at least one ADL or IADL difficulty. Standard errors are clustered at the state level. Significance is indicated as: * 10%, ** 5%, *** 1%.

Table 7: Use of Paid Helpers: Interactions with Medicaid Reimbursement Rate Increases

VARIABLES	(1) Has a Paid Helper	(2) Has a Paid Helper
Worker Hour Limit x Post Announcement		-0.097***
		(0.012)
Client Hour Limit x Post Announcement		0.046**
		(0.019)
Additional Budget for Overtime x Post		0.063***
		(0.015)
Additional Budget for Travel x Post		-0.071***
		(0.014)
Has Medicaid	-0.08***	-0.080***
	(0.018)	(0.018)
Gain x Has Medicaid	0.170***	0.167***
	(0.039)	(0.040)
Medicaid x Post Announcement	0.039	0.039
	(0.033)	(0.033)
Rate Change x Has Medicaid	0.261***	
	(0.015)	
Gain x Rate Change	-0.003	
	(0.025)	
Rate Change x Post Announcement	0.006	
	(0.011)	
Rate Change x Post Announcement x Medicaid	-0.142***	
	(0.040)	
Rate Change x Gain x Medicaid	-0.243***	
	(0.047)	
Gain x Post Announcement	0.014	
	(0.030)	
Gain x Medicaid x Post Announcement	-0.079	
	(0.055)	
Gain x Post x Rate Change	0.014	
	(0.025)	
Gain x Post x Medicaid x Rate Change	0.110*	
	(0.058)	
FILL IN EFFECTS FOR SCALED RATE CHANGES	-0.098***	
	(0.035)	
Observations	5,506	
R^2	0.138	
State FEs	Yes	
Year FEs	Yes	

Regression results from estimating equation 4, with difference-in-differences variables fully interacted with the size of the Medicaid rate change, with an indicator for whether the respondent has a paid helper as the dependent variable. Data come from the 2002-2018 HRS, for older adults age 65+ with at least one ADL or IADL difficulty. Standard errors are clustered at the state level. Significance is indicated as: * 10%, ** 5%, *** 1%.

Table 8: Minimum Prices for Private-Pay

VARIABLES	(1) Minimum Price
Gain x Post Announcement	-0.499
	(0.375)
Gain x Post Enforcement	1.182*
	(1.06)
Post-Enforcement Effect	1.324
	(0.981)
Observations	400
R^2	0.636
State FEs	Yes
Year FEs	Yes

Regression results from estimating equation 2 with the minimum price quoted for an hour of ADL assistance. Data come from the 2010-2015 and 2018-2019 Genworth Cost of Care Survey. Standard errors are clustered at the state level. Significance is indicated as: * 10%, ** 5%, *** 1%.

Figure C1: 95% Confidence Intervals for the Average Post-Enforcement Effect, Allowing for Deviations from Pre-Period Trend: Annual Payroll
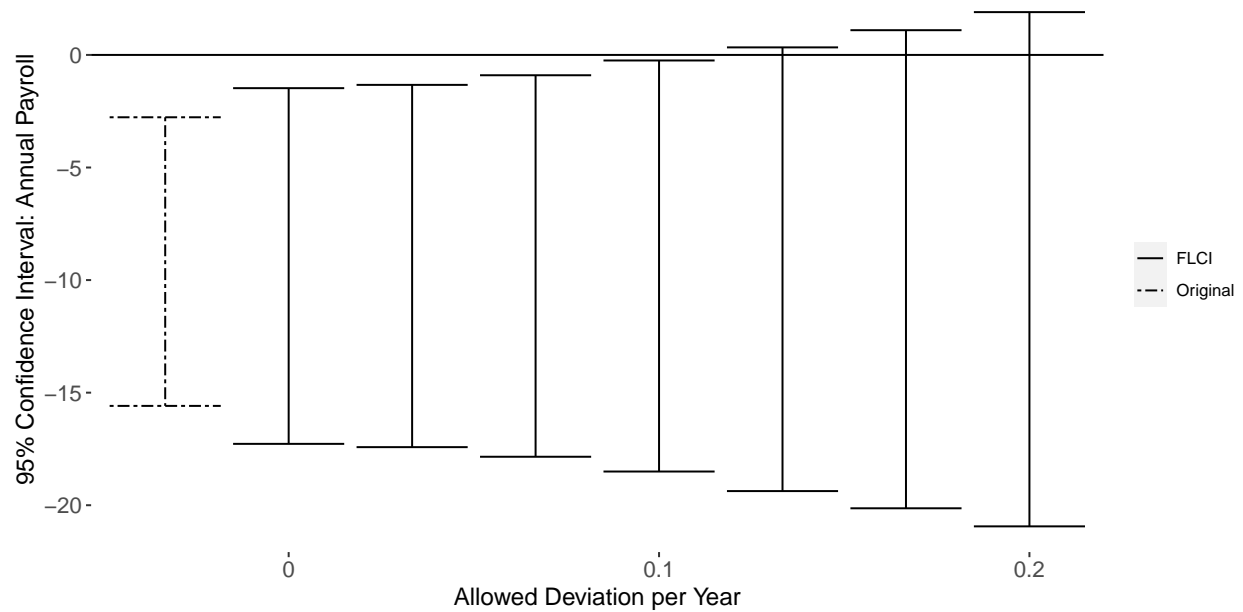
C   Robustness

C.1   Sensitivity to Deviations from Pre-Trends

One concern about the parallel trends assumption in this scenario is that different secular trends might appear parallel but differ during the post-treatment period. Here we use the method in Rambachan and Roth (2022) to quantify how much the post-trend could diverge from the pre-trend per year before we could no longer reject that the null hypothesis that the coefficient is equal to zero. We perform this test on the average post-enforcement effect, shown in Table 3, for annual payroll, employment, and 25th-percentile wages.

Figure C1 shows 95% confidence intervals for the average post-enforcement effect allowing for different amounts of per-period deviation from the pre-trend. The confidence interval from Table 3 is shown in dashed lines. Allowing for a per-period deviation of 0 is the same as including a linear time trend - because there was no substantial pre-trend relative to the states that always had coverage, the confidence intervals are centered on the same value

Figure C2: 95% Confidence Intervals for the Average Post-Enforcement Effect, Allowing for Deviations from Pre-Period Trend: Employment
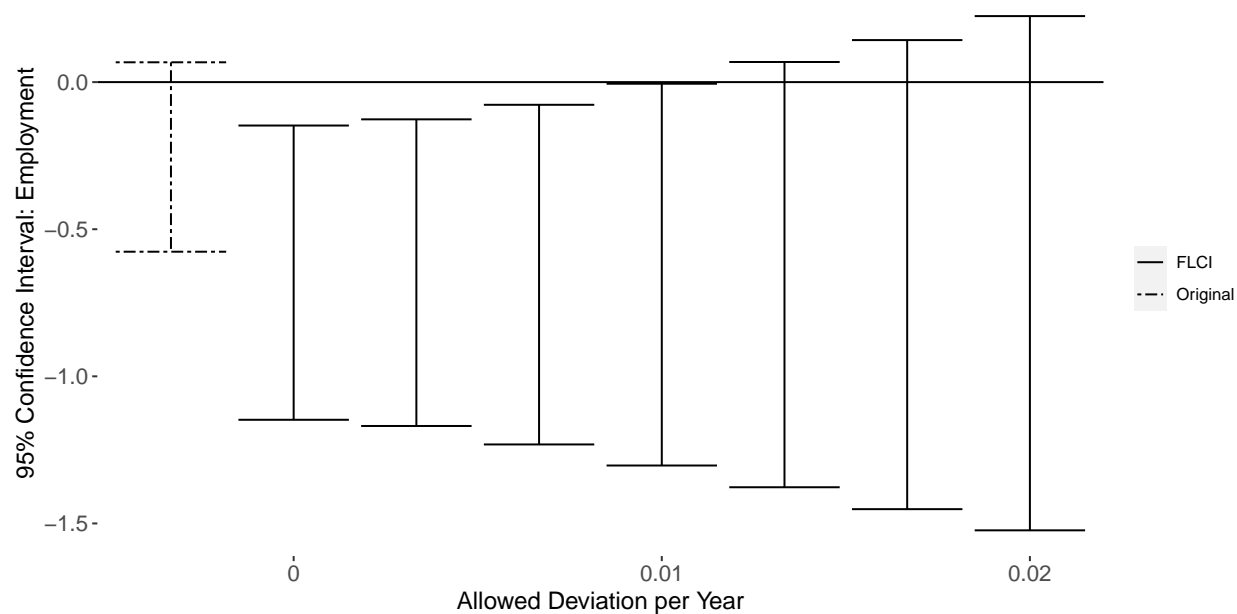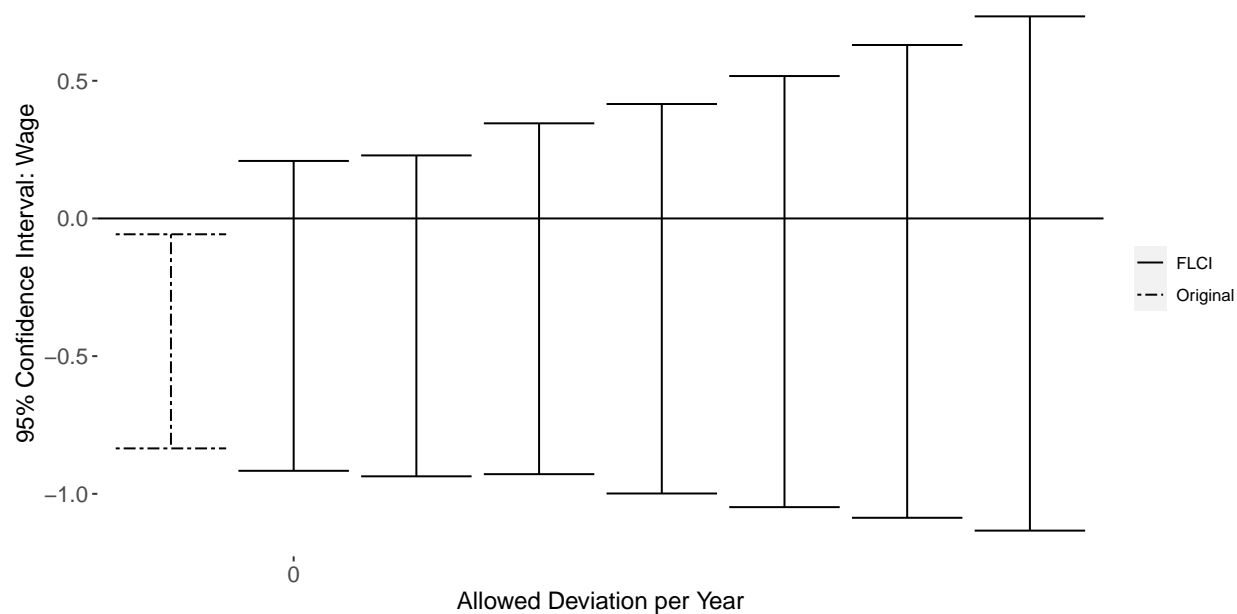

Figure C3: 95% Confidence Intervals for the Average Post-Enforcement Effect, Allowing for Deviations from Pre-Period Trend: 25th Percentile Wage

as the original estimate. We can continue to reject the null hypothesis up to per-period deviations in payroll of $1 per person age 65 and up per period.

Figures C2 and C3 repeat the exercise for employment and 25th-percentile wages. The confidence intervals for employment are more negative in the cases where small deviations are allowed because it linearly extrapolates a small, positive pre-trend in the states gaining coverage relative to the states that were always covered. Overall, employment can tolerate per-period deviations in employment of up to 0.01 employees per 100 people age 65 and up per period. On the other hand, 25th-percentile wages are much more sensitive to extrapolating the pre-trend, in part because the potential pre-trends in wages are much noisier than those for annual payroll or employment. We cannot reject the null hypothesis of no change in wages for any extrapolation of the pre-trend.

C.2 Analysis of Influential Clusters

One concern with clustered standard errors when clusters are of different sizes or there are relatively few treated clusters is that influential clusters may cause over-rejection of the null hypothesis. We use the methods in MacKinnon et al. (2022) to report on the leverage of clusters and how the estimated coefficient would change if the cluster were dropped from the analysis for our results on annual payrolls and use of paid helpers.

Table C1: Cluster Variability Summary for Annual Payroll

Order Statistic	Number of Observations in Cluster	Leverage of Cluster	Gain x Post Enforcement Coefficient Leaving Out Cluster
Minimum	12	1.24	-8.66
25th Percentile	12	1.24	-7.84
Median	12	1.24	-7.68
75th Percentile	12	1.31	-7.61
Maximum	12	1.31	-5.43

Results from applying MacKinnon et al. (2022) to the estimation of equation 2, with annual payroll as the dependent variable. The number of observations per cluster, the leverage of the cluster, and the estimated coefficient on Gained Coverage x Post Enforcement if the cluster were excluded are calculated for each state (the unit of clustering), and the order statistics are given in this table.

D   Additional Results

D.1   ACS Measures of Hours Worked

The ACS asks respondents about their usual hours worked per week. Here we analyze effects of the policy on hours of work.

We estimate the regression:

$$
\begin{aligned}
Hours_{ist} = \alpha_s + \gamma_t + \zeta Demographics_i \\
+ \beta_{Announce} PostAnnouncement_t \times GainedCoverage_s \\
+ \delta PostEnforcement_t \times GainedCoverage_s + \epsilon_{st}
\end{aligned} \tag{6}
$$

where other variables are defined as in the Methodology section, and $Demographics_i$ is a vector of the demographics characteristics of personal care aides listed in Table 1. We also

report the effect post-enforcement relative to 2012:

$$\beta_{Enforce} = \beta_{Announce} + \delta \tag{7}$$

We limit our sample to PCAs employed by agencies, as we are most interested in the response of agencies in assigning workers hours. The results are reported in Table D1 and are sufficiently noisy that we cannot rule out changes of meaningful magnitude in either direction.

D.2 Personal Care Establishments

The SUSB also collects data on the number of establishments by industry, and one possible hypothesis is that the shock to labor costs caused by the introduction of overtime and travel pay was sufficiently large that it was no longer profitable for some establishments to operate and that there was less profit to be gained by opening a new establishments, generating a decline in the number of establishments.

One challenge with the SUSB data on establishments is that Missouri and Kentucky experience a massive increase and then precipitous decline in the number of establishments, both of which are of an entirely improbable size. Figure D1 shows the average establishments per state with and without including Kentucky and Missouri. Consequently, we conduct the following analyses excluding Kentucky and Missouri.

We show trends and difference-in-differences coefficients for establishments in Figures D2 and D3. The post-enforcement decline in establishments is estimated sufficiently imprecisely that we cannot rule out meaningfully large gains in the number of establishments, and it is concerning that the coefficients are of the same magnitude as some in the pre-period.

Table D1: Usual Hours Worked for PCAs

VARIABLES	(1) Usual Hours	(2) Usually <30 Hours/Week	(3) Usually 30-40 Hours/Week	(4) Usually >40 Hours/Week
Age	-0.016	0.002***	-0.003***	0.001***
	(0.013)	(0.000)	(0.000)	(0.000)
Female	-1.886***	0.046***	-0.011*	-0.035***
	(0.527)	(0.013)	(0.006)	(0.010)
Black	1.246***	-0.050***	0.070***	-0.020***
	(0.329)	(0.009)	(0.008)	(0.006)
American Indian/Alaska Native	0.403	-0.059*	0.091***	-0.032*
	(0.929)	(0.035)	(0.030)	(0.019)
Asian/Pacific Islander	-0.420	0.012	0.010	-0.021**
	(0.448)	(0.007)	(0.010)	(0.011)
Hispanic/Latino	-0.735***	-0.001	0.032***	-0.031***
	(0.250)	(0.009)	(0.011)	(0.006)
Born Outside the US	1.741***	-0.056***	0.048***	0.009
	(0.584)	(0.011)	(0.008)	(0.012)
HS Diploma or Equivalent	1.544***	-0.065***	0.066***	-0.001
	(0.280)	(0.007)	(0.007)	(0.006)
Some College, No Degree	1.368**	-0.039***	0.024***	0.015
	(0.543)	(0.012)	(0.008)	(0.009)
Associate's Degree	1.841***	-0.049***	0.023**	0.026**
	(0.346)	(0.009)	(0.011)	(0.010)
Bachelor's Degree or Higher	1.976***	-0.067***	0.034***	0.033***
	(0.573)	(0.014)	(0.010)	(0.012)
Gain x Post Announcement	-0.352	0.009	-0.014	0.005
	(0.569)	(0.013)	(0.013)	(0.014)
Gain x Post Enforcement	-0.130	-0.005	0.016	-0.012
	(0.681)	(0.015)	(0.013)	(0.017)
Constant	33.051***	0.339***	0.521***	0.140***
	(1.195)	(0.028)	(0.015)	(0.022)
Post-Enforcement Effect	-0.482	0.00442	0.00244	-0.00685
	(0.792)	(0.0161)	(0.0150)	(0.0218)
Observations	74,942	74,942	74,942	74,942
R^2	0.017	0.026	0.026	0.010
State FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes

Regression results from estimating equation 6 with the column variable as the dependent variable. Columns (2)-(4) are indicator variables for having usual hours of work per week in the stated range. Data come from the 2008-2019 ACS, for workers whose occupation is PCA and who work at an agency. Standard errors are clustered at the state level. Significance is indicated as: * 10%, ** 5%, *** 1%.

Figure D1: Average Personal Care Establishments per 100 population age 65+
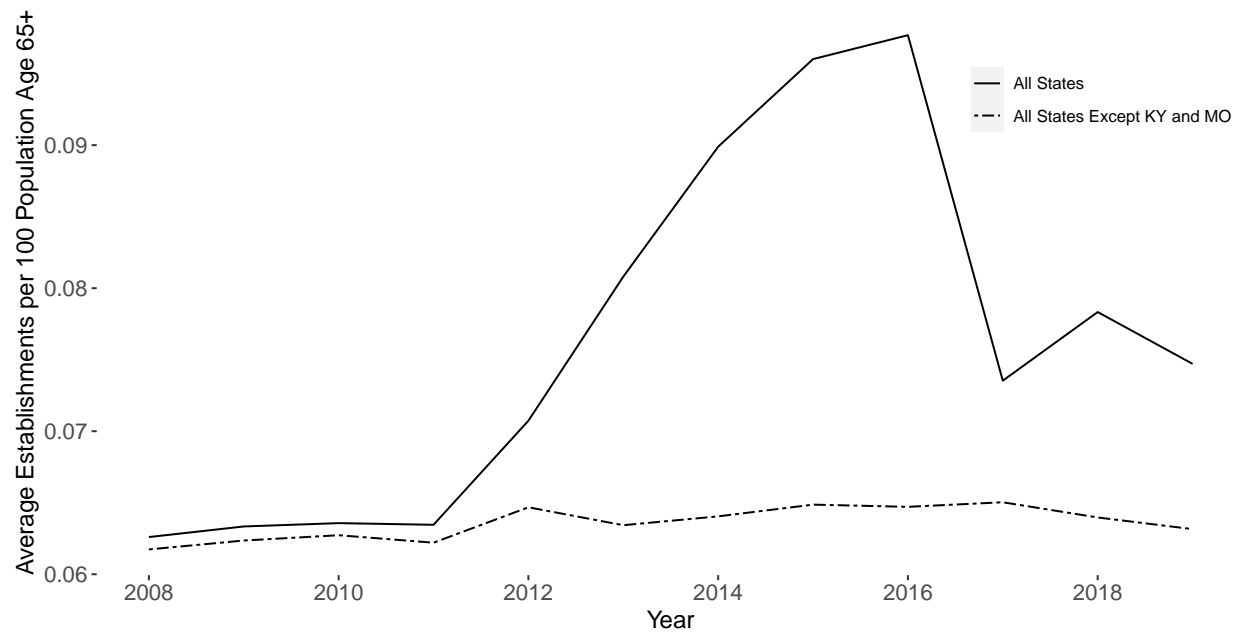
Plot of the average of a state's number of personal care agencies, as measured in the SUSB. The average is calculated with all 50 states, then with all states except Kentucky and Missouri. The y-variable is number of personal care establishments per 100 population age 65+. Means are normalized to 0 for 2012.

Figure D2: Personal Care Establishments per 100 population age 65+
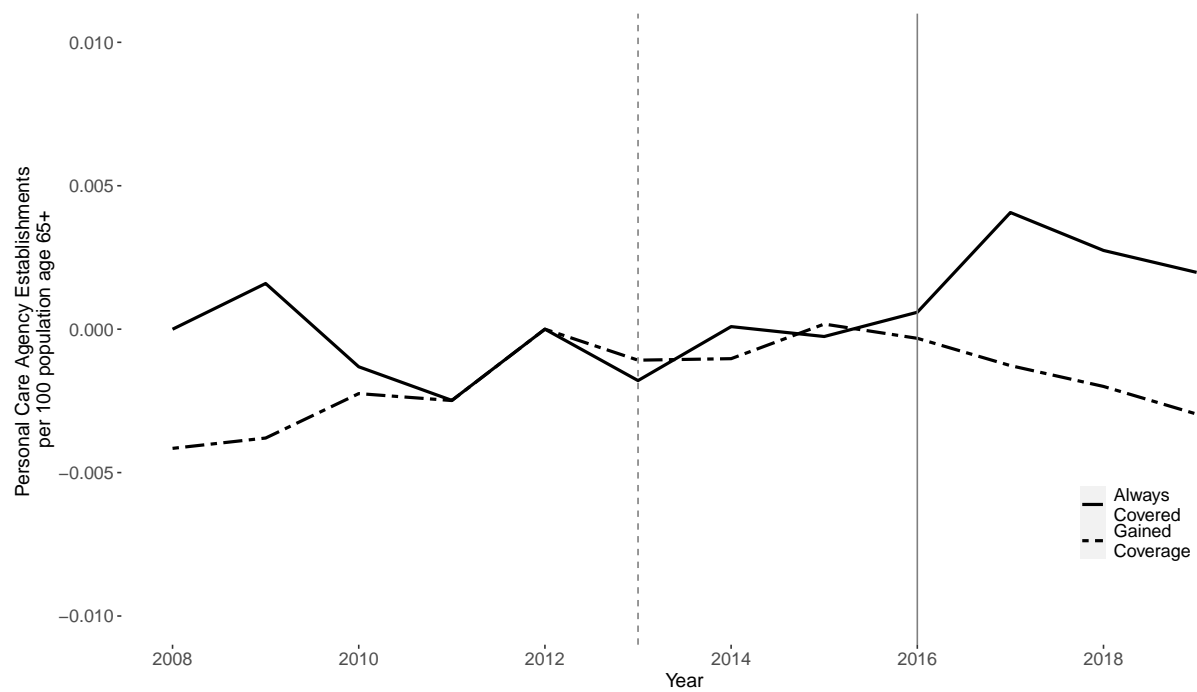
Plot of the average of a state's number of personal care agencies, as measured in the SUSB, by state policy status. The y-variable is number of personal care establishments per 100 population age 65+. Means are normalized to 0 for 2012.

Figure D3: Difference-in-Differences Coefficients: Personal Care Establishments
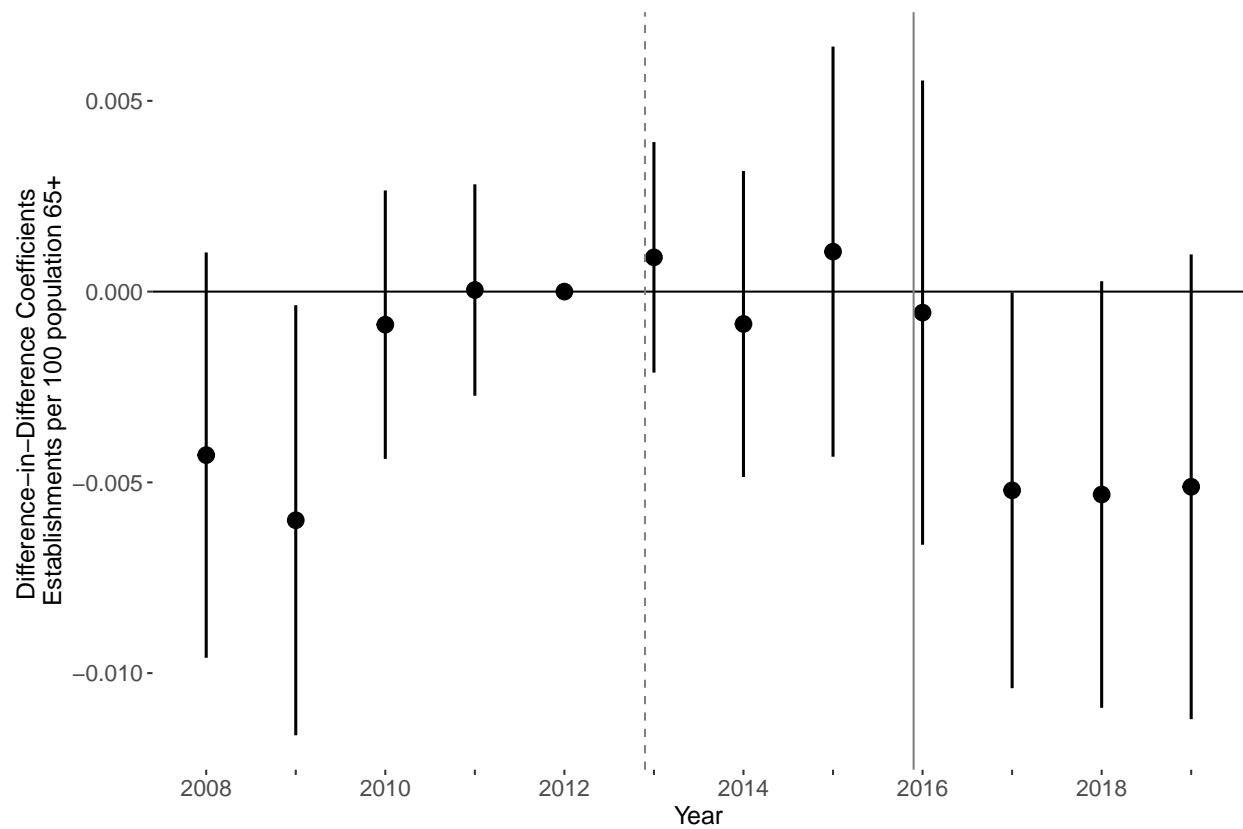
Plot of results of estimating equation 1 with establishments as the dependent variable. Points represent estimated coefficients for the interaction between year and policy indicators, and attached lines show the 95% confidence interval for the coefficient. Standard errors are clustered at the state level. All coefficients are relative to 2012 values.

D.3 State Responses: Rate Changes Compared to Worker Hour Limits

Table D2: Interaction with State Policy Responses

VARIABLES	(1) Policy = Rate Change ($)	(2) Policy = 40 Hour Limit	(3) Policy = Budgeting for Overtime	(4) Policy = Budgeting for Travel
Has Medicaid	-0.080***	0.033	0.029	0.032
	(0.018)	(0.041)	(0.052)	(0.047)
Gain x Has Medicaid	0.170***	0.014	0.015	0.012
	(0.039)	(0.047)	(0.060)	(0.055)
Medicaid x Post Announcement	0.039	0.044	0.042**	0.018
	(0.034)	(0.033)	(0.016)	(0.028)
Gain x Post Announcement	-0.005	0.007	0.006	-0.001
	(0.029)	(0.013)	(0.011)	(0.011)
Gain x Medicaid x Post Announcement	-0.133	-0.107***	-0.091***	-0.067**
	(0.039)	(0.037)	(0.024)	(0.033)
Policy x Has Medicaid	0.078***	-0.066	0.001	-0.012
	(0.011)	(0.041)	(0.055)	(0.051)
Policy x Post Announcement	-0.002	-0.039**	0.012	-0.011
	(0.006)	(0.017)	(0.019)	(0.022)
Policy x Gain x Medicaid	-0.122***	0.065	0.005	0.022
	(0.022)	(0.059)	(0.063)	(0.059)
Policy x Gain x Post	0.006	0.020	0.010	0.036
	(0.012)	(0.022)	(0.022)	(0.025)
Policy x Gain x Medicaid x Post	0.046**	-0.025	-0.060	-0.187*
	(0.021)	(0.070)	(0.101)	(0.100)
Difference in Medicaid DD Effect	0.052**	-0.005	-0.050	-0.152
(With Policy - Without Policy)	(0.024)	(0.063)	(0.099)	(0.111)
Observations	6,782	31,261	31,261	31,261
R^2	0.144	0.114	0.114	0.111
State FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes

Regression results from estimating equation 4, with an indicator for whether the respondent uses a paid helper as the dependent variable and with interactions of the difference-in-differences terms with measures of the state policy response. Column (1) uses the total post-announcement increase in the Medicaid reimbursement rate as the policy, measured in dollars, and column (2) uses an indicator for whether the state limited workers in its self-directed programs to 40 hours per week. Data come from the 2002-2018 HRS, with the sample in column (1) limited by the availability of historical data on Medicaid reimbursement rates. Significance is indicated as: * 10%, ** 5%, *** 1%.

D.4 Logit Specifications for Binary HRS Outcomes

Table D3: HRS Helper Type Results: Logistic Regressions

VARIABLES	(1) Paid Non-Relative Helper	(2) Relative Helper	(3) No Help at Home	(4) Institutional Helper	(5) Nursing Home Resident
Has Medicaid	1.26	0.546***	1.538***	4.846***	4.314***
	(0.037)	(0.068)	(0.122)	(0.561)	(0.377)
Gain x Has	1.30	1.418**	0.699**	0.691*	0.729*
Medicaid	(0.432)	(0.218)	(0.103)	(0.153)	(0.131)
Medicaid x Post	1.244	1.084	0.809	0.640*	0.702
Announcement	(0.270)	(0.245)	(0.162)	(0.156)	(0.166)
Gain x Post	1.190	1.056	0.891	0.655	0.707
Announcement	(0.185)	(0.103)	(0.094)	(0.180)	(0.153)
Gain x Medicaid x	0.409***	0.900	1.540*	1.648	1.336
Post Announcement	(0.109)	(0.227)	(0.351)	(0.529)	(0.379)
Observations	31,217	31,259	31,259	31,259	31,259
Pseudo-R^2	0.170	0.170	0.182	0.476	0.393
State FEs	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes

Regression results from estimating equation 4 as a logistic regression with the column variable as the dependent variable. Coefficients are odds ratios. Data come from the 2002-2018 HRS. Significance is indicated as: * 10%, ** 5%, *** 1%.

D.5 Main SUSB and OEWS Results with Medicaid Expansion Indicator

Table D4: SUSB and OEWS Results with ACA Expansion

VARIABLES	(1) Annual Payroll	(2) Employment	(3) 25th Percentile Wage	(4) Median Wage	(5) 75th Percentile Wage
Expanded Medicaid x Post Expansion	3.638*	0.0198	0.269**	0.236	0.190
	(2.040)	(0.112)	(0.132)	(0.148)	(0.192)
Gained Coverage x Post Announcement	0.556	0.0407	0.0626	0.0120	-0.0600
	(2.152)	(0.106)	(0.128)	(0.173)	(0.227)
Gained Coverage x Post Enforcement	-6.337**	-0.177	-0.205*	-0.129	0.171
	(2.926)	(0.163)	(0.115)	(0.110)	(0.204)
Post-Enforcement Effect	-5.780*	-0.136	-0.143	-0.117	0.111
SE	(3.134)	(0.158)	(0.167)	(0.216)	(0.278)
Dependent Variable	41.183	2.258	8.821	9.468	11.177
Mean					
Observations	572	572	565	565	565
R^2	0.944	0.934	0.918	0.924	0.910
State FEs	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes

Regression results from estimating equation 2 with the column variable as the dependent variable and an indicator for whether a state engaged in a Medicaid expansion interacted with an indicator for time periods after that state's expansion. Data come from the 2008-2019 SUSB for columns (1) and (2) and the 2008-2019 OEWS for columns (3)-(5). Standard errors are clustered at the state level. Significance is indicated as: * 10%, ** 5%, *** 1%.

D.6 Logit Specifications for Binary HRS Outcomes

Table D5: HRS Helper Type Results: Logistic Regressions

VARIABLES	(1) Paid Non-Relative Helper	(2) Relative Helper	(3) No Help at Home	(4) Institutional Helper	(5) Nursing Home Resident
Has Medicaid	1.26	0.546***	1.538***	4.846***	4.314***
	(0.037)	(0.068)	(0.122)	(0.561)	(0.377)
Gain x Has	1.30	1.418**	0.699**	0.691*	0.729*
Medicaid	(0.432)	(0.218)	(0.103)	(0.153)	(0.131)
Medicaid x Post	1.244	1.084	0.809	0.640*	0.702
Announcement	(0.270)	(0.245)	(0.162)	(0.156)	(0.166)
Gain x Post	1.190	1.056	0.891	0.655	0.707
Announcement	(0.185)	(0.103)	(0.094)	(0.180)	(0.153)
Gain x Medicaid x	0.409***	0.900	1.540*	1.648	1.336
Post Announcement	(0.109)	(0.227)	(0.351)	(0.529)	(0.379)
Observations	31,217	31,259	31,259	31,259	31,259
Pseudo-R^2	0.170	0.170	0.182	0.476	0.393
State FEs	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes

Regression results from estimating equation 4 as a logistic regression with the column variable as the dependent variable. Coefficients are odds ratios. Data come from the 2002-2018 HRS. Significance is indicated as: * 10%, ** 5%, *** 1%.