Is Tinkering with Safety Net Programs Harmful to Beneficiaries? Evidence from the Medicaid Notch and the Minimum Wage

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Abstract:

Redistributive policies can interact in unintended ways. We study one such interaction, namely the relationship between Medicaid eligibility notches and the minimum wage. A minimum wage increase reduces the number of hours a low-skilled individual can work while retaining Medicaid eligibility. We show that the empirical and welfare implications of this interaction depend crucially on the relevance of labor market frictions. Absent frictions, affected workers may maintain Medicaid eligibility through small reductions in hours of work. With frictions, affected workers may lose Medicaid eligibility unless they leave their initial job. Empirically, we find that workers in this scenario became less likely to participate in Medicaid, less likely to work, and more likely to spend time looking for new jobs, including search while employed. The observed outcomes suggest that low-skilled workers face substantial labor market frictions. Because adjustment is costly, tinkering with safety net program parameters can be harmful to beneficiaries.

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U.S. safety net arrangements have many moving parts. Redistributive transfers are made in cash and in kind, come often through regulation, and are implemented by multiple levels of government. Policy makers tinker with program parameters regularly. A policy change's desirability depends crucially, of course, on the particulars of the programs involved. This paper takes up a distinct consideration. We ask whether policy tinkering *per se* affects program beneficiaries' well-being.

Policy tinkering's effects depend on the ease with which beneficiaries navigate both the labor market and the programs in which they participate. Changes in program generosity and eligibility rules can alter beneficiaries' budget constraints in both anticipated and unanticipated ways. If responding to such changes is difficult, they may be associated with significant costs. Alternatively, if little effort is required for beneficiaries to adapt, such adjustments may be a nuisance rather than a substantial concern. To shed light on adjustment costs' relevance, we analyze a setting well-suited for precisely this purpose.

We empirically and theoretically analyze the effects of minimum wage increases on working adult Medicaid beneficiaries. When the minimum wage rises, jobs that initially enabled workers to maintain Medicaid eligibility may no longer do so. Because Medicaid phases out with a "notch," small earnings changes can affect eligibility for benefits worth thousands of dollars. In addition to influencing labor demand, as emphasized by a voluminous literature (Card and Krueger, 1995; Neumark and Wascher, 2006), the minimum wage may thus have non-standard effects on workers' preferences over hours of work.[1]

The implications of interactions between the Medicaid notch and the minimum wage depend on the cost of job search and the rigidity of firms' job offerings (Chetty et al.,

[1]By non-standard we mean effects aside from the usual income and substitution effects associated with changes in an individual's wage.

2011). If adjustment is seamless, a change in a notch's location may have minimal welfare implications; workers shifted out of eligibility can reduce hours slightly to maintain benefits. Reducing hours may require costly search for alternative employment, however, if there are significant labor market frictions. Workers shifted "over a notch" may lose access to benefits while they seek employment that permits fewer hours of work. Some may exit employment to maintain benefit eligibility. Loss of benefits, loss of earned income, and time spent searching all have costs. Both the empirical and welfare implications of a shift in an eligibility notch's location thus depend crucially on the relevance of frictions.[2]

Using the Survey of Income and Program Participation (SIPP), we estimate the responses of low-wage adult Medicaid beneficiaries to the July 2009 increase in the federal minimum wage. In July 2009, the federal minimum rose from $6.55 to $7.25 per hour.[3] Between 2007 and 2009, many states saw their effective minimums rise by 40 percent (from $5.15 to $7.25). These increases were only binding in states with minimum wage rates below the new federal minimum, generating natural treatment and control groups.

For minimum wage workers, the cumulative $2.10 minimum wage increase implied a 40 percent reduction in the work hours linked to Medicaid eligibility thresholds. Importantly, this period's eligibility thresholds were often well *below* 50 percent of the federal poverty line. For adults in many states, maintaining employment and Medicaid eligibility could thus be difficult.

In our sample of affected workers, binding minimum wage increases were followed by declines in Medicaid participation, declines in employment, and increases in job

[2]This is not unlike the differential effects of tax changes on the welfare of boundedly rationale agents, as analyzed in Chetty (2009) and Chetty et al. (2009).

[3]Because the relevant SIPP panel began in mid-2008, we are unable to capture our sample's experience surrounding the July 2008 and July 2007 minimum wage increases. The accumulation of these minimum wage increases would not qualitatively alter our predictions, but likely contributes to the magnitudes of our estimates.

search. All three of these outcomes distinguish the theoretical labor market with frictions from the theoretical labor market without frictions. The observed outcomes point to an important role for adjustment costs in the labor markets faced by low-skilled workers.[4]

There are two primary threats to interpreting the observed changes in employment, insurance status, and job search as causal effects of the interaction between minimum wage increases and the Medicaid notch. First, the states bound by this period's minimum wage increases also had relatively low Medicaid eligibility thresholds. It is thus possible that the transitions of working Medicaid beneficiaries from "bound" states would have differed from the transitions of those in "unbound" states in the absence of minimum wage changes. We explore this concern's relevance by examining the transitions of similarly selected samples during earlier SIPP panels. We find that working Medicaid beneficiaries in bound states were indeed more likely to transition off of Medicaid in prior periods, though only moderately so. We implement a triple-difference estimation framework to net out the transitions we observe during earlier time periods. This approach has essentially no effect on our estimates of the notch interaction's effect on workers' ability to maintain both employment *and* Medicaid eligibility.

Second, employment and insurance transitions may in part reflect heterogeneity in the Great Recession's effects across states. We thus explore our results' robustness to the inclusion of proxies for the Great Recession's severity. Our baseline analysis follows the analysis in Clemens and Wither (2014) by controlling directly for a Federal Housing Finance Agency housing price index. We show that alternative approaches to controlling for variations in the Great Recession's severity have little impact on our estimates. The employment and insurance transitions we observe thus do not appear to have been

[4]Additional details regarding the observed changes in search help to distinguish between the minimum wage's standard effects and the program interaction we emphasize. Specifically, we observe increases in job search among individuals who remain employed. This is at odds with the standard search-model prediction that minimum wage increases will tend to reduce turnover.

driven by heterogeneity in macroeconomic factors.

Our findings connect to several broad literatures. First, we contribute to the ongoing debate over the optimal complexity of redistributive systems. Early manifestations of this debate considered the relative merits of the negative income tax and the patchwork approach to redistributive policy. Proponents of the negative income tax have long highlighted its simplicity and straightforward administration (Friedman, 1968; Lampman, 1965; Tobin et al., 1967). By contrast, insights from Akerlof (1978), Nichols and Zeckhauser (1982), and others highlight that categorical eligibility rules and in kind benefit structures can improve the efficiency with which programs target their intended beneficiaries.[5] Programs can be complementary if they patch one another's holes, though the functionality of such patches must be empirically evaluated (Rothstein and Valletta, 2014; Clemens, 2015a).

Trends in inequality (Katz and Krueger, 1992; Kopczuk et al., 2010) have heightened interest in the search for what does and does not promote social mobility (Chetty et al., 2014). Our analysis complements existing work on the potential costs associated with administratively complex benefit designs. Recent work by Niehaus and Sukhtankar (2013) and Muralidharan et al. (2014), for example, suggests that intransparent benefit arrangements may facilitate corruption. On the beneficiary side, work by Aizer (2007), Bhargava and Manoli (Forthcoming), and Manoli and Turner (2014) points to the importance of informational and administrative impediments to the take-up of benefits for which individuals are eligible. Our findings imply that the costs of adjusting to changes in complex benefit designs are germane to the question of how best to design society's safety net.

Second, the setting we analyze presents a novel opportunity to learn about labor markets. Consistent with work by Chetty et al. (2011), Gelber et al. (2013), and others, our

[5]Kleven and Kopczuk (2011) similarly analyze the difficulty of the administrative hurdles to taking up a program as a form of screening mechanism.

evidence suggests that labor market frictions can be substantial. Chetty (2012) concludes that such frictions may reconcile seemingly disparate intensive and extensive margin, as well as micro and macro, estimates of labor supply elasticities. Existing work on frictions focuses primarily on middle to high income taxpayers and the elderly. Our evidence suggests that frictions may also be essential for understanding labor supply responses to low-income support programs.

Third, our results point to a new domain for the literature on policy uncertainty. Recent contributions, including work by Bloom (2009) and Shoag and Veuger (2014), find that uncertainty can lead firms to non-trivially delay hiring and investment decisions. We emphasize that similar forces may have important implications for the economic mobility of low-skilled individuals. Recent years have been associated with significant uncertainty regarding the safety net's future shape and generosity. Given the adjustment frictions they face, including the irreversibility of many human capital investments, the effects of these uncertainties on the skill accumulation of low-income individuals merit further study.

The paper proceeds as follows. In Section 1 we demonstrate the relevance of frictions for assessing the empirical and welfare implications of a change in the location of a benefit eligibility notch. Section 2 presents background on the minimum wage changes and Medicaid eligibility rules at the heart of our empirical analysis, as well as the data we utilize. Section 3 presents our empirical research design. Section 4 presents baseline summary statistics on our analysis samples. Sections 5 through 7 present the analysis itself and section 8 concludes.

1 Implications of Shifting a Benefit Eligibility Notch

Consider a set of individuals in the following circumstances. First, they are employed at the legally binding minimum wage w_{min}.[6] Second, they participate in a benefit program that phases out with a "notch" at income y^*. That is, individuals receive a transfer of value B if and only if income is less than or equal to y^*. Letting utility be additively separable in consumption, c, and hours of work, h, we have

$$U_i(c,h) = u(c) - D_i v(h), \text{ subject to } c = w_{min}h + B \times 1\{w_{min}h \leq y^*\}. \tag{1}$$

D_i scales type i's disutility from work and is distributed continuously on $(0, \overline{D})$.

Panel A of Figure 1 illustrates the budget constraint such individuals face if they can select hours of work without restriction. Hours of work between $\frac{y^*}{w_{min}}$ and $\frac{y^*+B}{w_{min}}$ are dominated in that an individual could increase both consumption and leisure by reducing labor supply to $\widetilde{h} = \frac{y^*}{w_{min}}$ and qualifying for the benefit. A mass of types will thus work precisely $\widetilde{h}$ hours, locating at point A.

In this setting, we analyze the empirical and welfare implications of "policy tinkering," by which we mean incremental changes in program parameters. Specifically, we consider an incremental change to the minimum wage. For our purposes, an incremental reduction in the eligibility threshold y^* would have similar implications. We show that tinkering of this form has very different empirical and welfare implications in labor markets with and without frictions that inhibit workers from freely altering their hours of work.

[6] Alternatively, we could consider a wage that is subsequently shifted by a subsidy.

1.1 Frictionless Hours Adjustment

We first consider the effects of a differential change in the minimum wage in a frictionless labor market. By frictionless we mean that individuals are uninhibited in selecting their desired hours of work at the minimum wage.[7] Increasing the minimum wage from w_{min} to $w_{min} + dw$ rotates the budget constraint, as illustrated in Figure 1's panel B. Individuals working $\frac{y^*}{w_{min}} = \widetilde{h}$ hours see their earnings rise to $y^* + \widetilde{h}dw$, making them ineligible for the benefit. Individuals working $\widetilde{h}$ hours thus shift from point A to B.

If individuals can adjust their work hours costlessly and without constraint, those initially working $\widetilde{h}$ hours will reduce hours to $\widetilde{h'} = \frac{w_{min}}{w_{min}+dw}\widetilde{h}$ to restore benefit eligibility.[8] They thus shift to point C, at which neither their earnings nor their program participation rates differ from their values at point A. Utility following the policy change is simply $u(y^* + B) - D_i v(\widetilde{h'})$. This marginally exceeds initial utility due to the incremental decline in work hours.

1.2 Implications of Frictions

We now introduce limitations on individuals' ability to adjust their work hours. We assume a very simple, but specific, structure: some minimum wage jobs require $\widetilde{h}$ hours of work while others require $\widetilde{h'}$. The points in the budget set are thus B, C, and D, which corresponds with unemployment.

Altering hours requires finding a new job. The cost of exerting search effort s is $z(s)$,

[7] In addition to assuming an absence of frictions, we also assume away disemployment effects of the minimum wage through the labor demand channel. Our objective is to assess the welfare consequences of policy tinkering *per se*, independent of the standard costs and benefits associated with the specific policies involved.

[8] An exception to this statement could involve individuals who were initially indifferent between point A and some point much higher on the budget constraint. We can dispose of this exception by assuming that these "ties" are broken in favor of greater hours of work, so that such individuals would not choose point A to begin with.

which is convex. We normalize s to be the probability of finding a minimum wage job at $\widetilde{h'}$ hours in the subsequent period. Let s_i^* be type i's optimal effort to find a job posted at $\widetilde{h'}$ hours. This search occurs from either point B or point D. As illustrated in Figure 1's Panels C and D, different types may have different preferences over these options.

Relative to the world of unrestricted hours adjustments, the above frictions have three novel empirical implications for the effects of shifting the eligibility notch's location. First, it is theoretically trivial, though of empirical interest, to note that a shift in the notch's location only induces search in the model with frictions. Second, the model with frictions implies that the policy change may reduce the relevant population's employment rate. Third, it implies that the policy change may reduce the relevant population's benefit participation rate.

The model with frictions also contrasts sharply with the frictionless model in its implications for the welfare consequences of tinkering with program parameters. For those choosing to search from point C, expected utility in the following period is

$$EU_i(c,h) = (1-s_i^*)[u((w_{min}+dw)\widetilde{h}) - D_i v(\widetilde{h})] + s_i^*[u(y^*+B) - D_i v(\widetilde{h'})] - z(s_i^*) \quad (2)$$

For those choosing to search from point D, expected utility in the following period is

$$EU_i(c,h) = (1-s_i^*)[u(B) - D_i v(0)] + s_i^*[u(y^*+B) - D_i v(\widetilde{h'})] - z(s_i^*). \quad (3)$$

In the presence of frictions, it is apparent that incrementally shifting the eligibility notch's location reduces the relevant population's expected utility through two channels. First, utility flows are unambiguously lower during time spent at either point B or point D than at the initial point A or the ultimate point C. Second, the search required to arrive at point C has a cost. We turn now to an empirical setting that enables us to provide

evidence on the relevance of such costs.

2 Background on Our Empirical Setting

An ideal empirical analysis of the forces modeled above would involve samples of individuals who, prior to a minimum wage increase, were working precisely the number of hours placing them at their Medicaid eligibility notch. Reality falls short of this ideal for several reasons related to measurement and the nuances of Medicaid eligibility. This section proceeds as follows. Its first sub-section details the nuances of Medicaid eligibility that complicate efforts to identify individuals at or close to states' Medicaid eligibility notches. Its second sub-section describes the minimum wage changes at the heart of our empirical analysis. Its third sub-section describes the data we use for the analysis.

2.1 Background on Medicaid Eligibility

As an empirical matter, there are several impediments to identifying workers who, prior to the minimum wage changes we analyze, were located precisely at Medicaid eligibility notches. Medicaid eligibility is technically linked to monthly pre-tax earned income. A first difficulty relates to the administration of these eligibility rules. Despite having monthly eligibility rules, the majority of states process renewals on a 12 month basis, with a small minority processing renewals on a 6 month basis (Heberlein et al., 2013). Monthly eligibility rules are thus not enforced in real time.[9]

Two further difficulties involve measurement. First, the self-reported earnings of low-income individuals exhibit non-trivial volatility. An individual reporting earnings close

[9]This may be for the best, as the monthly enforcement of eligibility rules could make it difficult for beneficiaries to maintain insurance coverage continuity.

to the notch in one month may have been beyond it in the previous month and below it the next. How such earnings patterns translate into renewed eligibility is a matter of administrative discretion.

A second measurement issue involves disregards, deductions, and other earnings adjustments. Gross earned income is not the income amount with which eligibility thresholds are compared. Our inability to directly observe the income concept that determines eligibility further limits our ability to identify individuals located precisely at these thresholds.

During the period we study, and in particular in states bound by increases in the federal minimum wage, Medicaid eligibility thresholds were typically below 50 percent of the poverty line. For a household of 3, this implies eligibility thresholds below $9,000 per year, and often significantly so. As these amounts fall well short of full time minimum wage earnings, employed Medicaid beneficiaries were, in general, not far from their states' eligibility thresholds. Our analysis thus focuses on a broad set of low-wage adults who, at baseline, reported being both regularly employed and covered by Medicaid.

2.2 Background on the Late 2000s Federal Minimum Wage Increases

The minimum wage increases we analyse were driven by federally mandated increases in the minimum wage rates applicable across the U.S. states.[10] On May 25, 2007, Congress legislated a series of minimum wage increases through the "U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act." Increases went into effect on July 24th of 2007, 2008, and 2009. In July 2007, the federal minimum rose from $5.15 to $5.85; in July 2008 it rose to $6.55, and in July 2009 it rose to $7.25.

[10]This section's text draws liberally on the text from Clemens and Wither (2014)

Figure 2 shows our division of states into those that were and were not bound by changes in the federal minimum wage. As in Clemens and Wither (2014), we base this designation on whether a state's January 2008 minimum was below $6.55, rendering it partially bound by the July 2008 increase and fully bound by the July 2009 increase. Using Bureau of Labor Statistics (BLS) data on states' prevailing minimum wage rates, we designate 27 states as fitting this description.

Figure 3 shows the time paths of the average effective minimum wages in the states to which we do and do not apply our "bound" designation. Two characteristics of the paths of the minimum wage rates in unbound states are worth noting. First, their average minimum wage exceeded the minimum applicable in the bound states prior to the passage of the 2007 to 2009 federal increases. Second, these states voluntarily increased their minimums well ahead of the required schedule. On average, the effective minimum across these states had surpassed $7.25 by January of 2008. This group's effective minimums rose, on average, by roughly 20 cents over the period we study, which extends for 4 years beginning in August 2008. By contrast, bound states saw their effective minimums rise by nearly the full, legislated $0.70 on July 24, 2009. Their minimum wage rates had also risen by nearly a full $0.70 on July 24, 2008. Given the ambiguities of Medicaid renewal assessments, as discussed in the previous section, the 2008 increase, and perhaps also the 2007 increase, may well have set the stage for the insurance and employment transitions we analyze.

2.3 Data and Sample Selection

We analyze the interaction between Medicaid eligibility thresholds and minimum wage changes using data from the 2008, 2004, 2001, and 1996 panels of the Survey of Income and Program Participation (SIPP). The SIPP is well-suited to our purposes because it longitudinally tracks individuals' wages, employment, benefit participation,

and job search. The 2008 SIPP panel, which is central to our analysis, follows these outcomes over an interval surrounding the July 2009 minimum wage increase.

Our analysis involves the experience of employed Medicaid beneficiaries who were affected by minimum wage increases. In constructing our baseline samples, we thus require the following. First, we restrict our attention to individuals who reported being covered by Medicaid for at least 6 of the sample's first 12 months.[11] Second, we require that the individual, when employed, have an average baseline wage rate less than $8.50 during the baseline months.[12] Below we provide direct evidence that such individuals' wage rates were significantly shifted by the minimum wage increases we analyze. To limit the relevance of Medicaid eligibility via disability, we restrict our sample to adults ages 55 and younger.

The SIPP panels we analyze vary in length, with the 2008 panel being the longest. Our sample from the 2008 SIPP panel extends from August 2008 to January 2013 (4 years, 6 months). Our samples from of the 1996, 2001, and 2004 panels of the SIPP cover periods ranging from August 1996 to December 1999 (3 years, 5 months), August 2001 to October 2003 (2 years, 3 months), and August 2004 to June 2007 (2 years, 11 months) respectively. As panel balance criteria, we require that individuals from the 2008 SIPP panel have complete data for at least 36 months, from the 2004 panel for at least 24 months, from the 2001 panel for at least 18 months, and from the 1996 panel for at least 24 months. Moderate changes in these criteria have little impact on our results.

[11] In the 2008 SIPP panel, the first 12 months constitutes the baseline period preceding the July 2009 increase in the federal minimum wage.

[12] For those workers who do not directly report an hourly wage, but rather a salary, we impute hourly wages as earnings divided by the individual's usual hours per week times their reported number of weeks worked.

3 Empirical Specification

We initially analyze the effects of interactions between Medicaid eligibility notches and binding minimum wage increases using the difference-in-differences model below:

$$\begin{aligned} Y_{i,s,t} = & \sum_{p(t)\neq 0} \beta_{p(t)} \text{Bound}_s \times \text{Period}_{p(t)} \\ & + \alpha_{1_s} \text{State}_s + \alpha_{2_t} \text{Time}_t + \alpha_{3_i} \text{Individual}_i \\ & + \mathbf{X_{s,t}}\gamma + \varepsilon_{i,s,t}. \end{aligned} \tag{4}$$

The primary dependent variable of interest, $Y_{i,s,t}$, is an indicator for whether individual i in state s at time t maintains both employment and Medicaid coverage. Additional outcomes of interest include Medicaid coverage by itself, employment by itself, and job search.

Equation (4) includes the standard features of difference-in-differences estimation, namely sets of state ($State_s$) and time ($Time_t$) fixed effects. Since the SIPP is longitudinal, we are able to include individual fixed effects (α_{3_i}), rendering controls for time-invariant, individual-specific characteristics redundant. The vector $\mathbf{X_{s,t}}$ contains time varying controls for each state's macroeconomic conditions. Our baseline specification controls for a housing price index produced by the Federal Housing Finance Authority (FHFA), which serves as a proxy for the state-level severity of the housing crisis. In robustness checks we explore our estimates' sensitivity to the inclusion of additional macroeconomic controls.

Equation (4) allows for dynamics in the effects of the minimum wage increases we analyze. Motivated by findings from Clemens and Wither (2014), we designate the three months preceding the minimum wage increase's implementation as a transition period; between April and June 2009, workers in bound states become significantly less likely

to report wage rates below the new minimum. We designate the year extending from August 2009 through July 2010 as period "Post 1" and subsequent months as period "Post 2." Months prior to the transition are the baseline period $p = 0$. Our primary coefficients of interest are then $\beta_{\text{Post 1}(t)}$ and $\beta_{\text{Post 2}(t)}$, which estimate the short and medium run changes in outcomes of interest in bound states relative to unbound states. We cluster the standard errors on these point estimates at the state level.

We initially use equation (4) to confirm that binding minimum wage increases shift the wage distribution of our sample as intended. For this analysis, we construct a set of outcome variables of the following form:

$$Y^j_{i,s,t} = 1\{W^{j-1} < \text{Hourly Wage}_{i,s,t} < W^j\}. \tag{5}$$

These $Y_{i,s,t}$ are indicators equal to 1 if an individual's hourly wage is between W^{j-1} and W^j, where each band is a \$0.50 interval. The $\beta_{p(t)}$ from these regressions thus trace out the short and medium run effects of binding minimum wage increases on the wage distribution's probability mass function.

We then move to our primary outcome of interest, namely the likelihood that an individual maintains both employment and coverage by Medicaid. There are two primary threats to interpreting the estimated changes in employment and insurance status as causal effects of the interaction between Medicaid eligibility notches and the minimum wage. The first relates to sample selection and the second to heterogeneity in the Great Recession's severity across states. We discuss each in turn.

States bound by this period's minimum wage increases also had relatively low Medicaid eligibility thresholds. It is thus possible that the employment and insurance transitions of working Medicaid beneficiaries from "bound" states would have differed from the transitions of those in "unbound" states in the absence of minimum wage changes. We explore this concern's relevance by examining the transitions of similarly selected

samples during earlier SIPP panels. More specifically, we implement a triple-difference estimation framework to net out the transitions we observe during earlier time periods. The relevant specification appears below:

$$
\begin{aligned}
Y_{i,s,t} = & \sum_{p(t)\neq 0} \beta_{p(t)} \text{Period}_{p(t)} \times \text{Bound}_s \times \text{Sippo8}_{p(t)} \\
& + \alpha_{1_{s,p(t)}} \text{State}_s \times \text{Period}_{p(t)} + \alpha_{2_{s,p(t)}} \text{State}_s \times \text{Sippo8}_{p(t)} + \\
& + \alpha_{3_s} \text{State}_s + \alpha_{4_t} \text{Time}_t + \alpha_{5_i} \text{Individual}_i + \mathbf{X_{s,t}}\gamma + \varepsilon_{i,s,t}. \qquad (6)
\end{aligned}
$$

The variable $\text{Sippo8}_{p(t)}$ is an indicator equal to one if an observation comes from the 2008 SIPP panel. Equation (6) augments the fixed effects from equation (4) with state-by-period effects and state-by-panel effects. The third set of standard two-way interactions, namely period-by-panel effects, are incorporated through a full set of time fixed effects.[13]

Because our setting is somewhat distinctive from common triple-difference environments, further discussion of the strategy's core assumptions may be of use. Equation (6) provides a check for the relevance of concerns associated with differences in the Medicaid eligibility thresholds in bound and unbound states. Eligibility thresholds in bound states have historically been low. Consequently, it may, all else equal, be more difficult to maintain both employment and Medicaid eligibility in these states. This would make transitions out of either employment or Medicaid participation more common among bound state samples even in the absence of the minimum wage changes we analyze. The triple-difference specification thus nets out differences in the transitions associated with similarly selected samples of individuals in bound and unbound states in prior periods. For equation (6)'s $\beta_{p(t)}$ to yield unbiased estimates, we assume that the prior-period

[13]This reflects the fact that the third layer of our triple-difference framework involves additional time periods. It does not, as in many applications, involve a within-state control group.

transitions capture any differences that would otherwise have prevailed. Contemporaneous changes in either Medicaid eligibility policy or minimum wage law pose potential threats to this approach. Regarding minimum wage law, we provide direct evidence that wage distributions in our bound and unbound states were not, at least to a significant degree, affected differentially by minimum wage changes that occurred during the earlier periods. We further investigate our estimates' sensitivity to controlling directly for changes in states' Medicaid-eligibility thresholds by including these thresholds in $\mathbf{X_{s,t}}$.

Finally, we note that the employment and insurance transitions observed during the 2008 SIPP panel may be affected by heterogeneity in the Great Recession's effects across states. We thus explore our results' robustness to the inclusion of proxies for the Great Recession's severity. Our baseline analysis follows the analysis in Clemens and Wither (2014) by controlling directly for a Federal Housing Finance Agency housing price index. We show that alternative approaches to controlling for the Great Recession's severity have little impact on our estimates. The employment and insurance transitions we observe thus do not appear to have been driven by heterogeneity in macroeconomic factors.

4 Baseline Summary Statistics

Table 1 presents baseline summary statistics for the samples we analyze. Columns 1 and 2 describe the bound and unbound state samples from the 2008 SIPP panel, which we use in estimating equation (4). Columns 3 and 4 describe the bound and unbound state samples from the 1996, 2001, and 2004 SIPP panels, which are incorporated into our estimates of equation (6).

Row 1 describes the fraction of months individuals spent earning wage rates between \$5.15 and \$7.25, which were the effective federal minimum wage rates in July 2006 and

July 2009 respectively. The data confirm that, at baseline, such wage rates were far more common among individuals in our bound states than in our unbound states. Bound state individuals spent 32 percent of baseline months working at such wage rates. The same was true of only 11 percent of months for individuals in unbound states, reflecting the fact that their state minimum wage rates exceeded or were equal to $7.25 at this time.

Subsequent rows reveal that our sample selection procedure has successfully identified working, low-wage Medicaid beneficiaries. Individuals in bound and unbound states were employed in 70 and 69 percent of baseline month respectively. Both samples reported Medicaid coverage in 85 percent of baseline months. Their probabilities of maintaining both employment and Medicaid coverage, our primary outcome of interest, were 52 and 53 percent respectively.

The second to last row of Table 1 reveals one of the primary differences between our bound and unbound state samples. Individuals in bound states had average monthly earnings of $422 while individuals in unbound states had average monthly earnings of $465. This reflects the fact that bound states tended to have lower Medicaid eligibility thresholds than unbound states over this time period. As discussed above, these differences in eligibility thresholds may independently shape the employment and insurance transitions of our bound and unbound state samples. Columns 3 and 4 provide evidence that the earlier SIPP panels will provide credible evidence on the relevance of this concern. Specifically, they show that our selection procedure yields similar earnings differences in these earlier samples ($536 per month relative to $606 in inflation adjusted dollars). We are thus reassured that these samples can be informative regarding the relevance of earnings threshold differences for our estimates.

5 Evidence of the Minimum Wage Increase's Effects on Wage Distributions

This section presents our estimates of the minimum wage increase's effects on the distribution of wages across our samples of low-wage Medicaid beneficiaries. Figure 4's Panel A characterizes the minimum wage increase's effect on the wage distributions of low-wage Medicaid beneficiaries. Each marker in the figure represents an estimate of $\beta_{\text{Post 2}(t)}$ from equation (4) when the outcome variables take the form described by equation (5). The lowest dot in Panel A, for example, is our medium-run estimate of the minimum wage increase's effect on the probability of earning an hourly wage between \$6.51 and \$7.00.

The estimates show that binding minimum wage increases had substantial bite on the wage distributions of our samples of low-wage Medicaid beneficiaries. The probability of wage rates between \$6.51 and \$7.00 declined by 18 percentage points more in bound states than in unbound states. This is supplemented by more modest declines in the probability of wages between \$5.51 and \$6.50. The shifted mass collects between \$7.01 and \$8.01. A significant portion of this mass falls between \$7.51 and \$8, and is thus not pinned to the new minimum.[14]

Panels B, C, and D display similar estimates for what one could call "placebo" minimum wage changes during the earlier SIPP panels we analyze. That is, we report similar estimates of equation (4) on samples from the 2004, 2001, and 1996 SIPP panels. The wage distributions of our bound and unbound state samples appear to evolve similarly during these earlier time periods. A possible exception involves moderate (though imprecisely estimated) increases, in bound states relative to unbound states, in the prob-

[14]This mirrors a finding in Clemens and Wither (2014), which we take as being consistent with findings in Katz and Krueger's (1992) longitudinal survey of Texas food service establishments.

abilities of wage rates between $6.50 and $7.50 during the 2004 SIPP panel. These shifts likely reflect the effects of state-specific minimum wage increases, which occurred disproportionately in unbound states over this time period. On the whole, however, it appears that the wage trajectories of low-wage Medicaid beneficiaries in bound and unbound states were quite similar during these earlier time periods.

6 A Graphical Representation of Employment and Insurance Changes

Figures 5 through 9 present time series tabulations of the raw employment and insurance coverage data underlying our estimates of equation (4). The panels of figure 5 present the full set of outcomes of interest for the 2008 SIPP panel. Figures 6 through 9 present tabulations associated with all 4 of the SIPP panels we analyze using our triple-difference models.

Figure 5's panel A presents the fraction of individuals in our sample that were both employed and covered by Medicaid, separately for the bound and unbound states, during the 2008 SIPP panel. Just over 50 percent of individuals in both the bound and unbound states were employed and covered by Medicaid during the baseline months, during which they followed quite similar trajectories. Between July 2009 and July 2010 these fractions diverge. By late 2010, individuals in bound states had become roughly 13 percentage points less likely to maintain both employment and Medicaid coverage.

Panels B, C, and D report tabulations for Medicaid participation (panel B), employment (panel C), and job search (panel D). Trends in Medicaid participation follow a path mirroring that seen in Panel A. After following similar baseline trajectories, the Medicaid participation of individuals in bound states declines by more than 10 percentage points relative to the Medicaid participation of individuals in unbound states. Panel C

reveals that employment outcomes diverged around July 2010. By July 2011, individuals in bound states were nearly 10 percentage points less likely to be employed than individuals in unbound states.[15] Panel D presents tabulations of job search. Individuals in bound states spent slightly more weeks per month searching for work during the baseline period than did individuals in unbound states. Over the first year following July 2009, this pattern reverses.

The tabulations from the 2008 SIPP panel line up quite consistently with Section 1's predictions for a world in which low-skilled workers face significant labor market frictions. Following minimum wage increases, the model with frictions predicted that low-wage Medicaid beneficiaries would spend more time searching for work, be more likely to exit employment, and be more likely to lose access to Medicaid. None of these outcomes are predicted in the model without frictions. As discussed above, however, our initial approach for estimating the causal effect of interactions between the Medicaid notch and minimum wage increases faces multiple threats. The tabulations presented in figures 6 through 9 and the regression evidence presented in section 7 encompass our effort to address these concerns.

The panels of Figure 6 show tabulations of the probability of maintaining both employment and Medicaid coverage in the 2008, 2004, 2001, and 1996 SIPP panels respectively. Reassuringly, there is little evidence that this outcome evolved differentially among individuals in bound and unbound states during the earlier SIPP panels. In the earlier panels, individuals in bound states have slightly lower probabilities of maintaining employment and Medicaid coverage throughout the relevant sampling frames. In panels B, C, and D, however, this outcome moves roughly in parallel across the two groups of states. The data thus reveal that estimates of equations (4) and equation (6)

[15]The observed dynamics highlight the potential importance of insights from Meer and West (2013) regarding policy changes' dynamic effects.

will yield similar estimates of the effect of binding minimum wage increases on the maintenance of both employment and Medicaid coverage.

The panels of Figures 7 reveal that estimates of the effect of binding minimum wage increases on Medicaid participation will be moderately sensitive to shifting from the difference-in-differences framework to the triple-difference framework. In earlier SIPP panels, individuals in bound states were moderately more likely to transition off of Medicaid than were individuals in unbound states. Estimates of the effect of interactions between Medicaid eligibility notches and the minimum wage will thus be moderately smaller in the triple difference specification. The panels of Figures 8 reveal that the relative employment experiences of individuals in bound and unbound states varied somewhat across time periods. Point estimates for employment outcomes may thus be somewhat sensitive to the inclusion of macroeconomic controls, and triple-difference specifications will tend to yield less precise estimates than difference-in-differences specifications. The panels of Figure 9 similarly reveal that job search patterns vary non-trivially across SIPP panels. It again appears clear, however, that estimates of equations (4) and (6) will yield similar results.

7 Regression Analysis

This section presents our difference-in-differences and triple-difference estimates of equations (4) and (6). We first present baseline estimates of the effect of interactions between Medicaid eligibility thresholds and minimum wage increases on employment and Medicaid participation. Next, we assess our baseline result's robustness to a variety of specification modifications. We then explore individuals' self-reported reasons for losing insurance and exiting employment. Finally, we present evidence on job search.

7.1 Effects on Medicaid and Employment Status

In Table 2, columns 1, 3, and 5 report estimates from equation (4)'s difference-in-differences specification, while columns 2, 4, and 6 report estimates from equation (6)'s triple-differences specification. The difference-in-differences estimate in column 1 reveals that low-wage Medicaid beneficiaries become significantly less likely to maintain both employment and Medicaid coverage following binding minimum wage increases. Relative to low-wage Medicaid beneficiaries in unbound states, their probability of maintaining employment and Medicaid coverage declined by 6.7 percentage points over the first year and 14.0 percentage points over subsequent years (the "medium run"). Assuaging concerns that individuals in bound states differ fundamentally from those in unbound states, the triple-difference estimates reported in column 2 are similar, with a short-run estimate of 6.6 percentage points and a medium-run estimate of 14.2 percentage points.

For columns 3 and 4 we replace the dependent variable with an indicator equal to one if an individual has insurance through Medicaid. Column 3's difference-in-differences estimates include a short-run decline of 7.5 percentage points and a medium-run decline of 12.9 percentage points. As suggested by Figure 7, the triple-difference specification yields moderately smaller estimates. Column 4 reports a short-run decline of 3.2 percentage points and a medium-run decline of 7.1 percentage points. Columns 5 and 6 report estimates of the associated employment changes. The estimated medium-run employment decline is 12.3 percentage points in the difference-in-differences specification and 14.9 percentage points in the triple-difference specification.

7.2 Robustness of the Baseline Estimates

Table 3 presents an analysis of our baseline results' robustness to a variety of specification changes. Estimates in in Table 3's Panel A are of equation (4)'s difference-in-differences model, while estimates in Panel B are of equation (6)'s triple difference model. The results in column 1 replicate the findings reported in Table 2's columns 1 and 2. The results associated with specification modifications appear in subsequent columns.

Column 2 replicates our primary specification but without application of the SIPP's population weights. This modification has essentially no effect on our estimates. In column 3 we exclude our macroeconomic control for states' median house prices. This decreases our difference-in-differences estimate by roughly 1 percentage point and our triple-difference estimate by a less trivial 3.6 percentage points. In column 4 we allow for a fairly exhaustive set of interactions between demographic indicator variables (e.g., individual age dummy variables) and linear time trends. The specification thus allows for the possibility that differential employment and insurance transitions are associated with differences in the demographic composition of our samples. The resulting estimates are economically indistinguishable from our baseline estimates. In column 5 we control directly for changes in states' Medicaid eligibility thresholds. While these thresholds significantly predict the dependent variable, they have negligible effects on our point estimates of interest. Finally, columns 6 and 7 add additional macroeconomic controls, specifically controls for statewide employment rates and statewide per capita personal income. The inclusion of these controls also has negligible effects on our estimates.

7.3 Effects on Reasons for Being Uninsured

In this section we analyze changes in individuals' likelihood of having *any* insurance coverage, coupled with self-reported reasons for lacking coverage when uninsured.[16] Table 4 reports the estimates. As in Table 2, odd-numbered columns report estimates of equation (4)'s difference-in-differences specification, while even-numbered columns report estimates from equation (6)'s triple-differences specification.

Columns 1 and 2 reveal that declines in Medicaid coverage tended not to be associated with transitions to other forms of insurance. The medium-run estimate in column 2, for example, reveals that individuals in bound states became 7.5 percentage points more likely to be uninsured than did individuals in unbound states. Self-reported reasons for this decline in coverage appear roughly in line with the baseline distribution of stated reasons for lacking coverage. Columns 3 and 4 reveal significant increases in lacking coverage due to coverage being "too expensive," while columns 5 and 6 reveal increases in the likelihood of referencing an inability to obtain coverage through work. Columns 7 and 8 reveal other reasons to be relatively unimportant.[17]

7.4 Effects on Reasons for Being Unemployed

Table 5 parallels Table 4 in reporting an investigation of individuals' self-reported reasons for being unemployed. Columns 1 and 2 begin by reporting that, relative to

[16]The SIPP asks individuals without any health insurance why they were not covered by any health insurance plan, and we group their possible responses into three all encompassing categories: 1. Too Expensive (health insurance was too expensive), 2. Work Restrictions (could not secure insurance from employer because either the employer did not offer any coverage, they were not working at the job long enough or enough hours to qualify, or they became unemployed), or 3. Other (includes all remaining possible reasons including having a pre-existing condition, being in good health with no desire to purchase health insurance, etc.). Table A.4 in the appendix gives the detailed question and answers pertaining to this question in the SIPP.

[17]Note that the estimates in columns 4, 6, and 8 need not add to the result in column 2 because respondents are permitted to give multiple responses. Unfortunately for our purposes, respondents are not asked if they lacked coverage due to being "shifted over the Medicaid eligibility notch."

individuals in unbound states, individuals in bound states became 12 to 15 percentage points more likely to be unemployed over the medium run. The remaining columns explore the avenues through which these disemployment effects occurred. We group responses into three categories: 1) Labor Demand (individuals reported being on either temporary or indefinite layoff), 2) No Match (reported that they were unable to find *suitable* work), or 3) Personal (includes all remaining possible reasons including being unable to work because of chronic health conditions, being retired, being pregnant, raising children, going to school, or being uninterested in working). Table A.5 in the appendix displays the underlying SIPP question and potential responses in greater detail.

Employment declines are disproportionately accounted for by declines in the self-reported ability to find suitable job matches. Increases in unemployment for personal reasons appear economically meaningful, but are estimated with very little precision. The point estimates associated with strictly demand side factors (i.e., layoffs) are economically negligible and statistically indistinguishable from 0. A role for changes in workers' preferences over hours of work, as emphasized in section 1, thus appears quite plausible.

7.5 Effects on Workers' Job Search

We continue our assessment of responses to interactions between Medicaid notches and minimum wage increases by analyzing job search. In our context, job search captures what may be the most novel implication of labor market frictions. Standard models predict that minimum wage increases will tend to reduce turnover. A minimum wage increase makes minimum wage employment more attractive. Because it may also reduce the number of such jobs available, those holding minimum wage employment thus have little reason to engage in on-the-job search. By contrast, Section 1's model with frictions showed that individuals shifted over a benefit eligibility notch may elect to search for

new employment from their initial job.

Table 6 presents our estimates of changes in job search. Columns 1 and 2 report changes in the number of weeks engaged in job search while either employed or unemployed. Relative to individuals in unbound states, individuals in bound states increased job search by an average of 0.05 weeks per month over the short run and 0.19 weeks over the long run. The precision of these estimates is low, with the medium-run estimate being statistically distinguishable from 0 at the 10 percent level. Columns 3 and 4 report estimates associated with the intensity of job search while employed. In both the difference-in-differences and triple-difference specifications, we observe a 0.05 short-run increase in the average number of weeks spent looking for work. The estimate in column 3 is statistically distinguishable from 0 at the 0.05 level, while the estimate in column 4 is statistically distinguishable from 0 at the 0.10 level. Notably, this short-run loading onto search while employed emerges in spite of the fact that individuals in bound states became less likely to be employed. Though it is not possible to exhaust all potential alternative explanations, this outcome appears uniquely consistent with a role for the notch interaction we emphasize. Long-run increases in job search load onto search while unemployed, as shown in columns 5 and 6.

7.6 Summary Effects

Appendix tables A.1 and A.2 present results associated with two summary outcomes that simultaneously incorporate changes in employment, job search, and Medicaid participation. The outcome in table A.1 is an indicator set equal to one if an individual was unemployed, was not participating in Medicaid, or was searching for work. The outcome in table A.2 is the sum of these three indicators. Estimates associated with these joint outcomes are strongly statistically significant and are robust to the full set of specification changes explored previously in table 3.

8 Conclusion

We analyze the effects of recent minimum wage increases on the employment and health insurance status of low-wage Medicaid beneficiaries. Minimum wage increases can have the unintended consequence of shifting Medicaid beneficiaries out of eligibility. Because this period's minimum wage increases were substantial, a non-trivial number of beneficiaries appear to have found themselves in these circumstances.

The empirical implications of interactions between minimum wage increases and Medicaid eligibility thresholds depend crucially on the relevance of labor market frictions. We find that affected individuals became less likely to be covered by Medicaid, more likely to be unemployed, and more likely to be searching for employment. The results suggest that the workers we analyze face substantial adjustment costs.

Low income households receive assistance through a wide range of policies, which can interact with one another in unexpected ways. Some program interactions involve desirable program complementarities. Lee and Saez (2012), for example, demonstrate the potential for minimum wage regulation to complement tax-financed wage subsidies. Neumark and Wascher (2011) explore such interactions empirically. Clemens (2015b) similarly analyzes the connection between community rating regulations and tax-financed Medicaid expansions in the health insurance context.

Program interactions like those explored here have the potential to cause unintended disruption. The costs of adapting to such disruptions may thus have implications for the social safety net's optimal design. Our analysis complements work by Bhargava and Manoli (Forthcoming) in showing that navigating complex benefit arrangements can be costly. All else equal, program participants may thus benefit from efforts to streamline the safety net and reduce its complexity.[18]

[18]Complexities associated with federalism are of related interest. While the federal government often attempts to bind lower governments' actions (Baicker et al., 2012), targeted funds sometimes fail to "stick"

Our evidence suggests that low-skilled individuals face significant labor market frictions. Given such frictions, the stability of redistributive programs' design may be an important, under-appreciated characteristic of the safety net as a whole. Steady streams of changes, be they radical or incremental, may significantly complicate low-income households' lives. The effects of the associated uncertainties on these households' well-being are thus a topic of potential interest.

where intended (Knight, 2002; Gordon, 2004). In such settings, it can be difficult for any one level of government to design policy changes that achieve its objectives. Accounting for patterns of program crowd out and substitution becomes an essential wrinkle to the program evaluation problem (Baicker and Staiger, 2005; Kline and Walters, 2014).

References

Aizer, A. (2007). Public health insurance, program take-up, and child health. *The Review of Economics and Statistics 89*(3), 400–415.

Akerlof, G. A. (1978). The economics of "tagging" as applied to the optimal income tax, welfare programs, and manpower planning. *American Economic Review 68*(1), 8–19.

Baicker, K., J. Clemens, and M. Singhal (2012). The rise of the states: Us fiscal decentralization in the postwar period. *Journal of Public Economics 96*(11), 1079–1091.

Baicker, K. and D. Staiger (2005). Fiscal shenanigans, targeted federal health care funds, and patient mortality. *Quaterly Journal of Economics* (1), 345–386.

Bhargava, S. and D. Manoli (Forthcoming). Psychological frictions and incomplete take-up of social benefits: Evidence from an irs field experiment. *American Economic Review*.

Bloom, N. (2009). The impact of uncertainty shocks. *Econometrica 77*(3), 623–685.

Card, D. and A. B. Krueger (1995). *Myth and measurement: the new economics of the minimum wage*. Princeton University Press.

Chetty, R. (2009). The simple economics of salience and taxation. *NBER Working Paper 15246*.

Chetty, R. (2012). Bounds on elasticities with optimization frictions: A synthesis of micro and macro evidence on labor supply. *Econometrica 80*(3), 969–1018.

Chetty, R., J. N. Friedman, T. Olsen, and L. Pistaferri (2011). Adjustment costs, firm responses, and micro vs. macro labor supply elasticities: Evidence from danish tax records. *Quarterly Journal of Economics 126*(2), 749–804.

Chetty, R., N. Hendren, P. Kline, and E. Saez (2014). Where is the land of opportunity? the geography of intergenerational mobility in the united states. *NBER Working Paper 19843*.

Chetty, R., A. Looney, and K. Kroft (2009). Salience and taxation: Theory and evidence. *American Economic Review 99*(4), 1145–1177.

Clemens, J. (2015a). Redistribution through minimum wage regulation: An analysis of program linkages and budgetary spillovers. Technical report.

Clemens, J. (2015b). Regulatory redistribution in the market for health insurance. *American Economic Journal: Applied Economics 7*(2), 109–34.

Clemens, J. and M. Wither (2014). The minimum wage and the great recession: Evidence of effects on the employment and income trajectories of low-skilled workers. *NBER Working Paper 20724*.

Friedman, M. (1968). The case for the negative income tax. *Republican papers 202*, 220.

Gelber, A., D. Jones, and D. W. Sacks (2013). Earnings adjustment frictions: Evidence from the social security earnings test. *NBER Working Paper* (w19491).

Gordon, N. (2004). Do federal grants boost school spending? evidence from title i. *Journal of Public Economics 88*(9), 1771–1792.

Heberlein, M., T. Brooks, J. Alker, S. Artiga, and J. Stephens (2013). Getting into gear for 2014: Findings from a 50-state survey of eligibility, enrollment, renewal, and cost-sharing policies in medicaid and chip, 2012-2013. Technical report, Kaiser Foundation.

Katz, L. F. and A. B. Krueger (1992). The effect of the minimum wage on the fast-food industry. *Industrial and Labor Relations Review*, 6–21.

Kleven, H. J. and W. Kopczuk (2011). Transfer program complexity and the take-up of social benefits. *American Economic Journal: Economic Policy*, 54–90.

Kline, P. and C. Walters (2014). Evaluating public programs with close substitutes: The case of head start. Technical report.

Knight, B. (2002). Endogenous federal grants and crowd-out of state government spending: Theory and evidence from the federal highway aid program. *American Economic Review*, 71–92.

Kopczuk, W., E. Saez, and J. Song (2010). Earnings inequality and mobility in the united states: evidence from social security data since 1937. *Quarterly Journal of Economics 125*(1), 91–128.

Lampman, R. J. (1965). Approaches to the reduction of poverty. *American Economic Review*, 521–529.

Lee, D. and E. Saez (2012). Optimal minimum wage policy in competitive labor markets. *Journal of Public Economics 96*(9), 739–749.

Manoli, D. S. and N. Turner (2014). Nudges and learning: Evidence from informational interventions for low-income taxpayers. *NBER Working Paper 20718*.

Meer, J. and J. West (2013). Effects of the minimum wage on employment dynamics. *NBER Working Paper 19262*.

Muralidharan, K., P. Niehaus, and S. Sukhtankar (2014). Payments infrastructure and the performance of public programs: Evidence from biometric smartcards in india. *NBER Working Paper 19999*.

Neumark, D. and W. Wascher (2006). Minimum wages and employment: A review of evidence from the new minimum wage research. *NBER Working Paper 12663*.

Neumark, D. and W. Wascher (2011). Does a higher minimum wage enhance the effectiveness of the earned income tax credit? *ILR Review 64*(4), 712–746.

Nichols, A. L. and R. J. Zeckhauser (1982). Targeting transfers through restrictions on recipients. *American Economic Review*, 372–377.

Niehaus, P. and S. Sukhtankar (2013). The marginal rate of corruption in public programs: Evidence from india. *Journal of Public Economics 104*, 52–64.

Rothstein, J. and R. G. Valletta (2014). Scraping by: Income and program participation after the loss of extended unemployment benefits. Technical report.

Shoag, D. and S. Veuger (2014). Uncertainty and the geography of the great recession.

Tobin, J., J. A. Pechman, and P. M. Mieszkowski (1967). Is a negative income tax practical? *Yale Law Journal*, 1–27.

Tables and Figures

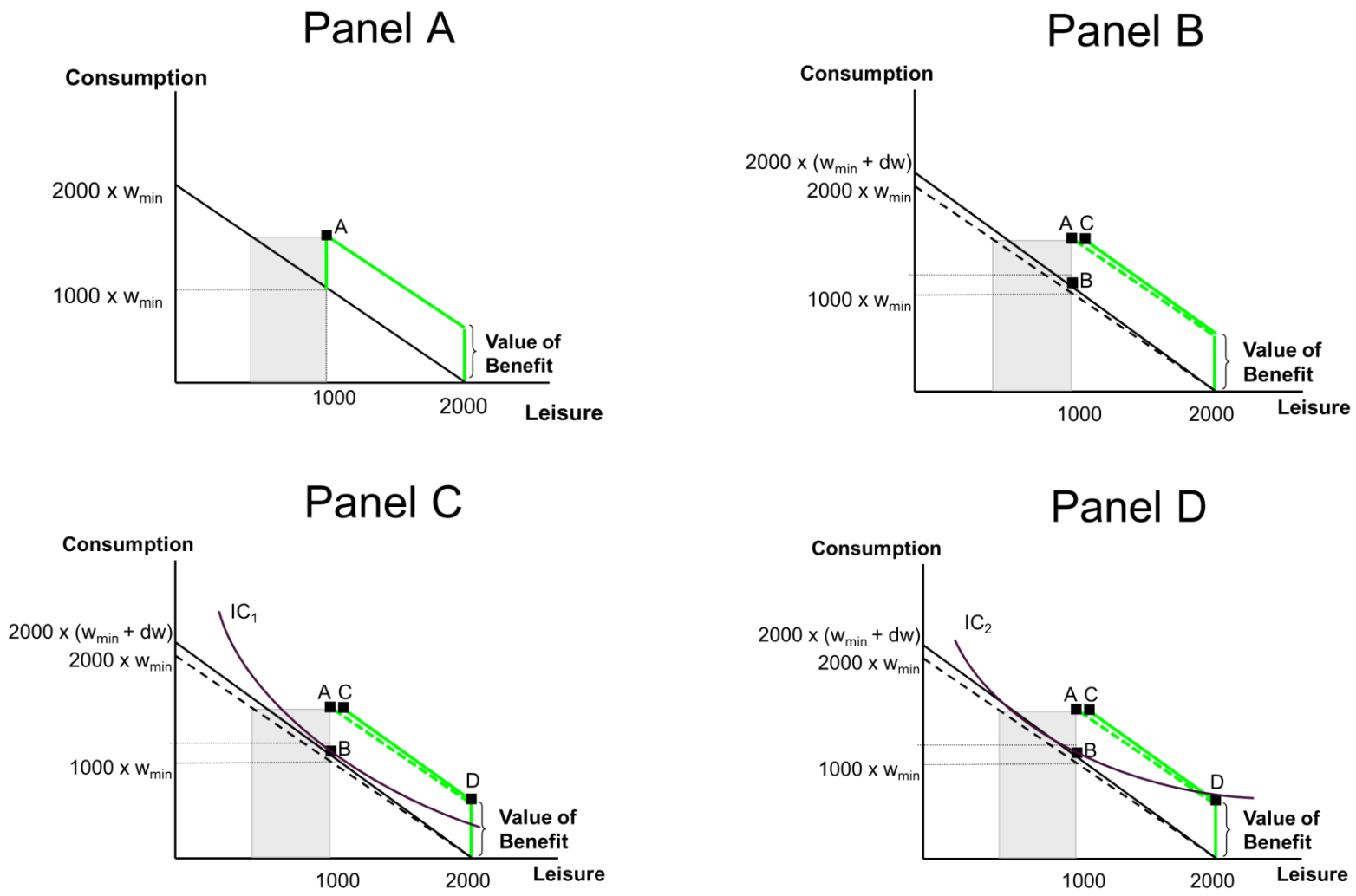


Figure 1: **Illustration of the Interaction between the Minimum Wage and a Benefit Eligibility Notch:**
The figure illustrates the implications of a change in the minimum wage for the budget constraint faced by individuals who may receive a benefit that phases out with a notch.

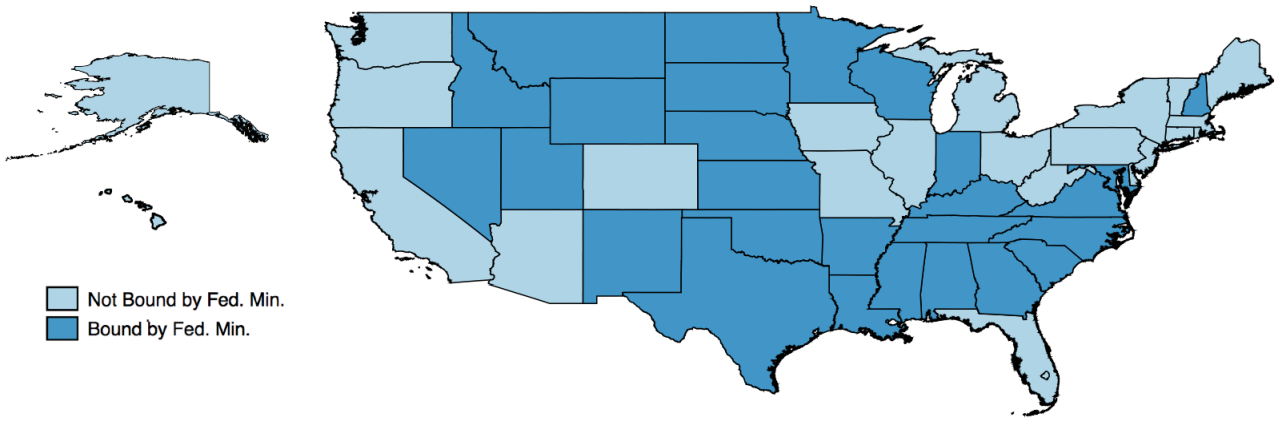


Figure 2: **States Bound by the 2008 and 2009 Federal Minimum Wage Increase:**
The map labels states on the basis of whether we characterize them as bound by the July 2008 and July 2009 increases in the federal minimum wage. We define bound states as states reported by the Bureau of Labor Statistics (BLS) to have had a minimum wage less than $6.55 in January 2008. Such states were at least partially bound by the July 2008 increase in the federal minimum and fully bound by the July 2009 increase from $6.55 to $7.25.

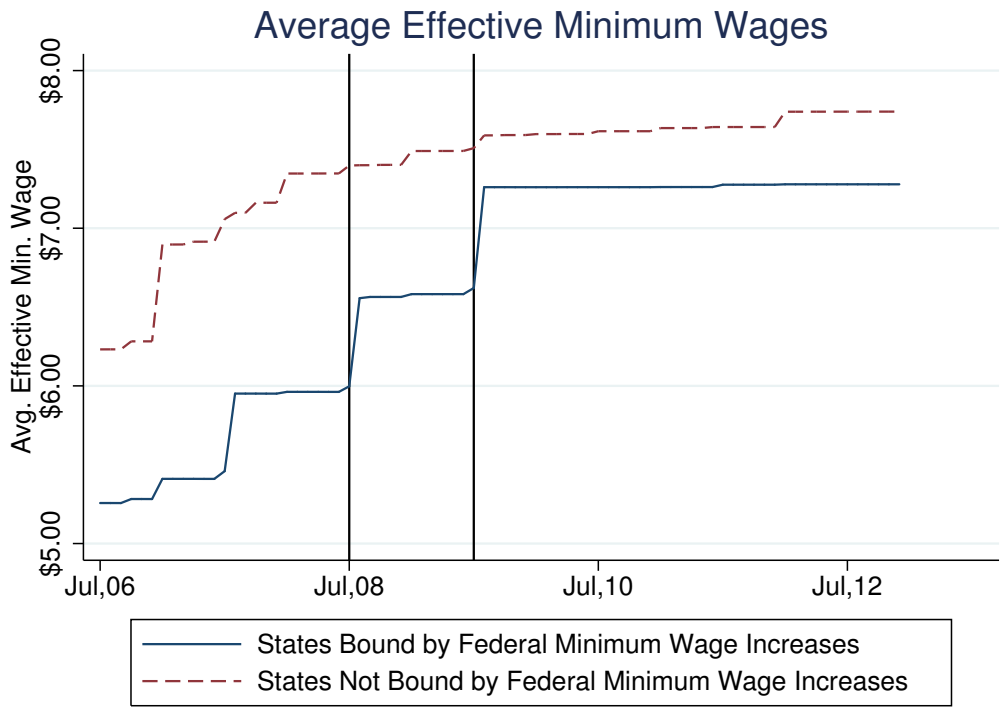


Figure 3: **Evolution of the Average Minimum Wage in Bound and Unbound States:** As in the previous figure, we define bound states as states reported by the Bureau of Labor Statistics (BLS) to have had a minimum wage less than $6.55 in January 2008. Such states were at least partially bound by the July 2008 increase in the federal minimum and fully bound by the July 2009 increase from $6.55 to $7.25. Effective monthly minimum wage data were taken from the detailed replication materials associated with Meer and West (2014). Within each group, the average effective minimum wage is weighted by state population. The first solid vertical line indicates the timing of the July 2009 increase in the federal minimum wage as well as the first month of data available in our samples from the 2008 panel of the Survey of Income and Program Participation. The second solid vertical line indicates the timing of the July 2009 increase in the federal minimum wage.

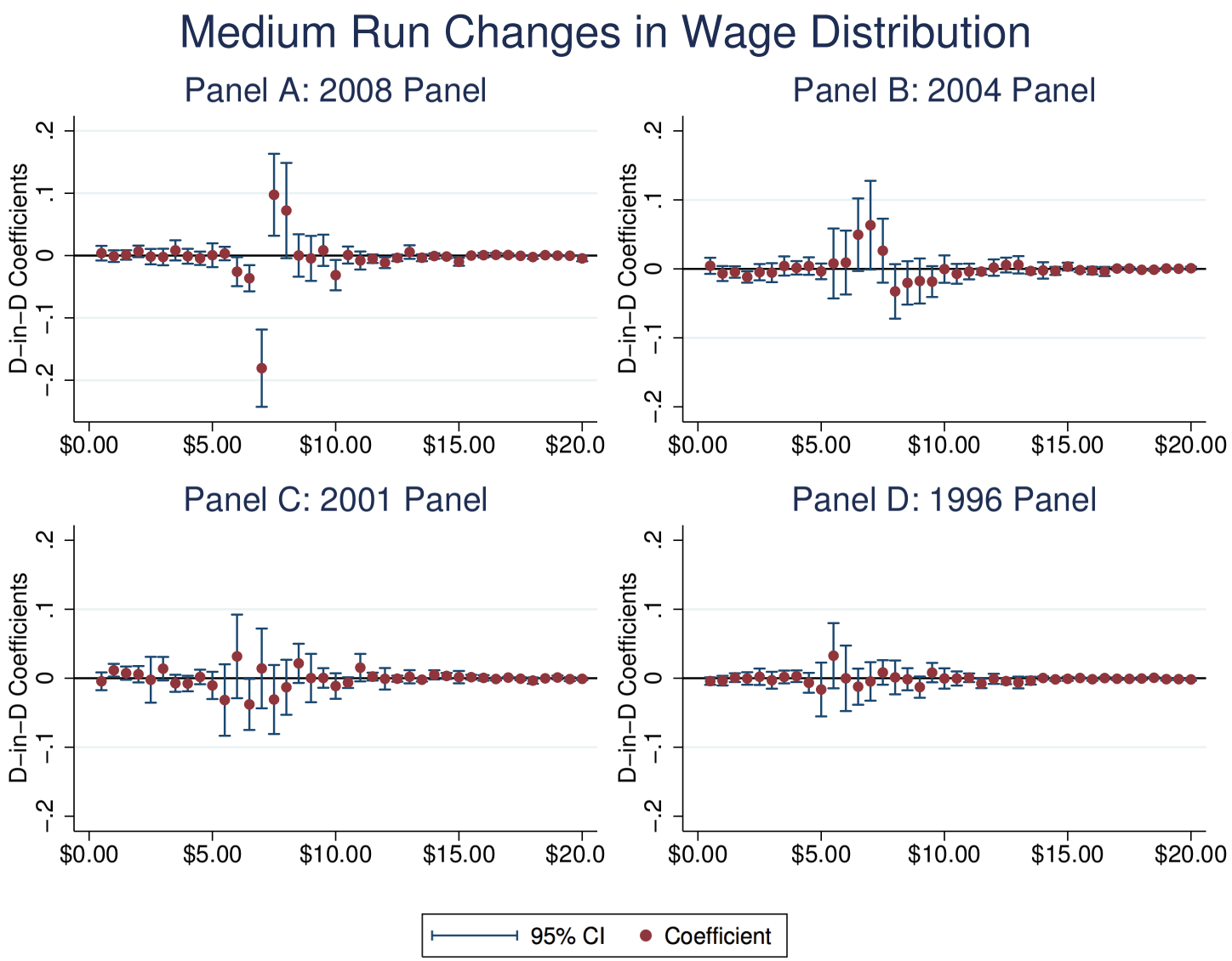


Figure 4: **Estimated Effects of the Minimum Wage on Hourly Wage Distributions:** The figure reports estimates of binding minimum wage increase's medium run effects on the wage distributions of the low-wage Medicaid beneficiary subsample across the four SIPP panels used in our analysis as indicated in each panel's title. Each dot is an estimate of the coefficient $\beta_{p(t)}$ from equation (4), where the relevant $p(t)$ corresponds with the period beginning one year after each panel's actual or simulated policy change representing the July 2009 increase in the federal minimum wage. The dependent variables in each specification take the form $Y^j_{i,s,t} = 1\{W^{j-1} < \text{Hourly Wage}_{i,s,t} < W^j\}$. These $Y_{i,s,t}$ are indicators equal to 1 if an individual's hourly wage is in the band between W^{j-1} and W^j, where each band is a 50 cent interval. The results can thus be described as estimates of the minimum wage's effect on the wage distribution's probability mass function. Panel A presents wage distribution changes in our sample from the 2008 SIPP Panel, Panel B the 2004 Panel, Panel C the 2001 Panel, and Panel D the 1996 Panel.

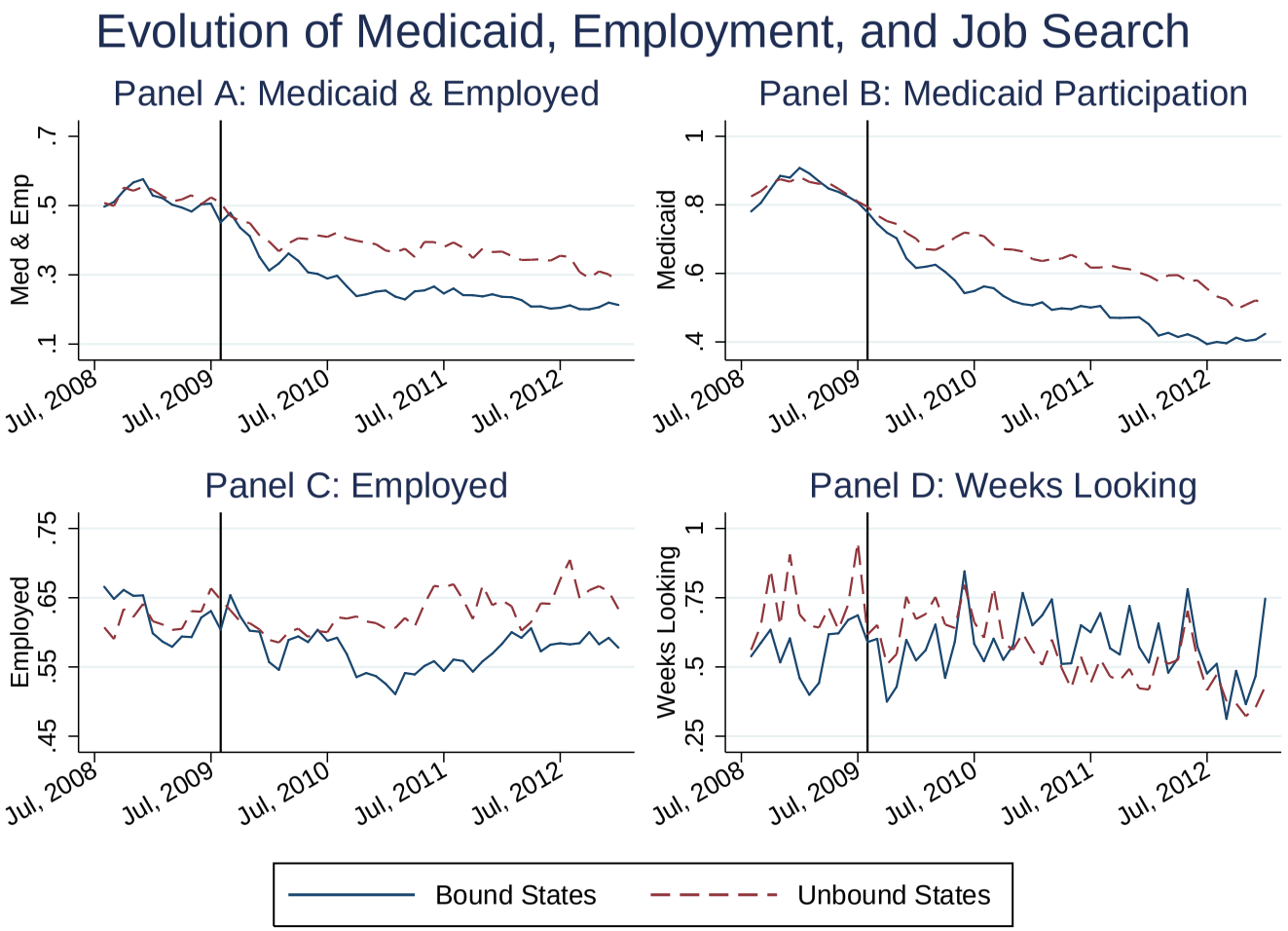


Figure 5: **Medicaid, Employment, and Job Search Trends in Bound and Unbound States:** The figure depicts the average trend of Medicaid, employment, and job search outcomes in bound and unbound states. In all cases the series are constructed by the authors using data from the 2008 panel of the Survey of Income and Program Participation (SIPP). Observations represent the average probability of the given outcome variable across all individuals in our previously defined bound and unbound states for each survey month and use individual probability sampling weights. Panel A depicts the trend of being both on Medicaid coverage and employed, Panel B the trend of Medicaid coverage, Panel C the trend of employment, and Panel D the trend of actively searching for work. In all panels, the solid vertical line indicates the timing of the July 2009 increase in the federal minimum wage.

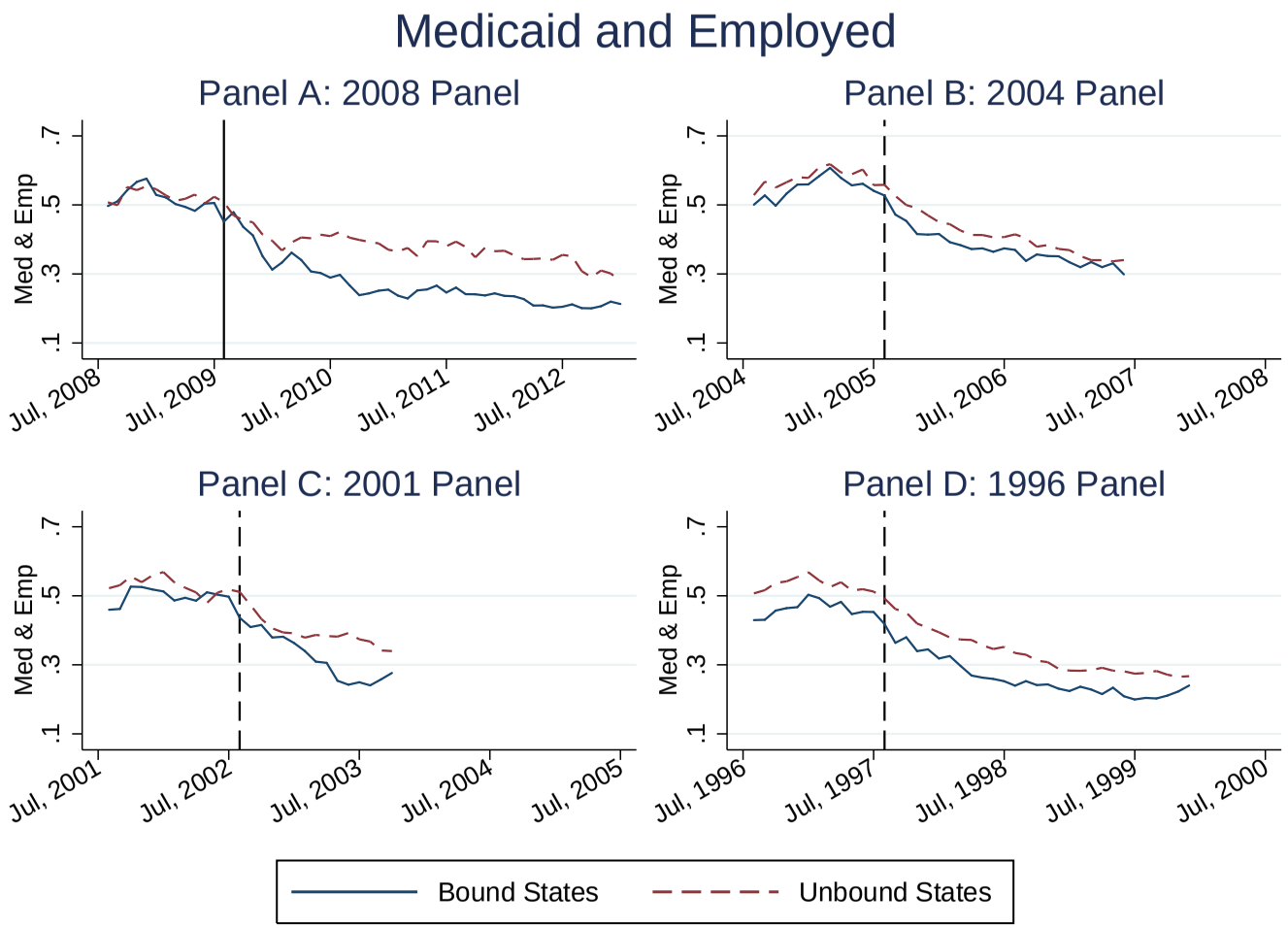


Figure 6: **Joint Employment and Medicaid Coverage Trends in Bound and Unbound States:** The figure depicts the average trend of being both employed and covered by Medicaid in bound and unbound states. In all cases the series are constructed by the authors using data from the 2008, 2004, 2001, and 1996 panels of the Survey of Income and Program Participation (SIPP). Observations represent the average probability of being both employed and with Medicaid coverage across all individuals in our previously defined bound and unbound states for each survey month and use individual probability sampling weights. Panel A depicts data from the 2008 panel, Panel B the 2004 panel, Panel C the 2001 panel, and Panel D the 1996 panel from the SIPP. In Panel A, the solid vertical line indicates the timing of the July 2009 increase in the federal minimum wage, while the dashed lines in the remaining panels represent the simulated minimum wage increase.

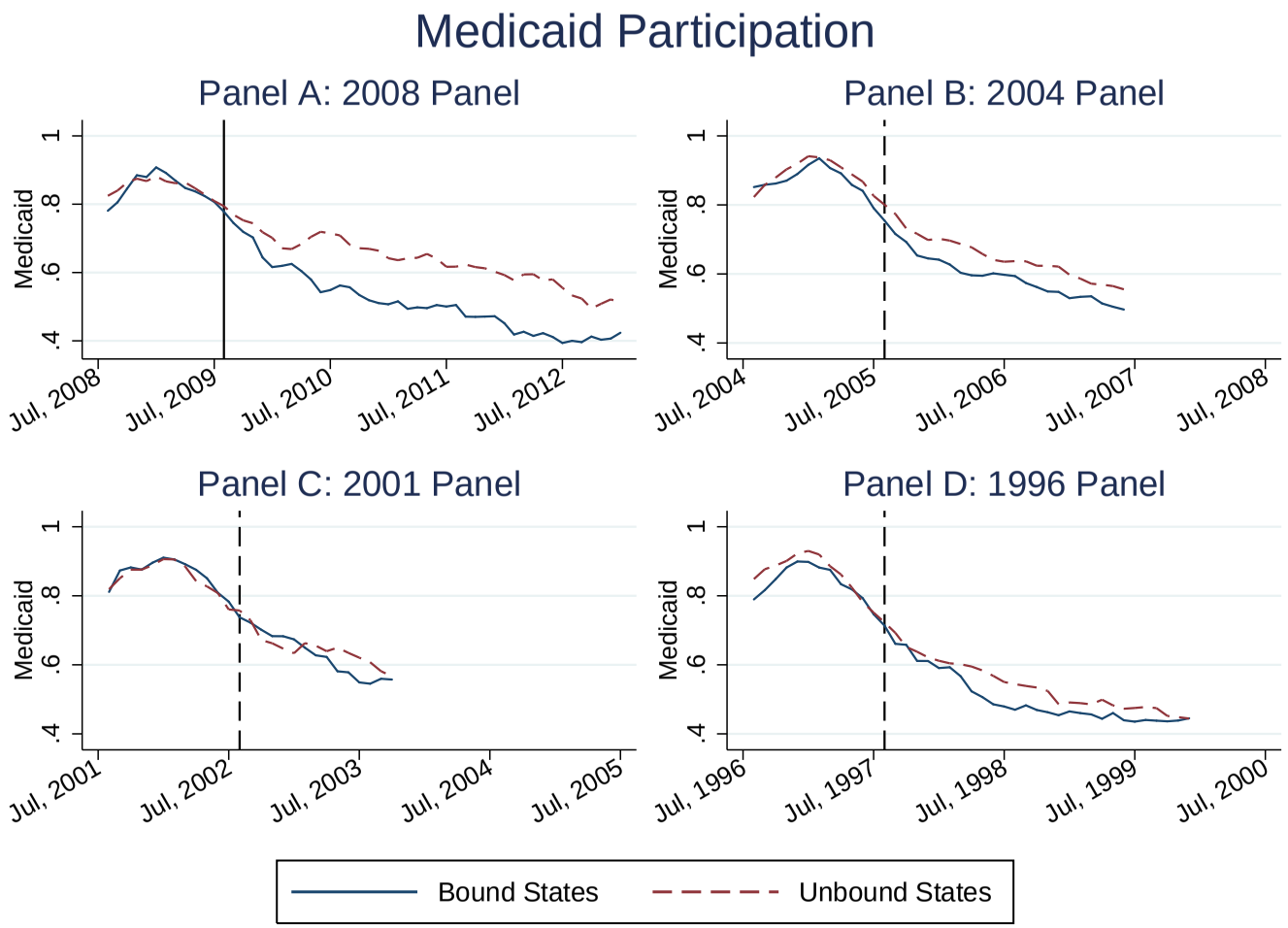


Figure 7: **Medicaid Trends in Bound and Unbound States:** The figure depicts the average trend of being covered by Medicaid in bound and unbound states. In all cases the series are constructed by the authors using data from the 2008, 2004, 2001, and 1996 panels of the Survey of Income and Program Participation (SIPP). Observations represent the average probability of having Medicaid coverage across all individuals in our previously defined bound and unbound states for each survey month and use individual probability sampling weights. Panel A depicts data from the 2008 panel, Panel B the 2004 panel, Panel C the 2001 panel, and Panel D the 1996 panel from the SIPP. In Panel A, the solid vertical line indicates the timing of the July 2009 increase in the federal minimum wage, while the dashed lines in the remaining panels represent the simulated minimum wage increase.

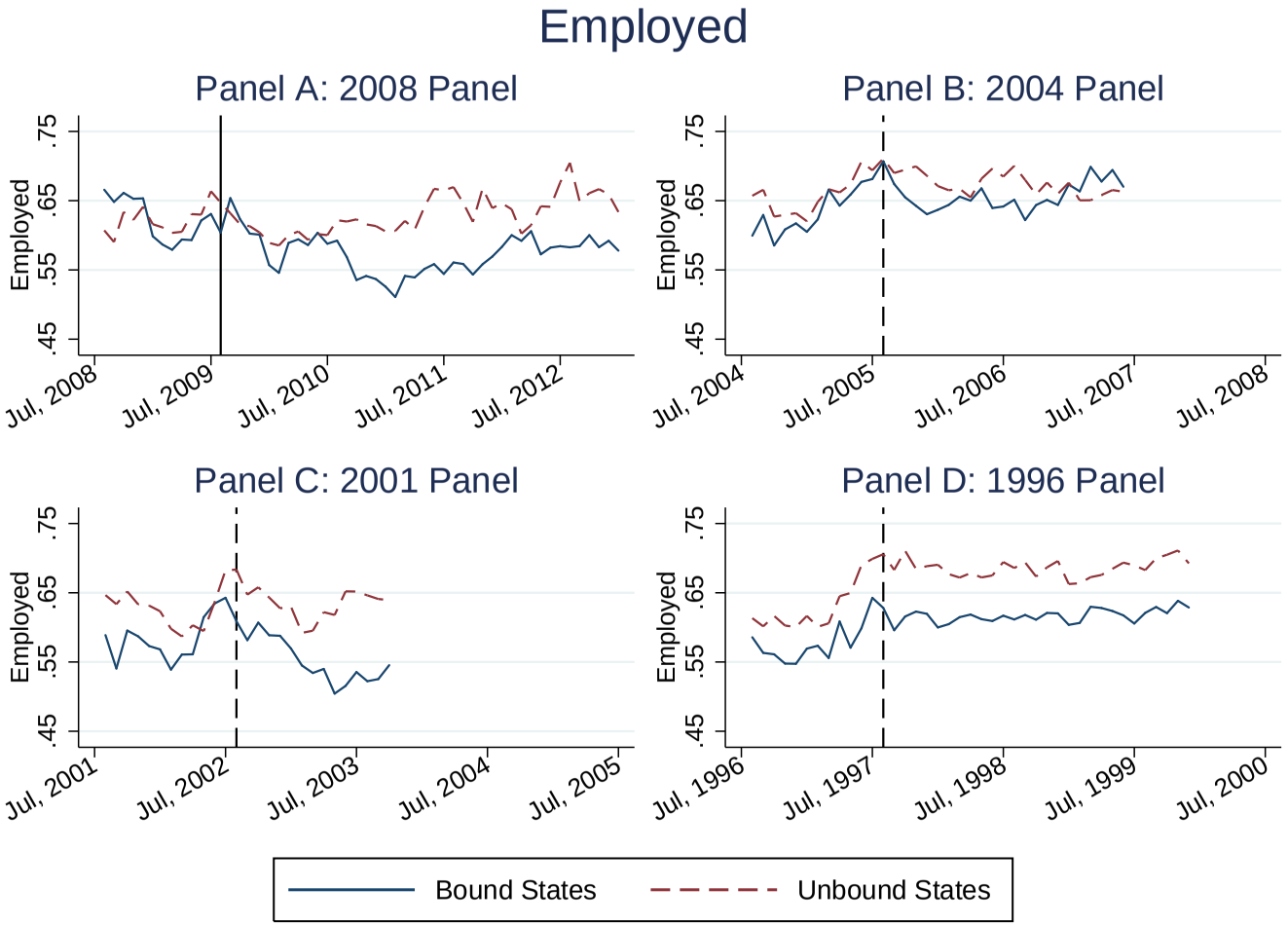


Figure 8: **Employment Trends in Bound and Unbound States:** The figure depicts the average trend of being employed in bound and unbound states. In all cases the series are constructed by the authors using data from the 2008, 2004, 2001, and 1996 panels of the Survey of Income and Program Participation (SIPP). Observations represent the average probability of being employed across all individuals in our previously defined bound and unbound states for each survey month and use individual probability sampling weights. Panel A depicts data from the 2008 panel, Panel B the 2004 panel, Panel C the 2001 panel, and Panel D the 1996 panel from the SIPP. In Panel A, the solid vertical line indicates the timing of the July 2009 increase in the federal minimum wage, while the dashed lines in the remaining panels represent the simulated minimum wage increase.

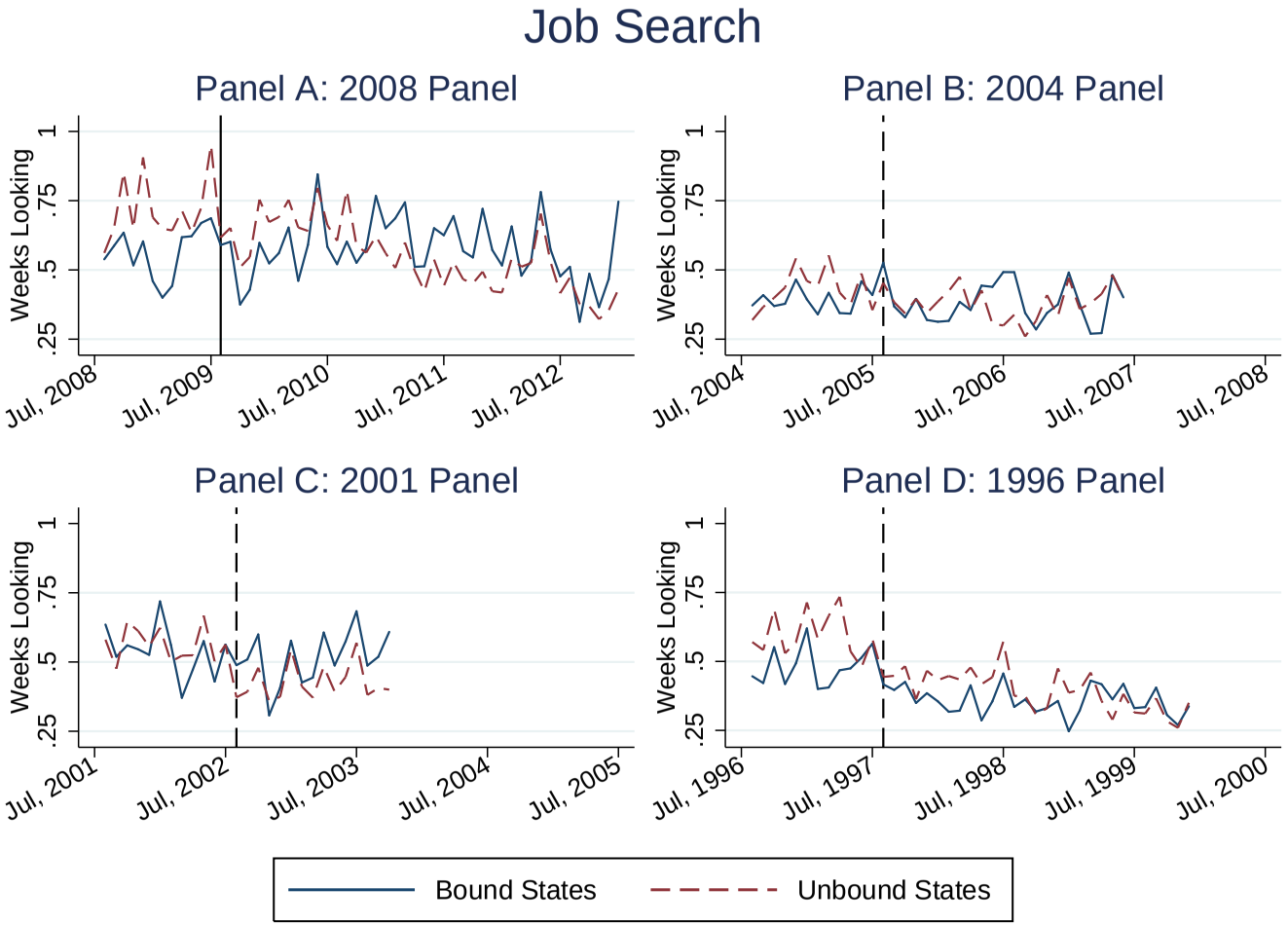


Figure 9: **Job Search Trends in Bound and Unbound States:** The figure depicts the average trend of the number of weeks spent actively looking for a job in bound and unbound states. In all cases the series are constructed by the authors using data from the 2008, 2004, 2001, and 1996 panels of the Survey of Income and Program Participation (SIPP). Observations represent the average number of weeks in the given month actively searching for work across all individuals in our previously defined bound and unbound states for each survey month and use individual probability sampling weights. Panel A depicts data from the 2008 panel, Panel B the 2004 panel, Panel C the 2001 panel, and Panel D the 1996 panel from the SIPP. In Panel A, the solid vertical line indicates the timing of the July 2009 increase in the federal minimum wage, while the dashed lines in the remaining panels represent the simulated minimum wage increase.

Table 1: **Baseline Summary Statistics by Treatment Status and SIPP Panel**

	(1) 2008 Bound	(2) 2008 Unbound	(3) Control Bound	(4) Control Unbound
Wage $5.15-$7.25	0.320	0.114	0.375	0.343
	(0.467)	(0.318)	(0.484)	(0.475)
Prob(employed)	0.623	0.622	0.601	0.639
	(0.485)	(0.485)	(0.490)	(0.480)
Prob(Medicaid coverage)	0.849	0.852	0.860	0.872
	(0.358)	(0.355)	(0.347)	(0.334)
Prob(uninsured)	0.115	0.108	0.0985	0.0857
	(0.319)	(0.310)	(0.298)	(0.280)
Prob(Medicaid & employed)	0.519	0.526	0.508	0.549
	(0.500)	(0.499)	(0.500)	(0.498)
Medicaid Eligibility Threshold	0.635	0.993	0.457	0.734
	(0.695)	(0.654)	(0.529)	(0.533)
Earnings	422.2	465.6	536.4	606.0
	(539.6)	(599.5)	(728.7)	(798.7)
Num hours worked/week	18.74	20.37	20.84	21.42
	(16.05)	(17.20)	(17.18)	(17.57)
Observations	4939	8934	17244	30324

Sources: Baseline summary statistics were calculated by the authors using data from the 1996, 2001, 2004, and 2008 panels of the Survey of Income and Program Participation. The baseline within each panel corresponds with the 12 month window from August of the first year of the panel to July of the second year of the panel. Samples consist of individuals ages 16-55 years old, earning an average baseline wage of less than $8.50 per hour while employed, having Medicaid coverage for at least six months in the pre-policy period, and having been in the sample for at least roughly two-thirds of the 1996, 2001, 2004, and 2008 panels of the Survey of Income and Program Participation (SIPP). Column 1 contains the mean and standard deviation (in parenthesis) of key variables from individuals in bound states, as defined in Section 2, from the 2008 SIPP panel, while column 2 reports the statistics of individuals in the panel's unbound states. Columns 3 and 4 report the baseline statistics from individuals in our 'control' panels, i.e. the combination of the 1996, 2001, and 2004 SIPP panels, in similarly designated bound and unbound states respectively.

Table 2: **Effects on Medicaid and Employment**

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Med&Emp		Medicaid		Employed	
Bound x Post 1	-0.067		-0.075*		-0.040	
	(0.042)		(0.031)		(0.042)	
Bound x Post 2	-0.140**		-0.129**		-0.123**	
	(0.040)		(0.039)		(0.040)	
Bound x Post 1 x SIPP 08		-0.066		-0.032		-0.052
		(0.043)		(0.031)		(0.049)
Bound x Post 2 x SIPP 08		-0.142**		-0.071*		-0.149**
		(0.042)		(0.030)		(0.050)
Housing Price Index	0.579	0.953*	-0.307	-0.133	1.158	1.260**
	(0.779)	(0.430)	(0.754)	(0.294)	(0.803)	(0.434)
N	40,797	153,940	40,797	153,940	40,797	153,940
Mean of Dep. Var.	0.524	0.533	0.851	0.865	0.622	0.625
R-Squared	0.414	0.434	0.437	0.490	0.469	0.474
Estimator	DD	DDD	DD	DDD	DD	DDD
Weighted	Yes	Yes	Yes	Yes	Yes	Yes
Full Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Triple Dif Interactions	No	Yes	No	Yes	No	Yes

Note: +, *, **, and *** indicate statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels respectively. The table reports difference-in differences and triple-difference estimates of the minimum wage's short and medium run effects on the relevant dependent variables. More specifically, the estimates in rows 1 and 3 correspond to our short-run effects within one year after the policy. The estimates in rows 2 and 4 correspond to our medium-run effects one year and beyond from the policy implementation. In columns 1 and 2, the dependent variable is the unconditional probability that an individual has Medicaid coverage and is employed. In columns 3 and 4, the dependent variable is the unconditional probability that an individual has Medicaid coverage, and finally in columns 5 and 6, the dependent variable is the unconditional probability that an individual is employed. Standard errors are clustered at the state level in all models. The regressions are run on a sample of individuals 16-55 years old, earning an average baseline wage of less than $8.50 per hour while employed, having Medicaid coverage for at least six months in the pre-policy period, and having been in the sample for at least roughly two-thirds of the 1996, 2001, 2004, and 2008 panels of the Survey of Income and Program Participation (SIPP). The full description of the sample selection is outlined in Section 2.3.

Table 3: **Robustness of Effects on Joint Medicaid and Employment Status**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable	Medicaid & Employed						
Panel A:	Difference-in-Differences Specifications						
Bound x Post 1	-0.067	-0.082+	-0.059	-0.069	-0.066	-0.068	-0.065
	(0.042)	(0.041)	(0.043)	(0.042)	(0.042)	(0.042)	(0.043)
Bound x Post 2	-0.140**	-0.138**	-0.129**	-0.141***	-0.140***	-0.141***	-0.136**
	(0.040)	(0.039)	(0.040)	(0.038)	(0.040)	(0.040)	(0.042)
Housing Price Index	0.579	0.633		0.563	0.265	0.473	0.461
	(0.779)	(0.708)		(0.764)	(0.778)	(0.783)	(0.759)
Med. Eligibility Limit					0.050*		
					(0.021)		
State Employment Rate						0.007	
						(0.017)	
State Inc. Per Cap. (1000s)							0.000
							(0.000)
N	40,797	40,797	40,797	40,797	40,797	40,797	40,797
Mean of Dep. Var.	0.524	0.524	0.524	0.524	0.524	0.524	0.524
R-Squared	0.414	0.402	0.414	0.418	0.414	0.414	0.414
Panel B:	Triple Difference Specifications						
Bound x Post 1 x SIPP 08	-0.066	-0.081+	-0.036	-0.067	-0.066	-0.068	-0.060
	(0.043)	(0.041)	(0.045)	(0.042)	(0.043)	(0.042)	(0.041)
Bound x Post 2 x SIPP 08	-0.142**	-0.140***	-0.106*	-0.145***	-0.144**	-0.150**	-0.138**
	(0.042)	(0.037)	(0.042)	(0.041)	(0.042)	(0.044)	(0.041)
Housing Price Index	0.953*	0.698+		0.967*	0.898*	0.889*	0.821*
	(0.430)	(0.390)		(0.432)	(0.437)	(0.415)	(0.399)
Med. Eligibility Limit					0.036*		
					(0.015)		
State Employment Rate						0.012	
						(0.009)	
State Inc. Per Cap. (1000s)							0.000*
							(0.000)
N	153,940	153,940	153,940	153,940	153,940	153,940	153,940
Mean of Dep. Var.	0.533	0.528	0.533	0.528	0.533	0.533	0.533
R-Squared	0.434	0.413	0.434	0.435	0.434	0.434	0.434
Full Interactions	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Weighted	Yes	No	Yes	Yes	Yes	Yes	Yes
Demographic Trends	No	No	No	Yes	No	No	No

Note: +, *, **, and *** indicate statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels respectively. The table reports difference-in differences and triple-difference estimates of the minimum wage's short and medium run effects on an indicator for whether or not an individual is both employed and has Medicaid coverage. More specifically, the estimates in row 1 of Panel A are of the coefficient $\beta_{p(t)}$ from equation (4), where the relevant $p(t)$ corresponds with the period beginning in August 2009 and extending through July 2010. The estimates in row 2 are of the coefficient $\beta_{p(t)}$ from equation (4), where the relevant $p(t)$ corresponds with the period beginning one year after the July 2009 increase in the federal minimum wage. Panel B reports analogous estimates of $\beta_{p(t)}$ from equation (6), namely our triple-difference specification. In Panel A the sample consists exclusively of individuals from our subsample of low-wage Medicaid beneficiaries from the 2008 SIPP Panel. In Panel B the sample is augmented to include the similar subsample of low-wage Medicaid beneficiaries from the collection of the 1996, 2001, and 2004 SIPP Panels. The full description of the sample selection is outlined in Section 2.3. The columns explore our baseline results' (column 1) robustness to a variety of specification changes, which are further described in the main text and within the table itself. Standard errors are clustered at the state level.

Table 4: **Effects on Reasons for Being Uninsured**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Uninsured		Too Expensive		Work Limitations		Other	
Bound x Post 1	0.080**		0.080**		0.086***		0.010	
	(0.023)		(0.025)		(0.021)		(0.007)	
Bound x Post 2	0.124**		0.126**		0.119**		0.012+	
	(0.039)		(0.037)		(0.038)		(0.007)	
Bound x Post 1 x SIPP 08		0.042+		0.041+		0.044+		0.004
		(0.025)		(0.025)		(0.024)		(0.007)
Bound x Post 2 x SIPP 08		0.075*		0.071*		0.073*		0.005
		(0.035)		(0.034)		(0.031)		(0.011)
Housing Price Index	0.332	0.087	0.203	0.143	0.722	0.296	0.043	-0.002
	(0.675)	(0.232)	(0.744)	(0.202)	(0.743)	(0.190)	(0.162)	(0.068)
N	40,797	153,940	40,797	153,940	40,797	153,940	40,797	153,940
Mean of Dep. Var.	0.111	0.094	0.087	0.067	0.080	0.058	0.011	0.010
R-Squared	0.382	0.419	0.376	0.412	0.353	0.383	0.183	0.230
Estimator	DD	DDD	DD	DDD	DD	DDD	DD	DDD
Weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Triple Dif Interactions	No	Yes	No	Yes	No	Yes	No	Yes

Note: +, *, **, and *** indicate statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels respectively. The table reports difference-in differences and triple-difference estimates of the minimum wage's short and medium run effects on the relevant dependent variables. More specifically, the estimates in rows 1 and 3 correspond to our short-run effects within one year after the policy. The estimates in rows 2 and 4 correspond to our medium-run effects one year and beyond from the policy implementation. In columns 1 and 2, the dependent variable is the probability that an individual has no health insurance (i.e., is uninsured). In columns 3 and 4, the dependent variable is the unconditional probability that an individual reports the cost of health insurance being too expensive as the reason for being uninsured. Columns 5 and 6's dependent variables are the unconditional probability that an individual claims work limitations as the reason for being uninsured. Finally, the dependent variable in columns 7 and 8 is the probability that an individual claims 'other' as the reason for being without health insurance. A full description of how the dependent variables were constructed can be found in Table A.4 in the Appendix. Standard errors are clustered at the state level in all models. The regressions are run on a sample of individuals 16-55 years old, earning an average baseline wage of less than $8.50 per hour while employed, having Medicaid coverage for at least six months in the pre-policy period, and having been in the sample for at least roughly two-thirds of the 1996, 2001, 2004, and 2008 panels of the Survey of Income and Program Participation (SIPP). Additional details are provided in the main text and within the table itself.

Table 5: **Effects on Reasons for Being Unemployed**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Unemployed		Demand		No Match		Personal	
Bound x Post 1	0.040		0.003		0.025		0.011	
	(0.042)		(0.005)		(0.016)		(0.033)	
Bound x Post 2	0.123**		0.004		0.074***		0.043	
	(0.040)		(0.005)		(0.016)		(0.034)	
Bound x Post 1 x SIPP 08		0.052		0.004		0.019		0.019
		(0.049)		(0.005)		(0.017)		(0.043)
Bound x Post 2 x SIPP 08		0.149**		0.008		0.070***		0.052
		(0.050)		(0.005)		(0.019)		(0.043)
Housing Price Index	-1.158	-1.260**	0.005	-0.018	-0.840*	-0.271*	-0.314	-0.999*
	(0.803)	(0.434)	(0.084)	(0.022)	(0.417)	(0.122)	(0.690)	(0.378)
N	40,797	153,940	40,797	153,940	40,797	153,940	40,797	153,940
Mean of Dep. Var.	0.378	0.375	0.010	0.005	0.053	0.036	0.210	0.231
R-Squared	0.469	0.474	0.137	0.186	0.287	0.302	0.445	0.455
Estimator	DD	DDD	DD	DDD	DD	DDD	DD	DDD
Weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Triple Dif Interactions	No	Yes	No	Yes	No	Yes	No	Yes

Note: +, *, **, and *** indicate statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels respectively. The table reports difference-in differences and triple-difference estimates of the minimum wage's short and medium run effects on the relevant dependent variables. More specifically, the estimates in rows 1 and 3 correspond to our short-run effects within one year after the policy. The estimates in rows 2 and 4 correspond to our medium-run effects one year and beyond from the policy implementation. In columns 1 and 2, the dependent variable is the probability that an individual is unemployed. In columns 3 and 4, the dependent variable is the unconditional probability that an individual reports a labor demand reason (layoff) as the reason for being unemployed. Columns 5 and 6's dependent variables are the unconditional probability that an individual claims being unable to find a suitable job as the reason for his or her unemployment. Finally, the dependent variable in columns 7 and 8 is the probability that an individual reports a personal explanation for being unemployed. A full description of how the dependent variables were constructed can be found in Table A.5 in the Appendix. Standard errors are clustered at the state level in all models. The regressions are run on a sample of individuals 16-55 years old, earning an average baseline wage of less than $8.50 per hour while employed, having Medicaid coverage for at least six months in the pre-policy period, and having been in the sample for at least roughly two-thirds of the 1996, 2001, 2004, and 2008 panels of the Survey of Income and Program Participation (SIPP). Additional details are provided in the main text and within the table itself.

Table 6: **Effects on Job Search**

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Looking		Looking&Emp		Looking&Unemp	
Bound x Post 1	0.051		0.050*		0.001	
	(0.087)		(0.024)		(0.086)	
Bound x Post 2	0.191+		0.024		0.166	
	(0.109)		(0.026)		(0.106)	
Bound x Post 1 x SIPP 08		0.039		0.047+		-0.008
		(0.099)		(0.027)		(0.094)
Bound x Post 2 x SIPP 08		0.180		0.022		0.158
		(0.127)		(0.027)		(0.121)
Housing Price Index	1.794	-0.835	0.645	0.215	1.149	-1.050
	(3.399)	(0.720)	(0.759)	(0.316)	(2.934)	(0.795)
N	40,797	153,940	40,797	153,940	40,797	153,940
Mean of Dep. Var.	0.660	0.531	0.127	0.108	0.533	0.423
R-Squared	0.267	0.268	0.105	0.122	0.260	0.258
Estimator	DD	DDD	DD	DDD	DD	DDD
Weighted	Yes	Yes	Yes	Yes	Yes	Yes
Full Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Triple Dif Interactions	No	Yes	No	Yes	No	Yes

Note: +, *, **, and *** indicate statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels respectively. The table reports difference-in differences and triple-difference estimates of the minimum wage's short and medium run effects on the relevant dependent variables. More specifically, the estimates in rows 1 and 3 correspond to our short-run effects within one year after the policy. The estimates in rows 2 and 4 correspond to our medium-run effects one year and beyond from the policy implementation. In columns 1 and 2, the dependent variable is the number of weeks that an individual was actively looking for a job in the given month. In columns 3 and 4, the dependent variable is the number of weeks spent looking for work while being employed, and finally in columns 5 and 6, the dependent variable is the number of weeks looking for work while unemployed. Standard errors are clustered at the state level in all models. The regressions are run on a sample of individuals 16-55 years old, earning an average baseline wage of less than $8.50 per hour while employed, having Medicaid coverage for at least six months in the pre-policy period, and having been in the sample for at least roughly two-thirds of the 1996, 2001, 2004, and 2008 panels of the Survey of Income and Program Participation (SIPP). Additional details are provided in the main text and within the table itself.

Appendix (Intended For Online Publication Only)

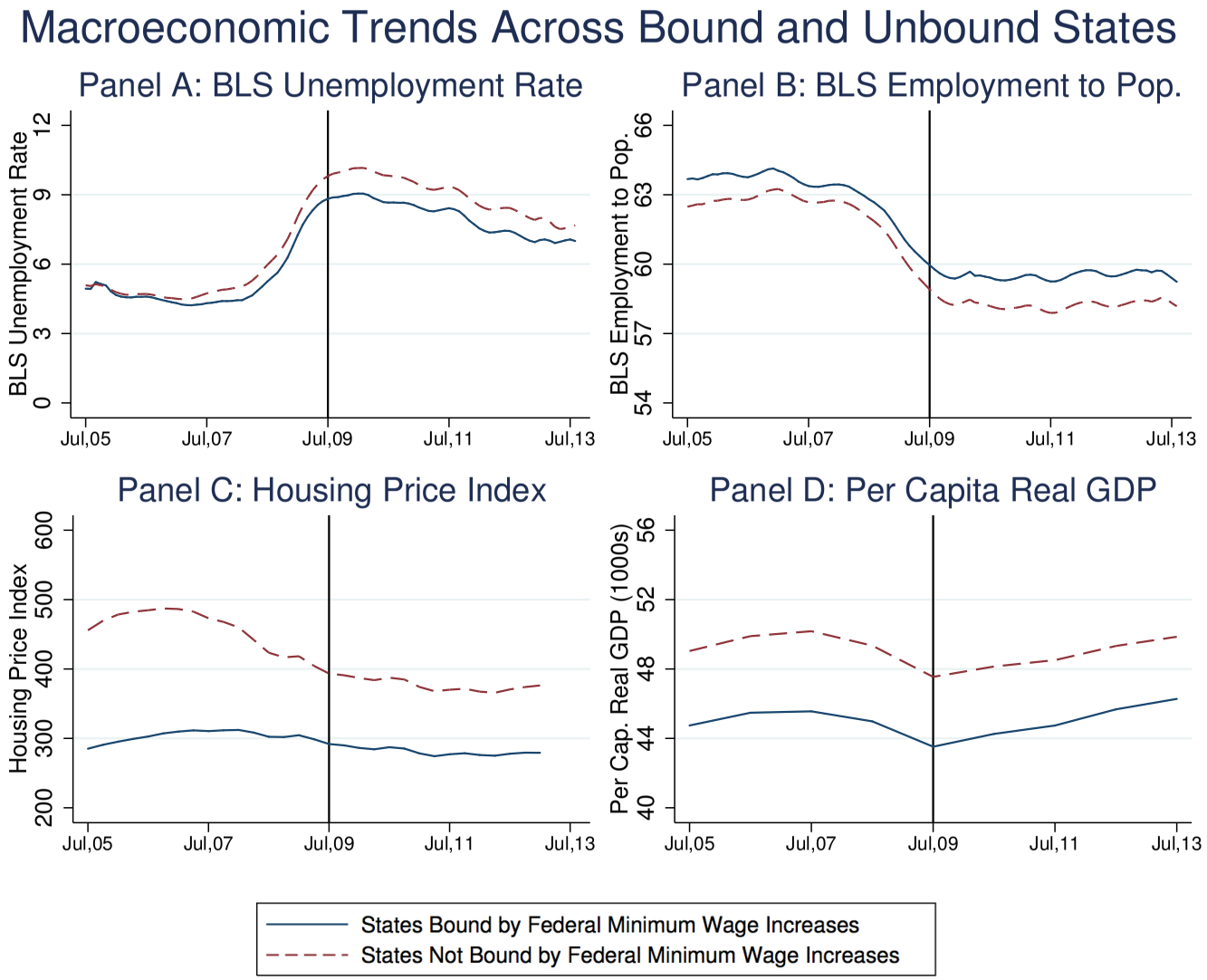


Figure A.1: **Macroeconomic Trends in Bound and Unbound States:**
Bound and unbound states are defined as in previous figures and in Section 2. This figure's panels plot the evolution of macroeconomic indicators over the course of the housing bubble and Great Recession. Panel A plots the average monthly unemployment rate, as reported by the BLS. Panel B plots the average monthtly employment to population ratio, also as reported by the BLS. Panel C plots the average of the Federal Housing Finance Agency's quarterly housing price index. Panel D plots the average of annual real per capita GDP, as reported by the Bureau of Economic Analysis (BEA). In each panel, the solid vertical line indicates the timing of the July 2009 increase in the federal minimum wage.

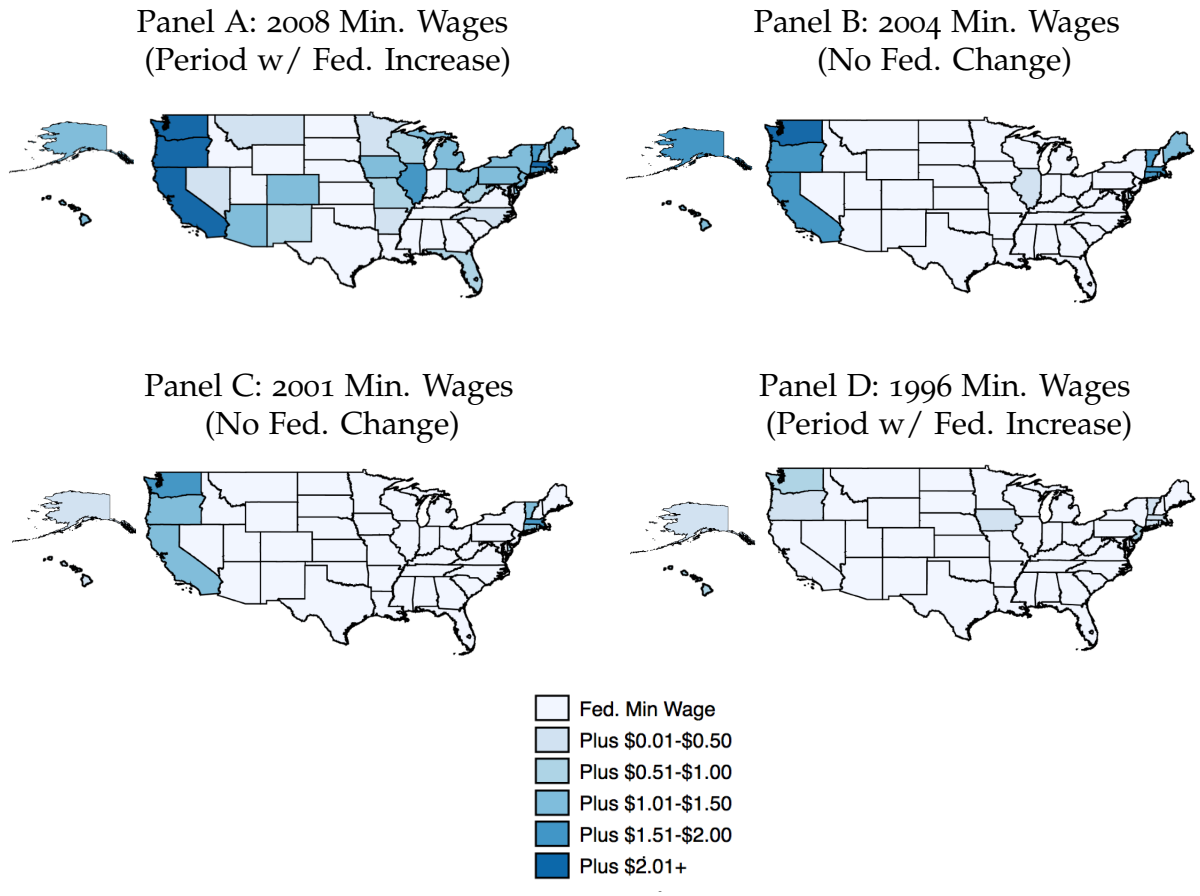


Figure A.2: **Variation in State Minimum Wages by SIPP Panel:** The figure depicts variation in state minimum wage rates across the United States at the beginning of each SIPP panel used in our analysis. Panel A displays wage rates across the U.S. in January 2008, Panel B 2004, Panel C 2001, and Panel D 1996. In all cases, the lightest shade of blue represents a state whose minimum wage was set at the federal minimum wage at the time, and each successively darker shade of blue represents being within a 50 cent increase above the federal minimum.

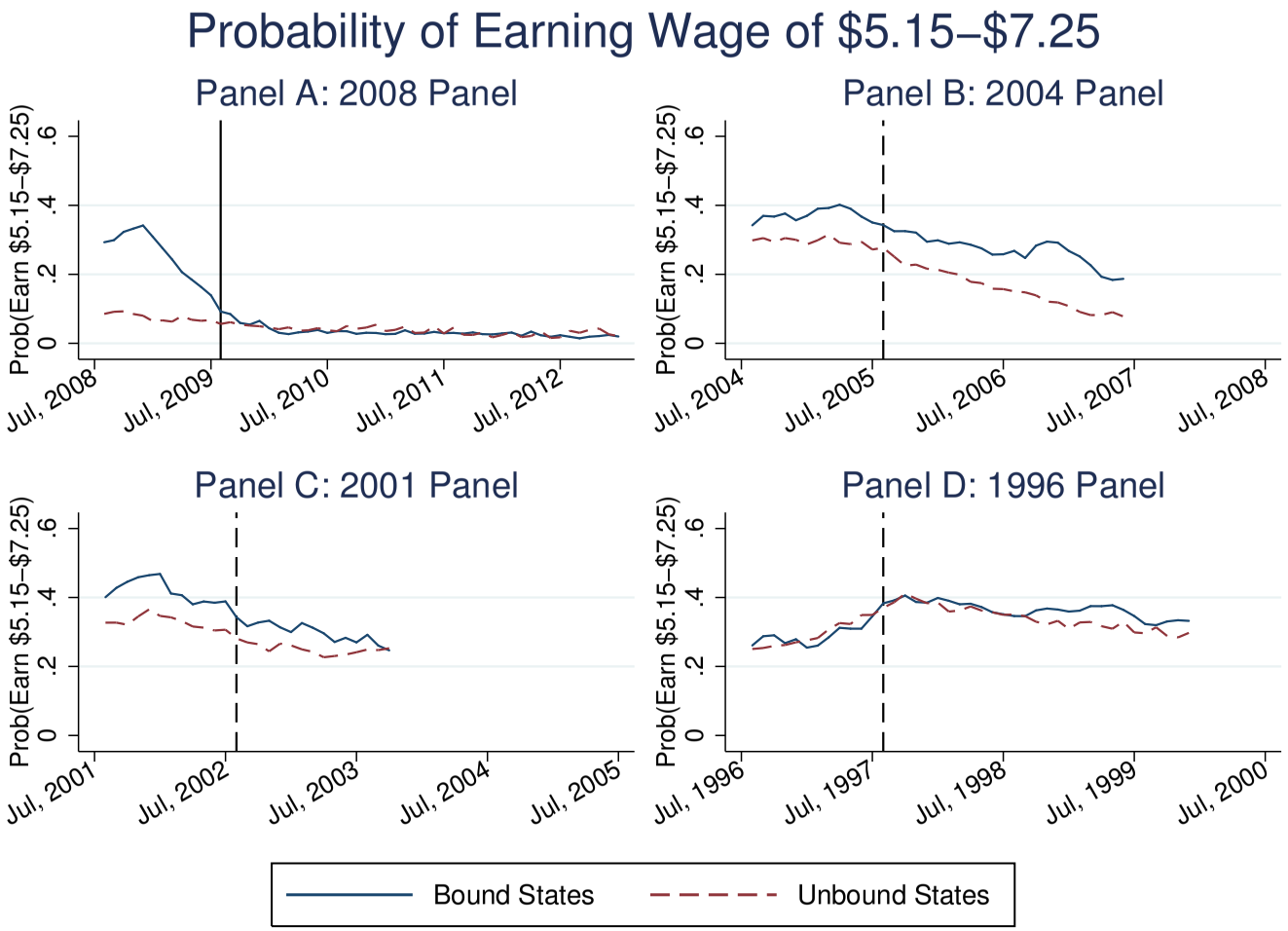


Figure A.3: **Trend of Fraction Earning Hourly Wage of $5.15-$7.25 in Bound and Unbound States:** The figure depicts the average trend of earning an hourly wage between $5.15 and $7.25 in bound and unbound states. In all cases the series are constructed by the authors using data from the 2008, 2004, 2001, and 1996 panels of the Survey of Income and Program Participation (SIPP). Observations represent the average probability of earning an 'affected wage' across all individuals in our previously defined bound and unbound states for each survey month and use individual probability sampling weights. Panel A depicts data from the 2008 panel, Panel B the 2004 panel, Panel C the 2001 panel, and Panel D the 1996 panel from the SIPP. In Panel A, the solid vertical line indicates the timing of the July 2009 increase in the federal minimum wage, while the dashed lines in the remaining panels represent the simulated minimum wage increase.

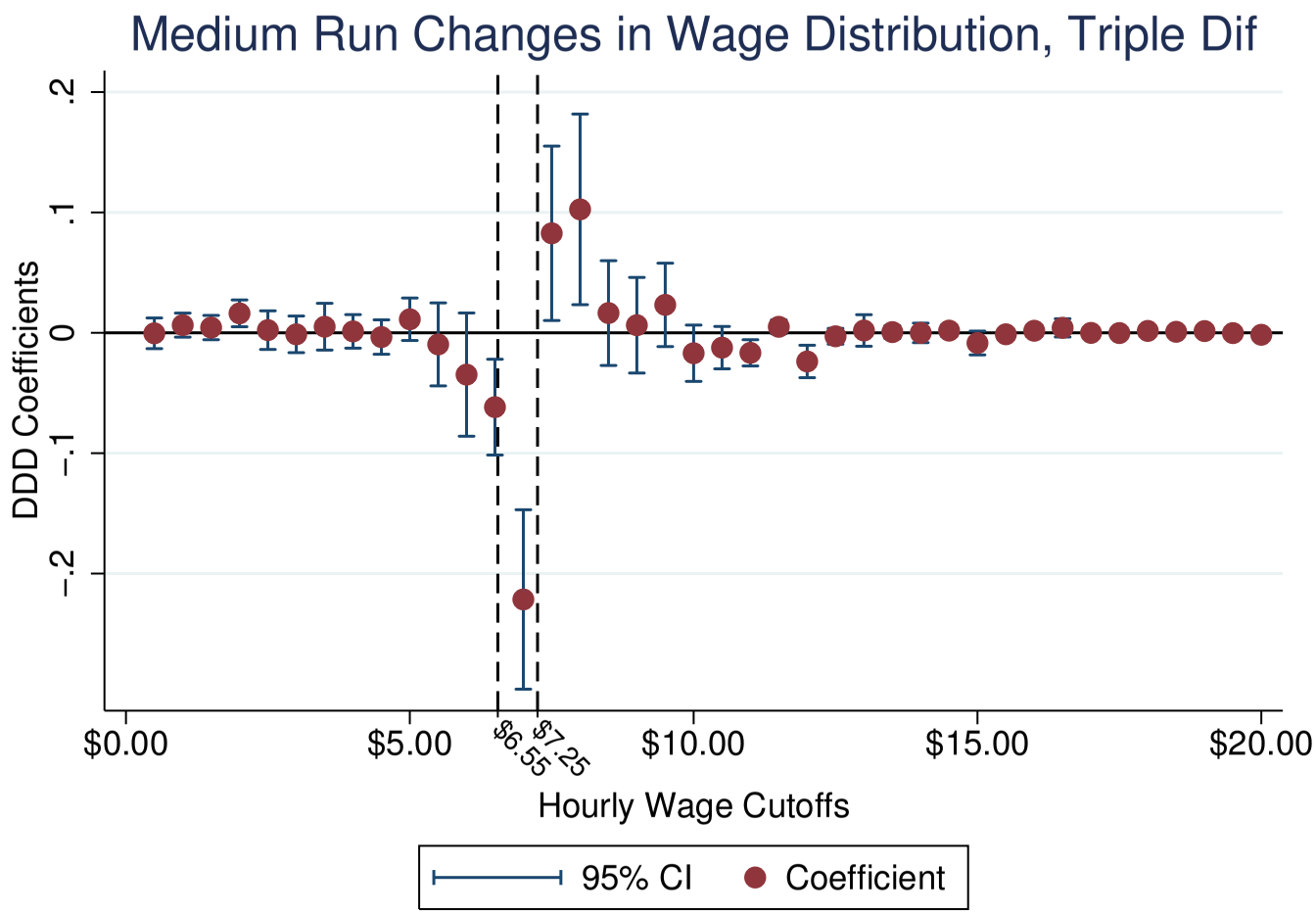


Figure A.4: **Estimated D-D-D Effects of the Minimum Wage on Hourly Wage Distributions:** The figure reports estimates of binding minimum wage increase's medium run effects on the wage distributions of the low-wage Medicaid beneficiary subsample across the four SIPP panels used in our analysis as indicated in each panel's title. Each dot is an estimate of the coefficient $\beta_{p(t)}$ from equation (6), where the relevant $p(t)$ corresponds with the period beginning one year after each panel's actual or simulated policy change representing the July 2009 increase in the federal minimum wage. The dependent variables in each specification take the form $Y^j_{i,s,t} = 1\{W^{j-1} < \text{Hourly Wage}_{i,s,t} < W^j\}$. These $Y_{i,s,t}$ are indicators equal to 1 if an individual's hourly wage is in the band between W^{j-1} and W^j, where each band is a 50 cent interval. The results can thus be described as estimates of the minimum wage's effect on the wage distribution's probability mass function. The left vertical dashed line represents the federal minimum wage of $6.55 from July 2008 to July 2009, and the right vertical dashed line represents the federal minimum wage of $7.25 from July 2009 onwards.

Table A.1: **Robustness of Effects on Any Costly Outcome**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable	Any Costly Outcome						
Panel A:	Difference-in-Differences Specifications						
Bound x Post 1	0.086*	0.093*	0.080*	0.088*	0.084*	0.086*	0.083*
	(0.040)	(0.040)	(0.040)	(0.039)	(0.039)	(0.040)	(0.040)
Bound x Post 2	0.150***	0.143***	0.143***	0.152***	0.150***	0.151***	0.147***
	(0.038)	(0.039)	(0.038)	(0.035)	(0.037)	(0.038)	(0.039)
Housing Price Index	-0.399	-0.540		-0.407	-0.092	-0.359	-0.265
	(0.703)	(0.666)		(0.693)	(0.706)	(0.734)	(0.673)
Med. Eligibility Limit					-0.049*		
					(0.020)		
State Employment Rate						-0.003	
						(0.015)	
State Inc. Per Cap. (1000s)							-0.000
							(0.000)
N	40,797	40,797	40,797	40,797	40,797	40,797	40,797
Mean of Dep. Var.	0.519	0.518	0.519	0.518	0.519	0.519	0.519
R-Squared	0.404	0.394	0.404	0.408	0.405	0.404	0.404
Panel B:	Triple Difference Specifications						
Bound x Post 1 x SIPP 08	0.083*	0.089*	0.055	0.084*	0.083*	0.085*	0.077+
	(0.041)	(0.040)	(0.042)	(0.041)	(0.041)	(0.041)	(0.039)
Bound x Post 2 x SIPP 08	0.151***	0.143***	0.117**	0.154***	0.152***	0.159***	0.147***
	(0.041)	(0.037)	(0.038)	(0.040)	(0.041)	(0.043)	(0.039)
Housing Price Index	-0.882*	-0.664+		-0.899*	-0.825+	-0.812+	-0.743+
	(0.438)	(0.387)		(0.443)	(0.447)	(0.415)	(0.406)
Med. Eligibility Limit					-0.038*		
					(0.015)		
State Employment Rate						-0.013	
						(0.009)	
State Inc. Per Cap. (1000s)							-0.000*
							(0.000)
N	153,940	153,940	153,940	153,940	153,940	153,940	153,940
Mean of Dep. Var.	0.505	0.511	0.505	0.511	0.505	0.505	0.505
R-Squared	0.427	0.408	0.427	0.428	0.428	0.427	0.427
Full Interactions	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Weighted	Yes	No	Yes	Yes	Yes	Yes	Yes
Demographic Trends	No	No	No	Yes	No	No	No

Note: +, *, **, and *** indicate statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels respectively. The table reports difference-in differences and triple-difference estimates of the minimum wage's short and medium run effects on the probability of experiencing any costly outcome, definied as either being unemployed, being without Medicaid coverage, or actively looking for work for at least one week out of the month. More specifically, the estimates in row 1 of Panel A are of the coefficient $\beta_{p(t)}$ from equation (4), where the relevant $p(t)$ corresponds with the period beginning in August 2009 and extending through July 2010. The estimates in row 2 are of the coefficient $\beta_{p(t)}$ from equation (4), where the relevant $p(t)$ corresponds with the period beginning one year after the July 2009 increase in the federal minimum wage. Panel B reports analogous estimates of $\beta_{p(t)}$ from equation (6), namely our triple-difference specification. In Panel A the sample consists exclusively of individuals from our subsample of low-wage Medicaid beneficiaries from the 2008 SIPP Panel. In Panel B the sample is augmented to include the similar subsample of low-wage Medicaid beneficiaries from the collection of the 1996, 2001, and 2004 SIPP Panels. The full description of the sample selection is outlined in Section 2.3. The columns explore our baseline results' (column 1) robustness to a variety of specification changes, which are further described in the main text and within the table itself. Standard errors are clustered at the state level.

Table A.2: **Robustness of Effects on the Sum of Costly Outcomes**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable	Sum of Costly Outcomes						
Panel A:	Difference-in-Differences Specifications						
Bound x Post 1	0.133+	0.146*	0.127*	0.136*	0.130+	0.132+	0.136*
	(0.066)	(0.062)	(0.062)	(0.066)	(0.065)	(0.066)	(0.067)
Bound x Post 2	0.297***	0.294***	0.290***	0.300***	0.297***	0.296***	0.302***
	(0.061)	(0.059)	(0.056)	(0.060)	(0.061)	(0.061)	(0.063)
Housing Price Index	-0.399	-0.832		-0.464	0.247	-0.516	-0.573
	(1.344)	(1.242)		(1.406)	(1.362)	(1.363)	(1.398)
Med. Eligibility Limit					-0.102**		
					(0.033)		
State Employment Rate						0.008	
						(0.024)	
State Inc. Per Cap. (1000s)							0.000
							(0.000)
N	40,797	40,797	40,797	40,797	40,797	40,797	40,797
Mean of Dep. Var.	-0.292	-0.297	-0.292	-0.297	-0.292	-0.292	-0.292
R-Squared	0.385	0.382	0.385	0.389	0.386	0.385	0.385
Panel B:	Triple Difference Specifications						
Bound x Post 1 x SIPP 08	0.099	0.113+	0.058	0.104	0.099	0.100	0.098
	(0.065)	(0.062)	(0.063)	(0.064)	(0.064)	(0.065)	(0.063)
Bound x Post 2 x SIPP 08	0.262***	0.253***	0.213***	0.272***	0.265***	0.268***	0.261***
	(0.063)	(0.060)	(0.057)	(0.062)	(0.063)	(0.065)	(0.061)
Housing Price Index	-1.286*	-0.977*		-1.327*	-1.188*	-1.239*	-1.262*
	(0.512)	(0.464)		(0.520)	(0.519)	(0.501)	(0.493)
Med. Eligibility Limit					-0.065*		
					(0.027)		
State Employment Rate						-0.009	
						(0.014)	
State Inc. Per Cap. (1000s)							-0.000
							(0.000)
N	153,940	153,940	153,940	153,940	153,940	153,940	153,940
Mean of Dep. Var.	-0.341	-0.334	-0.341	-0.334	-0.341	-0.341	-0.341
R-Squared	0.410	0.394	0.410	0.412	0.411	0.410	0.410
Full Interactions	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Weighted	Yes	No	Yes	Yes	Yes	Yes	Yes
Demographic Trends	No	No	No	Yes	No	No	No

Note: +, *, **, and *** indicate statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels respectively. The table reports difference-in differences and triple-difference estimates of the minimum wage's short and medium run effects on the sum of costly outcomes experienced by an individual, defined as in the previous table as being unemployed, being without Medicaid coverage, or actively looking for work for at least one week in the month. More specifically, the estimates in row 1 of Panel A are of the coefficient $\beta_{p(t)}$ from equation (4), where the relevant $p(t)$ corresponds with the period beginning in August 2009 and extending through July 2010. The estimates in row 2 are of the coefficient $\beta_{p(t)}$ from equation (4), where the relevant $p(t)$ corresponds with the period beginning one year after the July 2009 increase in the federal minimum wage. Panel B reports analogous estimates of $\beta_{p(t)}$ from equation (6), namely our triple-difference specification. In Panel A the sample consists exclusively of individuals from our subsample of low-wage Medicaid beneficiaries from the 2008 SIPP Panel. In Panel B the sample is augmented to include the similar subsample of low-wage Medicaid beneficiaries from the collection of the 1996, 2001, and 2004 SIPP Panels. The full description of the sample selection is outlined in Section 2.3. The columns explore our baseline results' (column 1) robustness to a variety of specification changes, which are further described in the main text and within the table itself. Standard errors are clustered at the state level.

Table A.3: SIPP Time Period Identification

SIPP	Pre-Policy Period		Post-Policy Period	
Panel	Baseline	Transition	Short Run	Medium Run
2008	Aug. 08 - Apr. 09	May 09 - Jul. 09	Aug. 09 - Jul. 2010	Aug. 10 - Jan. 13
2004	Aug. 04 - Apr. 05	May 05 - Jul. 05	Aug. 05 - Jul. 2006	Aug. 05 - Jun. 07
2001	Aug. 01 - Apr. 02	May 02 - Jul. 02	Aug. 02 - Jul. 2003	Aug. 03 - Oct. 03
1996	Aug. 96 - Apr. 97	May 97 - Jul. 97	Aug. 97 - Jul. 1998	Aug. 98 - Dec. 99
$p(t) =$	0	Transition	Post 1	Post 2

Note: This table outlines the specific months that comprise each period of the samples used in the analysis. Data from the 2008 SIPP Panel spans 4 years, 6 months from August 2008 through January 2013, data from the 2004 SIPP Panel lasts 2 years, 11 months from August 2004 through June 2007, data from the 2001 SIPP Panel covers 2 years, 3 months from August 2001 through October 2003, and ifnally the 1996 SIPP Panel spans 3 years, 5 months from August 1996 through December 1999.

Table A.4: **SIPP Reasons for Being Uninsured**

SIPP Question	"Which of these reasons describes why ... was not covered by health insurance?"
SIPP variables	ehirsno1 - ehirsn12
Category	Response
Too Expensive	Too expensive, can't afford
Work Restrictions	No health insurance offered by employer of self, spouse, or parent
Work Restrictions	Not working at a job long enough to qualify
Work Restrictions	Job layoff, job loss, or any reason related to unemployment
Work Restrictions	Not eligible because working part time or temporary job
Other	Can't obtain insurance because of poor health, illness, age, or a pre-existing condition
Other	Dissatisfied with previous insurance or don't believe in insurance
Other	Have been healthy, not much sickness in the family, haven't needed health insurance
Other	Able to go to VA or military hospital for medical care
Other	Covered by some other health plan, such as Medicaid
Other	No longer covered by parents policy
Other	Some other reason

Note: This table contains the specific question and responses in the Survey of Income and Program Participation used to analyze the reasons why an individual might not be covered by health insurance in the reference month. The differential effects of the minimum wage increase on these outcomes are found in Table 4.

Table A.5: **SIPP Reasons for Being Unemployed**

SIPP Question	"What is the main reason ... did not work at a job or business during the reference period?"
SIPP variable	ersnowrk
Category	Response
Demand	On layoff (temporary or indefinite)
No Match	Unable to find work
Personal	Temporarily unable to work because of an injury
Personal	Temporarily unable to work because of an illness
Personal	Unable to work because of chronic health condition or disability
Personal	Retired
Personal	Pregnancy/ childbirth
Personal	Taking care of children/ other persons
Personal	Going to school
Personal	Not interested in working at a job
Personal	Other

Note: This table contains the specific question and responses in the Survey of Income and Program Participation used to analyze the reasons why an individual may have been unemployed in the reference month. The differential effects of the minimum wage increase on these outcomes are found in Table 5.