EFFECTS OF FEDERAL POLICY TO INSURE YOUNG ADULTS:
EVIDENCE FROM THE 2010 AFFORDABLE CARE ACT DEPENDENT COVERAGE MANDATE

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ABSTRACT

We study the impact of the recent Affordable Care Act (ACA) provision that required private health insurers to allow older child dependents to stay on parental policies until age 26 using data from the Survey of Income Program Participation (SIPP) spanning August 2008 to November 2011. By comparing outcomes for targeted young adults aged 19-25 to those who are slightly older and slightly younger, before and after the law, we find the ACA substantially reduced uninsurance among young adults. Young adults were 30 percent more likely to be on their parents' employer policies on average after the staggered implementation commenced in September 2010, compared to before the enactment of the law. This increase in dependent coverage drew from both the uninsured and the otherwise insured. We also find evidence consistent with greater take-up among those with higher marginal benefits and lower marginal costs of obtaining dependent coverage, such as those whose parents already had family employer health insurance policies prior to the law. Dependent coverage increases are also greater for Whites relative to non-Whites, for single individuals relative to married individuals, and for non-students relative to students. We find no statistically significant difference in the impact of the provision on young adults who reside in states with and without some form of prior state dependent coverage mandate.

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Introduction

The earliest insurance expansion provision of the March 2010 Affordable Care Act (ACA) mandated that health plans and insurers that offer dependent coverage allow children to stay on their parent's health insurance plan until their 26th birthday (U. S. Public Health Services Act section 2714). This mandate was effective on the first plan anniversary date on or after September 23rd 2010. Although early estimates of the number of young adults insured by the provision through 2011 showed that substantially more young adults were insured after the law (Cohen and Martinez, 2012), net effects can mask different behavioral responses. The contribution of our paper is to present answers to an extended set of questions about the effects of the policy change using differences-in-differences (DD) and triple differences study designs. Specifically, we investigate the extent to which the law affected uninsurance, as well as take-up and coverage substitution behavior among young adults. We also examine how these results differ according to expected marginal benefits and costs of obtaining new coverage through parents by health status; and social and demographic characteristics.

The extension of dependent coverage was an important aspect of the reform package since young adults have historically high uninsurance rates (Levy, 2007). Full year uninsurance among young adults, defined in this paper as those aged 19-25 years, was 37 percent in 2008. The comparable statistic was 18 percent for those aged 12-18 years, and 25 percent for those aged 26-35 years.[2] Substantial federal and state public policy attention has been devoted to increasing children's health insurance access in the past through Medicaid and the Children's Health Insurance Program (CHIP), but eligibility for these public plans

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[2] Author calculations using the Current Population Survey of March 2009.

phases out by age 19 (Anderson et al, 2012; Levine et al,2011). Insurer mandates to cover older dependent children past age 18 have been popular among states prior to 2010, albeit in a weaker form relative to the ACA provision (Levine et al, 2011; Monheit et. al, 2011; Cantor et al, 2012).

The use of private insurer mandates has been a popular way for governments to increase provision of health insurance without much new public spending for several decades (Jensen and Morrissey, 1999). The relatively small increase in public spending comes from shifting compensation package from wages to health insurance, which is tax exempt. As noted by Summers (1989), mandates could be justified on paternalistic ground as employers and employees may otherwise opt for lower levels of coverage and later experience remorse. One the one hand, mandates could also solve possible adverse selection of workers to selective firms that offer coverage for services they value that drive up employer costs. Mandates, however, are not without welfare costs. To the extent that those who benefit from the greater insurance value conferred by a mandate are not the only ones who pay the additional costs, there would be inefficiencies created by a mandate (Lahey, 2012; Kolstad and Kowalski, 2012).

The many differences between recent public policy initiatives to cover younger children vs. those to cover older children over age 18 suggest that results from one policy may not be generalized to the other. For instance, younger child coverage expansions are financed primarily through public funds, while the primary channel for young adult dependent mandates is private coverage and entail much smaller tax subsidies. Another difference is the demographic groups targeted. Dependent coverage provisions impact those whose parents have private insurance, while Medicaid and CHIP policy affects lower income populations. This has implications for behavioral effects among those who might already be insured, as well as for those who are uninsured. Among young adults with parents

who are privately insured in 2010, only 17 percent are estimated to be uninsured, and 40 percent are covered by own-name private insurance (U.S. DOL, 2010).

Although broad insurance mandates to cover populations have been enacted and studied in the past at the state level, most recently in Massachusetts (Kolstad and Kowalski, 2010; Long and Stockley, 2009), and before that in Hawaii (Buchmueller et al, 2011), federal insurance mandates have thus far focused on mandating that private insurers offer coverage for specific services such as minimum maternity coverage (Gruber, 1994) and minimum postpartum hospital stays (Liu et al, 2004). These federal insurer mandates have typically occurred after similar laws had gained traction at the state level.

Even though most states had already expanded dependent coverage for young adults before the ACA (Monheit et al, 2011; Levine et al, 2011; Cantor et al, 2012) there are several reasons why studying the impact of the federal expansion of dependent coverage is important. First, state expansions had led to unclear effects on health insurance coverage for young adults, partly because the state laws had several restrictions based age, marital and student status, on tax deductibility for employers, and state residency. Internal Revenue Service (IRS) regulations prior to March 2010 stipulated that the exclusion of employer health insurance contributions from taxable income applied only to children under age 19, or under age 24 for full time students. Under the ACA, this section of the IRS code was amended effective March 2010 so that the tax exemption applies to children until they turn 27 years old regardless of whether they are tax dependents (IRS, 2010a, 2010b). Earlier state laws also did not apply to self-insured plans because the Employee Retirement Income and Security Act (ERISA) exempts them from these regulations. About 57 percent of private sector health insurance enrollees were enrolled in self-insured plans in 2010 (AHRQ, 2012). Moreover, it is not clear how well the state provisions were understood by potentially eligible

families, while the ACA provisions were widely publicized. Unlike the heavily qualified state laws, the federal insurer mandate applies to all children under the age of 26, and therefore presents a unique opportunity to study the effect of a targeted insurance expansion on coverage of affected individuals. Finally, the early insurance effects of the ACA are important to understand because of the high uncertainty surrounding the future implementation of the law.

Using data from the Survey of Income and Program Participation (SIPP) covering August 2008 to November 2011, we study the impact of the ACA provision on uninsurance and on insurance substitution patterns of young adults from the pre-enactment period (August 2008 to February 2010), to the post-enactment period (March 2010 to September 2010), as well as the staggered implementation period (October 2010 and onwards). We use the federal mandate as a quasi-experiment to estimate DD regressions that compares slightly younger and older adults (16-18 and 27-29 year olds), who are excluded from the mandate, to those in the age group targeted by the mandate (19-25 year olds). We also employ a triple difference identification strategy which uses information on parental employer-sponsored health insurance status to create a within-age comparison group.

We find that the 2010 ACA provision had an immediate impact on parental employer health insurance coverage of young adults even before implementation officially started in late September 2010. From March 2010-September 2010, parental employer coverage rose by 10.2 percent among young adults relative to their baseline rate prior to March 2010. Since the period of staggered implementation commenced, parental employer coverage among young adults rose by 30 percent (7.0 percentage point increase) on average from October 2010 to November 2011, relative to the base value prior to March 2010.

The increase in parental employer coverage drew from both the uninsured and the otherwise insured populations. The average impact of the law during the time period post-September 2010, relative to the pre-enactment period before March 2010, was a 3.2 percentage point increase in insurance; the 7.0 percentage point increase in dependent coverage is associated with a decreases of 3.1 and 0.8 percentage points in own-name employer sponsored insurance (ESI) and individually purchased non-group insurance respectively. These results translate into a 9.5 percent fall in uninsurance on average during the period after implementation began. We also find evidence consistent with greater increase in dependent plans among those with higher marginal benefits and lower marginal costs of obtaining new coverage, such as those whose parents had family employer health insurance policies prior to the law. Increases in dependent coverage are also greater for Whites relative to non-Whites, for single individuals relative to married individuals, and for non-students relative to students. We also find greater decreases in uninsurance among men than women, and among older young adults (23-25) than among those ages 19-22. We find no statistically significant difference in the impact of the provision on young adults who reside in states with and without some form of prior state dependent coverage mandate.

Background and Motivation

ACA Dependent Care Provision

Although the main insurance provisions of the ACA are not scheduled to go into effect until 2014, the dependent coverage expansion was implemented in 2010, starting with a March revision of the IRS rules that allow employer health insurance policies to cover children until their 27th birthday without losing the tax exclusion for employer provided health insurance. From September 23rd 2010, insurers who offer dependent coverage policies that included children were

required to allow older children to remain enrolled up to their 26th birthday, as of the next renewal date of the plan.[3] Prior to the ACA, plans typically followed IRS tax deductibility rules and allowed older dependents to remain on the policy until 19 years, or until age 24 in the case of full-time students; the Veterans Administration coverage defined dependent children similarly, and Medicaid and the Children's Health Insurance Program (CHIP) defined children as those under age 19. As mentioned above, recent state laws have changed availability of parental coverage to older children, with thirty states implementing some form of dependent coverage mandate prior to the ACA.[4]

While some insurers chose to comply with the ACA dependent coverage provision sooner than September 2010, insurers and employers could legally wait until the start of the next plan year on or after September 23rd 2010.[5] Although this plan renewal date could be as late as September 22nd 2011, few employer plans appear to have start dates aside from January or July, with the vast majority being in January (Cronin, 2012). Until 2014, grandfathered employer plans in existence as of March 23rd 2010 are allowed to refuse coverage to age-qualified dependent children whose own employer offered them health insurance, although it is unknown to what extent this provision has been enforced. Other than this stipulation, employer and individual market policies are required to include children regardless of marital status, student status, co-residence with parents, tax dependent status, or other limitations that were associated with earlier state

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[3] In our empirical work, we exclude those who are aged 26 years since they are not clearly part of either the control or the treatment group. In our main analysis, we do not separate out full-time students age 19-24 years as it is not clear whether employers universally covered them prior to the ACA or which of them are dependents for tax purposes.

[4] The most recent details on state laws for dependent coverage can be found in Cantor et al (2012).

[5] Health and Human Services Secretary Sebelius requested insurers to implement the provision sooner than September 23rd 2010 to avoid disenrolling and re-enrolling children who would graduate from college in May 2010; several major insurers agreed to this request (US DOL 2010).

attempts at expanding dependent coverage.[6] Employers were required to send written notification of a special open enrollment period during which newly eligible children could be added to policies. There was widespread publicity regarding the new law, including an active "Young Adult Coverage" Facebook page created by the White House Office of Public Engagement. More details regarding the dependent coverage policy can be found at U.S. DOL (2010).

Insurance rates of young adults aged 19-25 years have already been reported to be substantially higher after the law based on data from the National Health Interview Survey (NHIS) (Cohen and Martinez, 2012) and the Current Population Survey (CPS) (Sommers and Kronick, 2012). Sommers and Kronick (2012) find that relative to an older control group, the mean rate of insurance among those aged 19-25 years was 2.9 percentage points higher in 2010, relative to 2005-2009. NHIS data show that the insurance coverage rate of 19-25 year olds rose 6.5 percentage points, from 66.2 percent in the first quarter of 2010 (before the enactment of the ACA in March 2010) to 72.7 percent in the second quarter of 2011. The SIPP data show the insurance coverage of 19-25 year olds rose 4.6 percentage points, from 66.0 percent in the first quarter of 2010 to 70.6 percent in the 2nd quarter of 2011 (See Figure 1). While the CPS asks about insurance held at any point during the previous year, the SIPP and NHIS contain point in time insurance questions. Although it is reassuring that these three surveys provide mean insurance coverage rates that are fairly comparable in levels and changes, the net effects could mask varying rates of take-up and coverage substitution patterns among different populations.

Prior State Private Insurance Mandates

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[6] Tricare also voluntarily added the extension to age 26 for military insurance starting January 2011. http://www.navy.mil/search/display.asp?story_id=58052

Private insurance mandates regarding health insurance have often been used as a policy lever, mostly at the state level but occasionally also at the federal level. Currently, there are over 40 mandates on average in each state regarding what must be covered by private health insurance (Bunce, 2012).[7] Most mandates target services or providers that should be covered, rather than coverage of sub-populations. An example of a prior federal mandate that applies to a sub-population rather than to a provider or a service is the 1985 Consolidated Omnibus Budget Reconciliation Act (COBRA) that stipulated time-limited unsubsidized coverage of former workers and their dependents. State mandate activity specific to young adult dependent coverage, which started in 1995 with legislation in Utah, yielded provisions limited to firms that are not self-insured, and typically further limited to dependents that are below some specified age, unmarried, without access to coverage from other sources, or living in the same state or the same household as parents. State provisions are also limited in their visibility to young adults, and in enforcement, relative to the federal mandate (Cantor et al 2012), and the fact that IRS tax deductibility regulations do not change with state laws makes it difficult for employers to treat young adult coverage as equivalent to coverage for existing dependents. Employers who provide dependent coverage to those not deemed dependents for tax purposes by the IRS would have to ensure that the portion of the premium contributions for those dependents was reported as taxable income.

Two papers have evaluated the effects of dependent coverage state laws, reaching somewhat different conclusions regarding their effect on uninsurance rates among eligible young adults. Levine et al (2011) use the CPS Annual Demographic Survey (ADS) for 2000-2009 and differences-in-differences

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[7] Note that these mandates are different from the ACA "individual mandate" at the center of the Supreme Court hearings of 2012, which fines certain individuals if they remain uninsured after 2014.

estimation strategy comparing the effect of state laws on those who are eligible based on demographic characteristics of age, student and marital status requirements in their state. While Levine et al (2011) find that state laws have an impact on uninsurance rates, Monheit et al (2011) find no impact when they use CPS data for 2000-2008, a DD strategy with a variety of additional controls and a slightly different categorization of state laws. These mixed results on the effect of state health insurance expansion for young adults make the evaluation of the federal dependent coverage law all the more pressing.

Hypotheses

We first examine how much the ACA reduced uninsurance among young adults after the enactment and implementation of the provision. Because several health insurers announced intentions to act before the actual implementation date, we expect that the law would have had an impact prior to September 2010. However, as with anticipatory behavior by seniors in response to the Medicare Part D implementation (Alpert, 2012), it is also possible that young adults would reduce their insurance coverage in the period between enactment and implementation due to their anticipation of imminent eligibility for new health insurance coverage.

We next test whether we observe insurance effects consistent with predictions from a very simple conceptual framework of health insurance. We hypothesize that effects will be concentrated among families with lower marginal costs of adding dependents on parental employer health insurance policies, and among those with higher marginal benefit—e.g. those in worse health. In our simple conceptual framework, young adults derive utility from insurance coverage, $I,$ and from consuming a composite good, Y. They maximize $U(I,Y)$

constrained by the available set of insurance choices, including access to dependent health insurance through parents, and their health status.

Through the ACA policy change, some young adults whose parents have an employer policy could be added as a dependent for low marginal cost. Changing from uninsured to insured status increases the utility of the formerly uninsured young adults, particularly those in worse health. Utility also increases for those who switch away from their current insurance source towards coverage under their parents' policy if the current source is inferior in cost and quality or if parental coverage would allow them to consider future job changes free of worries of losing employer insurance. Even if there is an increased cost to parents of adding young adults in terms of higher premiums or long run lower wages, these costs may not always come out of the dependent's pocket. It is unclear whether there are advantages to dropping public health insurance as cost sharing is typically very low, and there are few avenues to public coverage for the population targeted by this provision. However, if the quality of public insurance is perceived as sufficiently inferior, there could also be substitution away from public insurance. In their study of the impact of state dependent coverage laws on young adults, Levine et al (2011) find suggestive evidence of this "reverse crowdout" phenomenon whereby expansion of private coverage substitutes for public coverage.

We expect that availability of parental insurance affects insurance choices primarily for those whose parents have access to insurance. We assume that if the young adult's parents do not currently work for an employer who offers health insurance or who does not offer dependent coverage, it is likely to be prohibitively expensive for most parents to move jobs in search of new coverage for older dependents. However, if the parent already has a full family policy that covers younger children, the marginal cost of adding an older child is close to

zero. In fact, by law insurers are not allowed to charge more for the newly eligible dependents due to their age than they already do for other dependent children.

In summary, we hypothesize that the ACA could lead to a reduction in uninsurance among young adults starting prior to the implementation of the law. We expect that dependent coverage through parental policies could increase partly as a result of young adults switching away from other sources of coverage for which they pay more than they would for the new coverage option. Coverage increases should be largest among those with lower marginal costs of adding extra dependents to existing employer policies and among those in worse health status with higher marginal benefit from coverage.

Data

We investigate the impact of the ACA dependent coverage mandate using data from the SIPP 2008 panel. The SIPP is a household based nationally representative longitudinal survey of the civilian non-institutionalized population, conducted by the U.S. Census Bureau. The SIPP 2008 panel interviewed approximately 50,000 households every four months for four years, starting in September 2008. Data are released roughly nine months after collection, making it a valuable tool for the early evaluation of recent public policies. We use data from August 2008 to November 2011, which includes the latest wave of SIPP data that have been released. The 2008 panel is well timed for the evaluation of the dependent coverage provision since it contains data prior to the March 2010 ACA enactment, from March 2010 to the September 2010 start of implementation, and an additional year of data after September 2010.

SIPP data offer several advantages for our purpose. First, it contains point-in-time insurance questions rather than one response that refers to insurance

held at any point in the year. This allows us to investigate differential responses to the law after the enactment and implementation dates. The SIPP also allows us to distinguish ESI in own name separately from ESI dependent coverage.

Second, the SIPP follows individuals longitudinally. This allows us to gather more information than would be contained in cross sectional surveys.[8] When young adults move out of their parents' household, the survey continues to follow both the young adult and their parents. We determined that for 67.0 percent of all 19-25 year olds, we have contemporaneous parental health insurance characteristics even in the post-reform period.[9] This allows us to estimate the impact of the provision on those who are treated (young adults aged 19-25 years whose parents have ESI), in addition to estimating the impact of the policy on the insurance rate of all US young adults aged 19-25 years.

Our base sample consists of monthly observations for those aged 16-29 years, except for 26 year olds who are not clearly in either the treatment or the control group. To reduce recall bias, we only use data collected on the most recent reference month of the wave.[10] We create binary dependent variables to indicate having any insurance, dependent employer coverage from parents, own-employer coverage, own-name non-group individual coverage, and public coverage.[11] As with all longitudinal surveys, there is a concern about attrition and nonresponse during follow up rounds. The SIPP program goes to considerable effort to

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[8] The 2008 SIPP follows all original sample members who moved, as long as they did not move into military barracks or become institutionalized.

[9] Appendix Table A3 shows how this percent varies by the age of the young adults. Of the 67.0 percent mentioned, most but not all (91.3 percent) are currently sharing the same main address with their parents.

[10] As an alternative, we have conducted sensitivity tests using all months of data with a dummy variable for responses from the most recent reference month.

[11] Even though the law applied to non-group coverage that parents bought, we did not create a separate column for this form of coverage as it is relatively rare and contains very few young adult dependents on parental non-group policies.

maximize follow up, and sampling weights are produced to reduce the influence of attrition on estimates, but concerns regarding nonresponse bias may still persist. We use survey weights in all results presented.

Method

Estimating the effect of the policy requires a strategy that can isolate the impact of the ACA on insurance coverage of young adults from contemporaneous changes in health insurance coverage. During our sample period, there are strong time trends in coverage due to the ongoing decline in employer coverage as well as macro level recessionary and recovery cycles. Since the policy's effects are delineated by age, our main identification strategy is to use a control group of younger (16-18 years) and older individuals (27-29 years), relative to our treatment group of 19-25 year olds. Our identification strategy rests on the assumption that the control group will account for other time varying factors that would have led the treatment group to have different insurance rates after reform, but not due to the reform itself. We choose a composite control group of younger and older individuals for our main approach, but we also estimate results using just one or the other. The older control group may be more similar to young adults when it comes to making their own insurance and employment choices. However, the younger control group may reflect the changing circumstances of employer dependent coverage, which has been reducing in generosity over time (Vistnes et al, 2012).

While the post-reform suitability of the control group is an untestable assumption, we can test the extent to which treatment and control group insurance rate trends were similar in the pre-reform period in several ways. In Figure 1, we plot unconditional insurance coverage rates for control and treatment groups to

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visually examine the period before and after the ACA enactment. This figure shows that while there is generally a similar pattern prior to the ACA passage, the two lines diverge sharply after the law. Relative to the control group, the treatment group insurance rates start to increase from the time of enactment, although the larger increases happen after the third quarter of 2010. The insurance rate of the control group on the other hand does not experience dramatic changes, but increases in the fourth quarter of 2011, which could reflect the impact of national labor market improvements.

In Figure 2, we plot coverage under dependent policies by age group and time. This shows that the age profile of dependent insurance changed markedly for those in the age 19-25 range, as we move from enactment to implementation and beyond. However, a simple visual inspection of the data is unlikely to reveal the causal effect of the ACA; for example, the dip in insurance rates that happens mid-year for the treatment group in Figure 1 may be due to college graduation and loss of insurance, which does not affect the control group. Our descriptive analysis suggests our treatment and control groups followed a similar trend before the enactment of the law, making the DD strategy we employ theoretically valid. In addition, Figure 2 provides a strong visual confirmation that the law had a direct and large impact on the parental employer health insurance coverage rate of our treatment group. To estimate the effects more precisely, we estimate the DD regression model below under the assumption that the control and treatment groups would have similar trends absent the policy intervention:

$$[1] \; Y_{igst} = \alpha + \gamma \, Treat_g + \delta \, Implement_t + \vartheta \, Enact_t$$
$$+ \eta\big(Treat_g * Implement_t\big) + \sigma(Treat_g$$
$$* Enact_t) + X_{igst}\beta + \tau_t + \zeta_s + \varepsilon_{igst}$$

where Y_{igst} represents insurance coverage for individual i in age range g, state s and time t, X_{igst} represents other individual level factors that affect insurance, $Implement_t$ represents a dummy for the period after staggered reform enactment commenced in September 2010 through the latest period of data available, November 2011, and $Treat_g$ represents a dummy for being in the 19-25 age range (relative to those ages 16-18 and 27-29). The interaction of $Implement_t$ and $Treat_g$ captures the average impact since staggered reform implementation started, by comparing insurance coverage during this period relative to insurance coverage in the months before enactment, among the treatment group relative to the control group. To examine the changes in insurance coverage that happened after enactment but before implementation, we add a dummy variable, $Enact_t$, and its interaction with the treatment dummy variable to capture anticipatory behavior by young adults and insurers between March 2010 and September 2010. The X_{igst} vector includes an indicator for age, gender, race/ethnicity, marital status, student status, household income as a share of federal poverty line, and its squared term. This vector also includes a monthly linear time trend, the monthly state unemployment rate, and an interaction of the treatment dummy variable and the state unemployment rate.[12] We control for national year and calendar month effects that shape the insurance rate over time by including dummy variables for year and calendar month in τ_t. We include state fixed effects, ζ_s, to account for differences by state in dependent coverage laws prior to the ACA, and we cluster standard errors at the level of the state.[13] Following the earlier literature in dependent coverage laws (e.g. Levine et al, 2011) we use linear probability models due to the ease of interpretation and computation of marginal effects of

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[12] We have also estimated models that used a one year lag of the unemployment rate, in case the unemployment rate in the state may be affected by the ACA provision, but find the results to be unaffected.
[13] We also implemented clustering at a more aggregate level (by year-quarter following examples in Cameron et al (2008)) and found that our results are robust to this change; we report these results in the Appendix.

interacted variables while clustering standard errors. As an alternative, we also estimated our main models using a logistic regression specification with standard errors calculated as suggested by Ai and Norton (2003).[14] We estimate model [1] for all targeted young adults and their control group. We also estimate the model separately for those with different self-reported health status and other demographic characteristics to explore the heterogeneous impact of the law.

Even if it appears that past trends in insurance do not differ between control and treatment groups, a DD method does not guarantee that trends in the control group will capture all other unobserved factors that could affect the treatment group's insurance status, absent the policy change. For example, job opportunities might have worsened for young adults relative to others. We lessen this concern somewhat by choosing a control group consisting of both older and younger age groups relative to the treatment group and allowing the state monthly unemployment rate to be correlated with the treatment group dummy. Fortunately, the structure of the SIPP allows us to also use a triple difference strategy. Among young adults, those whose parents do not have employer health insurance are unaffected by the law directly, but are arguably likely to experience the same health insurance trends that their age cohort faces outside of health reform. Assuming that parents do not respond by adding employer health insurance at the margin because their older children are offered coverage by the law, those young adults whose parents do not have access to employer health insurance form a plausible control group for our DDD specification. We estimate this triple difference specification after testing whether the mandate induced parents with children who are aged 19-25 to seek new private insurance.

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[14] We do not find that our main results change substantially in a qualitative manner although the magnitudes are smaller; we report these results in the Appendix.

We considered two alternative estimation strategies which we concluded were inappropriate for this situation. For one, we investigated the possibility of using a regression discontinuity approach. Unfortunately, we found the discontinuity in insurance rates at the top end of the age distribution of 26 years or at age 19 did not change substantially enough to enable an RD design. This is illustrated further in Figure 2. Another potentially attractive approach is to use states with prior dependent coverage mandates as a control group for the impact of the federal law. However, this approach presents several challenges since state laws were substantially weaker and it is not possible to tell which young adults in a state will be treated by the federal law but were not treated by prior state law. For example, even if a prior state mandate covered young adults between the ages of 19-22 years who were unmarried, more than half of these cases would be self-insured plans exempt from the law. We would not know in the SIPP which employers were self-insured or whether the employer was able to account for the IRS tax deductibility rule. As we will discuss more extensively later, we find that the effect of the federal law was actually not statistically different in states that had enacted some type of prior young adult mandate relative to other states.

Results

Table 1 shows descriptive statistics for our sample of 16-29 year olds. We first show the statistics for the full sample, and then break them down by treatment group (19-25 year olds) vs. the two age groups included in the control category (16-18 year olds and 27-29 year olds). On average during our time period, there are similarities as well as large differences between the groups in level terms. As noted earlier, uninsurance rates tend to be highest among those in the treatment group age range. From Table 1, we see that 67.8 percent of 19 to 25

year olds have insurance of any kind compared to 87.0 percent and 69.3 percent for 16 to 18 year olds and 27 to 29 year olds respectively. Race and ethnicity is similar across the groups.

Our main DD results from Equation [1] presented in Table 2 show the effect of the implementation period of the law as well as the anticipatory response of young adults and insurers before implementation began. Since the two different policy dummy variables featured in this table are mutually exclusive, each result tells us the average effect on insurance rates during that phase of the policy, relative to before the March 2010 enactment date. Below the regressions results in Table 2, we show the mean insurance rates by control and treatment groups, before enactment in March 2010 and after implementation in September 2010.

Table 2 shows that in anticipation of the implementation of the law, dependent health insurance coverage for young adults increased relative to the control group by 2.4 percentage points (10.2 percent relative to base); this increase is offset by a 1.7 percentage point decrease in employer sponsored insurance coverage in own name. There is a marginally significant 1.1 percentage point decrease in government provided health insurance as well. During this initial period, we also find no statistically significant change in individually purchased coverage or in uninsurance rates. These reactions are likely to reflect anticipatory responses to reform by which increases in dependent coverage did not yet translate into increases in any coverage. The implementation of the ACA provision led to a 3.2 percentage point reduction in uninsurance for 19-25 year olds, relative to the control group, after conditioning on all other variables in the model. This represents a 9.5 percent reduction in the rate of uninsurance for young adults, as their uninsurance rate was 33.5 percent (100-66.5) prior to ACA enactment. We also find a 7.0 percentage point increase in dependent coverage, a 0.8 percentage point reduction in individually purchased coverage, and a 3.1

percentage point decrease in own name coverage. The coefficient on dependent coverage corresponds to 30 percent increase, as the base rate is 23.4 percent. This is a very substantial expansion of the insurance for young adults, especially as this represents an average over those with and without parents with access to employer health insurance, and over a time period of staggered implementation. There is no detectable change in public coverage during the same time period. This is perhaps not surprising, due to limited avenues for public coverage for young adults.

In unreported tables, we also estimated Table 2 separately by several demographic characteristics to explore heterogeneity of effects. In particular, we estimated our main results by age (19-22 vs. 23-25), gender, race/ethnicity, marital status (married vs. non-married) and student status (full-time students vs. others). We find evidence that the increase in parental employer dependent coverage was statistically significantly higher for Whites, non-married individuals, and among non-students, than their complements. A larger increase in dependent coverage for Whites is consistent with patterns of higher availability of (parental) employer health insurance among Whites (KFF, 2009). Married young adults are more likely to be financially independent of parents than single young adults, which possibly explains the lower increase in dependent coverage observed for them. Since full-time students had greater access to parental employer health insurance due to prior laws, the difference in take-up we estimate between the two groups is unsurprising. We find no statistically significant differences in parental employer dependent coverage by gender and age. However, men experienced statistically significantly greater reductions in uninsurance than women; the coefficient for men (0.04) was about twice as large as that for women (0.02). This is a meaningful result given the high rates of uninsurance among young men. Correspondingly, young adults aged 23-25 were

not statistically significantly different in their change in dependent coverage relative to those who were 19-22 years of age, but experienced greater reductions in uninsurance than their counterparts.[15]

We also tested whether married young adults are likely to drop their spousal coverage as a result of the law. It is plausible that young adults might find it advantageous to switch from family coverage to single coverage if one spouse is able to obtain insurance as a dependent on his or her parents' policy. In unreported tables, we find no evidence to suggest that spousal health insurance decreased, even when we restricted the sample to only married individuals.

The specification in Table 2 estimates the average effect of the law during the two time periods of March 2010-September 2010 and October 2010-November 2011. In the Appendix Table A1, we estimate a model that splits the post September 2010 time period into three: October 2010-February 2011; March 2011-September 2011; and October 2011-November 2011. The first period captures the bulk of plan anniversary dates, since it encompasses January 2011. The second comprises the remainder of the implementation period, and the third represents a period after all plans were expected to comply. We find that, as expected, there are successively higher average take-up rates in the later time periods, relative to pre-enactment. The full-implementation effect on parental employer coverage is now 44.0 percent, corresponding to a 10.3 percentage point increase. The estimated results on uninsurance are, however, sensitive to the time periods chosen for comparison.

Although the ACA is unprecedented in its expansion of dependent coverage, most states had passed laws of varying strength prior to the time that

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[15] DD tests by age also restricted the control groups correspondingly. Treatment group individuals aged 19-22 used control group individuals aged 16-18 while treatment group individuals aged 23-25 used control group individuals aged 27-29.

the federal law's provision went into effect. In exercises not reported in tables, we tested whether the results we observe in Table 2 are robust to inclusion of state time trends; to removing states that passed any state dependent coverage laws during our data period, August 2008 to November 2011; and to removing Massachusetts from the sample due to prior comprehensive state health reform.[16] We also tested separate models for states that had passed some form of law prior to the ACA date of March 2010 in Appendix Table A2. The results were generally unchanged when we included state linear time trends and when we removed specific states. We found in Table A2 that although the coefficient representing the effect of the ACA was slightly larger in states which had not passed reforms relative to states that had passed reforms, they are not statistically significantly different from each other. As noted earlier, state level provisions are far weaker than the federal dependent care provision, thus it may not be surprising that these differences are not more pronounced. In fact, it could well be that the unobserved factors that lead some states and not others to adopt state laws might lead to a smaller reaction to the broader-reaching federal law in states that chose not to pursue any prior action.

In Table 3, we present results that test how much the law affected populations who may have greater demand for parental coverage due to their health status. The SIPP does not contain measures for presence of chronic conditions, thus we separate the sample by the self-reported 1-5 health status variable. The best health recorded is "Excellent," followed by "Very Good," "Good," "Fair," and "Poor." Roughly 60 percent of young adults reported that their health status was less than "Excellent," so we used this as our indicator for

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[16] In classifying states by prior laws, we follow details collected by the National Conference of State Legislatures at http://www.ncsl.org/issues-research/health/mandated-health-insurance-benefits-and-state-laws.aspx, reading the state statutes to resolve any conflicts in state classifications in prior literature. Our final state classification matches Cantor et al (2012).

higher health care demand. When we tested the sensitivity of this classification using other cutoffs for health status (such as Excellent and Very Good vs. the rest), we found qualitatively similar results. The top section of Table 3 shows that among those in excellent health, there appears to be a larger coefficient on the dependent coverage measure, but the percentage effects appear smaller since the base coverage rate is smaller among those in worse health relative to those in excellent health. Formal statistical tests of the two coefficients across the specifications for dependent coverage and for own-employer coverage indicate they are not significantly different from each other.[17] Testing for differential insurance behavior according to finer measures of health status, as well as the health and health care consequences of the ACA provision, are topics for further exploration. However, this present exercise suggests that demand for health insurance may have played a role in explaining the heterogeneity of responses to the new law.

An advantage of the SIPP over other data sets is the greater availability of information regarding parents' health insurance characteristics, even when children do not reside with the parents. Table A3 shows the fraction of young adults for whom we are able to identify whether their parents have current employer provided health insurance. For 67.0 percent of the treatment age group, we have information on whether parental health insurance is available even for the post-implementation time period. There is also a substantial fraction of the control group for whom this information is available. Using data on the subset of individuals for for whom parental information is available, we implement a DDD estimation strategy and present results in Table 4. We define the affected group as those whose parents have employer health insurance (and are in the relevant age

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[17] We compare effects by testing the equality of coefficients using Seemingly Unrelated Regression methods.

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range) and use young adults whose parents do not have employer health insurance as a further control group. We expect that this group will capture effects arising from other time trends that may affect young adults differentially relative to younger or older cohorts over time. Since parental information is not known for all young adults, we consider the specification in Table 2 our main approach.

Before proceeding to the DDD, we first estimate the Table 2 DD specification for the sample with parental data in Table A4. Compared to Table 2, results in Table A4 show slightly greater increase in any source coverage, and smaller reduction in employer sponsored coverage in own name. The result for increased dependent coverage is slightly smaller and the base rates of coverage differ, reflecting the fact that those with parental information available tend to be younger. That is, even though the SIPP tracks individuals who leave their parents household, more of the older cohorts did not reside with their parents in August 2008 when the sampling began.

The DDD results in Table 4 show a higher increase in dependent coverage through parents (9.7 percentage points), a marginally statistically significant reduction in own-name individual coverage, and a 6.9 percentage point increase in coverage from any source. As a percent, the increase in dependent coverage is smaller in Table 4 (18.5 percent) relative to Table 2 (30.0 percent) because of the higher base coverage rate in Table 4. The coefficient on own-name ESI is not statistically significant.

One possible confounding factor in our DDD analysis is that parents may themselves seek employer health insurance after they are able to retain older dependents on their policies, as this makes coverage more valuable to them. If this is the case, then our DDD control and treatment groups would change in composition along with the policy and contaminate the study design. In Table 5,

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we estimate models to test whether there is evidence of greater own access to employer health insurance after the ACA provision, among parents of young adults aged 19-25. We use the corresponding control group and explanatory variables as our main DD model in Table 2. Our results indicate no evidence of such an effect.

A different way to use the information available on parents is to estimate an alternative DD estimate that is limited to observations for young adults aged 19-25 years of age using parental availability of employer sponsored insurance as the second difference instead of those slightly younger and older. The DDD approach is superior to this DD if there are differential time trends in insurance for those whose parents have health insurance relative to those who do not have access to parental health insurance; the DDD on the other hand, uses those younger and older than 19-25 but with parents who have access to ESI to control for those trends. We find (in unreported tables) that the results of this DD method are statistically significant and the coefficients are qualitatively larger than the results of our main specification; there is a 4.2 percentage point increase in any source health insurance as a result of the ACA implementation, and a 8.9 percentage point increase in employer dependent coverage through a parent, a 4.0 percentage point decrease in employer own coverage, and a 0.8 percentage point decrease in individually purchased own coverage.

Even within the group of young adults with access to parental health insurance, there are differences in marginal costs of adding a young adult to an insurance plan, based on the type of coverage held by parents. If a parent holds a single policy that covers only him or herself, the cost of adding a young adult dependent may be high as that involves moving from a single to a family health insurance policy. On the other hand, a parent who already holds a policy that covers other children will face zero marginal cost in employee premiums to add a

young adult, especially as the ACA specifically forbids insurers from pricing young adults differently than already covered dependents. We investigate this in Appendix Table A5 by calculating the fraction of young adults who take up parental coverage by the type of coverage held by their parents prior to the ACA. Of those 19-25 year olds whose parents had family employer health insurance in the four months prior to the ACA but did not already obtain dependent coverage during that time period, 29.1 percent signed up for parental coverage after the ACA, compared with 20.9 percent for those with non-family coverage (single, or single plus one dependent) prior to the ACA. We also estimated this in the form of a regression and found that adding covariates did not change the results much (Table A6). The regression results indicate that young adults are 9.5 percentage points more likely to obtain dependent coverage through parents if their parents had family coverage before ACA than if their parents had non-family coverage. This is interesting both because it shows the greater take-up among those with the lower costs of adding dependent coverage, and also because there is substantial take-up among those who did not start out with family coverage.

Robustness Checks and Alternative Specifications

We estimated several additional models to check the robustness of our results. We estimated models in which we assumed falsely that the reform took place in different months prior to March 2010. That is, for each of the 17 months between August 2008 and February 2010, we re-estimated Table 2 assuming a placebo date of the ACA law, and created a distribution of the results from the replications. We present the mean and standard deviation of the estimates obtained in Table 6, relative to the values obtained in Table 2. We see that the placebo tests produce results which are close to zero and are relatively far away from the estimated effects in Table 2. Only two out of a possible 85 estimates were statistically significantly different from zero at even the 5 percent level. This

indicates that the results we obtain in Table 2 do not occur by chance because treatment and control groups might have been trending differently even prior to the law.

Second, we investigated whether the results in our main Table 2 are robust to clustering standard errors at a more aggregated level (year-quarter level) than the state, following the example in Cameron et al (2008). In this specification, the left hand variable is the ratio of those with each insurance type calculated at year-quarter level for treatment and control groups. This reduces the number of observations to 28, and we cluster at year-quarter level for 14 clusters. Using dummy variables for the March to September 2010 period and another for the post September 2010 implementation of the law, a treatment group dummy and an interaction of these as right hand side variables as in Cameron et al (2008), we show in Table A7 that adjusting the level of clustering and using wild cluster bootstrap-t procedure do not affect the statistical significance of the results in a meaningful way.

Third, we investigated the impact of estimating marginal effects using a logistic regression, although for ease of interpretation, convergence, and to follow prior literature we use linear probability models for our main results. We first estimate a linear probability model corresponding to the logit model which requires us to use no sample weights and to drop one explanatory variable that was causing convergence problems. Table A8 shows that the results from the two models are qualitatively similar.

Fourth, we explored whether results are sensitive to which control group and treatment group ages we use. Because of added avenues for public health insurance through the Children's Health Insurance Program Reauthorization Act of 2009 (CHIPRA) which led some states to expand coverage, older teens may

not be an ideal control group for young adults. But older young adults aged 27-29 are also not ideal since the effect of the recession may have been less damaging for them than for the treatment group, and because they are not able to serve as a control for trends in dependent coverage that might result from rising health care premiums.

To examine the implications of using different ages of control groups, we performed several additional tests against the base specification in Table 2. In unreported tables, we find that the outcomes are fairly unchanged when using different control group ages, except that using only the younger control group (ages 16-18) leads to a slightly larger increase in dependent coverage.

Finally, we estimated a model that used only one variable for the policy change: if we did not recognize the importance of the period between enactment and implementation and included the entire period prior to September 2010 in the "pre" policy period, we find that the effects on dependent coverage and own coverage are smaller when using only one "post" variable. These unreported results illustrate the importance of recognizing the anticipatory effects of this policy change.

Discussion and Conclusions

In this paper, we present differences-in-differences and triple difference models using data from the SIPP 2008 Panel spanning August 2008 to November 2011 to investigate the impact of the 2010 ACA provision that allows older dependents to remain on their parents' health insurance policies. Our main estimates from a DD model that compares the coverage rates of those aged 19-25 years with those who are slightly older (27-29 years) and slightly younger (16-18

years), during different time intervals. Since insurers responded proactively to the law even before its actual implementation, we estimate both the immediate effect between enactment and implementation, and the subsequent effect after implementation officially began.

We estimate from March 2010 to September 2010, parental employer coverage was higher by 10.2 percent among young adults, indicating a substantial anticipatory effect by insurers and families. From September 2010 to November 2011, parental employer coverage for young adults rose by 30 percent relative to the base value prior to March 2010. The insurance coverage rate of young adults was on average 3.2 percentage points higher during the same period. In spite of the availability of new dependent coverage for young adults, uninsurance does not decrease by as much as the increase in dependent coverage because of decreases in both individually purchased coverage and employer own-name coverage.

Using a subset of our population, we also implement a triple difference model comparing those young adults aged 19-25 with parents who have ESI policies, relative to young adults whose parents do not have ESI, and relative to control group individuals who are slightly younger and older. This DDD estimation shows a larger percentage point change in sources of coverage, as expected; we find no evidence that parents' own coverage was affected by the ACA law. We also show that among those with parental health insurance, there is greater take-up where the marginal cost of adding a dependent (to a family policy) is lower. We find additional evidence consistent with larger increases of dependent coverage among those who are Whites, single, and non-students, but no statistically significant difference in the impact of the provision on young adults who reside in states with and without some form of prior state dependent coverage mandate. We perform a number of robustness checks of our results and find that they are fairly stable to alternative specifications and samples, although exact magnitudes vary.

This paper provides one of the first comprehensive analyses of an important early provision of the ACA. Reports have already established, based on data from the early release program of the National Health Interview Survey (Cohen and Martinez, 2012) that a large number of young adults gained coverage between September 2010 and June 2011. Our analysis using difference-in-difference regressions, a different data set and a slightly different time period confirms the finding of substantial increases in the coverage of young adults as a result of the ACA provision, but also points to a number of new findings on other outcomes.

Many other insurance related changes are scheduled to be implemented in coming years depending on the outcome of the Supreme Court decision. Assuming the ACA continues on schedule, other provisions could also affect the insurance decisions of young adults. On the one hand, the availability of Medicaid for adults under 138 percent of the federal poverty level (FPL) and subsidized exchange coverage for other low income families could reduce reliance on dependent coverage through parents' employers. On the other hand, take-up could increase in the long run if the individual mandate is enforced. It is unclear if there will be more take-up of this provision after 2014 when insurers are required to provide coverage to age-eligible dependents even if they have access to own employer health insurance. Currently, grandfathered plans are not required to extend coverage to dependents who themselves have an offer of employer coverage.

Regardless of the precise number of newly covered young adults, the changes are substantial enough that several more outcomes should be examined in future work, such as use of health care, health, labor market outcomes, and social outcomes, such as intergenerational relationships. A full welfare analysis of this provision would consider how the costs of new coverage were distributed within a

firm and the value of reduced job lock for young adults. Despite the obvious importance of the Supreme Court decision due late June 2012 for shaping research on health reform, future work should also extend the study of the young adult provision and other provisions that have already been implemented.

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Figure1. Percentage of Young People with Any Insurance Coverage by Treatment and Control Groups
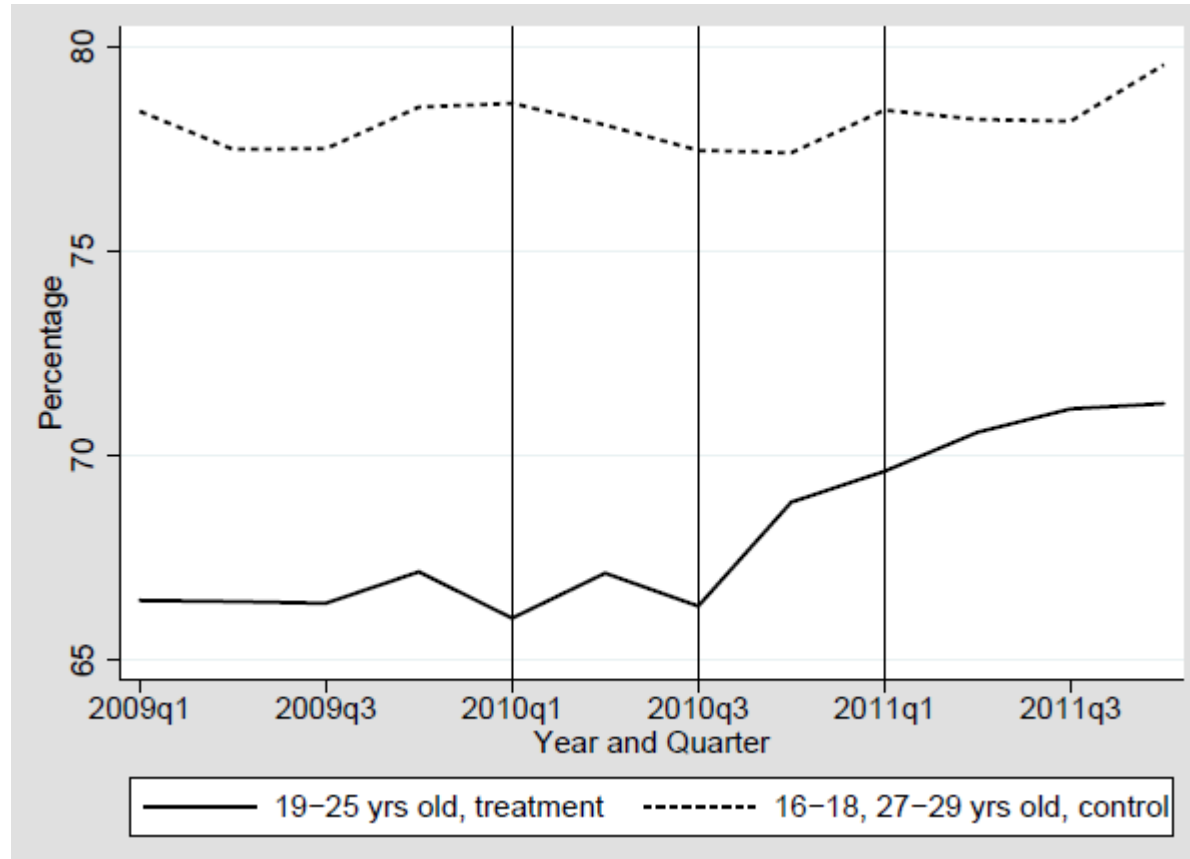
Note: Sample weighted estimates from 2008 SIPP panel, using data from August 2008 to November 2011. The first vertical line indicates the first quarter of 2010 when the ACA was passed, the second vertical line indicates the third quarter of 2010 when the dependent coverage mandate was implemented, and the third vertical line indicates the first quarter of 2011 when most new insurance plan years start after the implementation of the mandate. The estimate for a quarter averages insurance reported as of the three interview months contained in that quarter. We use only the data from October and November 2011 to plot the fourth quarter of 2011since the data for December 2011 is not available in SIPP currently.

Figure 2. Percentage of Young People Covered by Employer Sponsored Health Insurance as Parents' Dependents
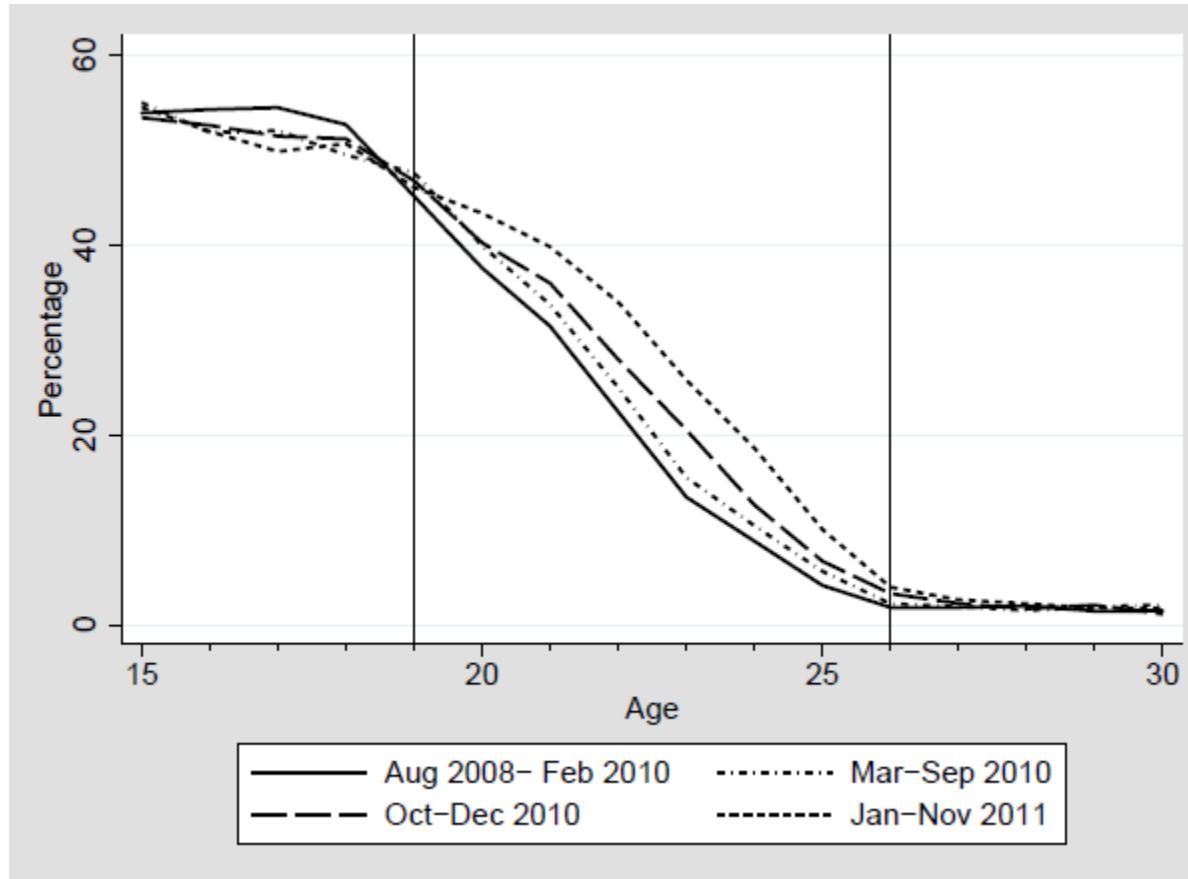
Note: Sample weighted estimates from 2008 SIPP panel, using from August 2008 to November 2011 as indicated by trend lines.

Table 1. Demographic, Socioeconomic and Insurance Characteristics

	All Observations	Age, 16-18	Age, 19-25	Age, 27-29
Health Insurance Status				
Indicator: covered by any health insurance (HI)	0.727	0.870	0.678	0.693
Indicator: covered by employer HI as a parent's dependent	0.267	0.523	0.264	0.019
Indicator: covered by own employer HI	0.198	0.024	0.189	0.393
Indicator: covered by incivially purchased HI in own name	0.028	0.011	0.032	0.036
Indicator: covered by government HI	0.158	0.256	0.127	0.129
Employment Status				
Indicator: employed	0.569	0.253	0.628	0.754
Indicator: unemployed	0.080	0.063	0.089	0.076
Demographic Characteristics				
Age	22.22	17.02	21.96	28.01
Indicator: white	0.602	0.575	0.613	0.604
Indicator: black	0.136	0.146	0.135	0.127
Indicator: Hispanic	0.190	0.200	0.183	0.195
Indicator: married	0.180	0.013	0.140	0.435
Education				
Indicator: student	0.419	0.885	0.361	0.084
Indicator: less than high school	0.257	0.770	0.098	0.103
Indicator: high-school graduate	0.272	0.178	0.325	0.245
Indicator: some college	0.333	0.051	0.452	0.347
Indicator: college graduate	0.113	0	0.113	0.223
Health Status				
Self-reported health is less than "Excellent"	0.585	0.486	0.596	0.663
Number of observations	150,997	39,886	78,212	32,899

Note: Sample weighted estimates from the 2008 SIPP, using data from August 2008 to November 2011. Throughout the paper, we use only the 4th reference month within a wave to reduce recall bias. The "All observations" column refers to those aged 16 to 29 years, except for 26 year olds.

Table 2. Main DD Results, Effect of ACA on Coverage of Young Adults 19-25 years

	Any source		Employer dependent coverage (through parents)		Individually purchased insurance in own name		Employer own coverage		Government provided	
ACA Enactment Effect (March-Sep, 2010)	-0.0017		0.0239	***	0.0024		-0.0170	***	-0.0105	*
	(0.006)		(0.006)		(0.003)		(0.005)		(0.005)	
Effect of the implementation (October 2010-)	0.0317	***	0.0701	***	-0.0081	***	-0.0309	***	-0.0024	
	(0.008)		(0.007)		(0.002)		(0.006)		(0.006)	
Dependent Variable Means										
Treatment, before ACA enactment	0.665		0.234		0.035		0.204		0.123	
Control, before	0.781		0.280		0.023		0.208		0.182	
Treatment, after ACA implementation	0.702		0.307		0.026		0.171		0.133	
Control, after	0.783		0.263		0.023		0.210		0.200	

Notes: (1) Number of observations is 150,997.

(2) Cells of the table contain: coefficients, and standard errors in parentheses. Coefficients in the first row are from the interaction of a dummy variable for treatment group (19-25 years old) and a dummy variable for the period after ACA enactment but before implementation (March-September, 2010), and coefficients in the second row are from the interaction of a dummy variable for treatment group and a dummy variable for the period after ACA implementation (October 2010 and onwards).

(3) Superscripted notations next to the coefficients indicate the level of statistical significance from a two-tailed t-test. *** denotes the 1 percent level, ** denotes the 5 percent level and * denotes the 10 percent level.

(4) Standard errors are clustered at the state level. All regressions are weighted using person-level weights.

(5) Data: pooled waves of the 2008 SIPP panel. We use the data for period from August 2008 to November 2011. The population is young adults aged from 16-29, except for the removal of 26 years olds who are in neither control nor treatment. Only 4th reference month observations from the SIPP are used in the regression.

(6) Dependent variables—column 1: indicator variable that equals 1 if individual covered by health insurance from any source and 0 otherwise; column 2: indicator variable that equals 1 if individual is covered by employer health insurance as a dependent of a parent and 0 otherwise; column 3: indicator variable that equals 1 if individual is covered by individually purchased insurance in own name and 0 otherwise; column 4: indicator variable that equals 1 if individual is covered by employer health insurance in own name and 0 otherwise; column 5: indicator variable for any type of government-provided health insurance.

(7) Other regressors are an indicator for the period after ACA enactment but before implementation, an indicator for the period after ACA implementation , an indicator for each year of age, year-specific fixed effects, month-specific fixed effects, time trend, state fixed effects, gender, race/ethnicity, marital status, student status, household income as a share of federal poverty line and its squared term, monthly unemployment at state level, interaction of unemployment and an indicator for treatment group .

(8) Means of dependent variables are obtained for treatment and control groups before ACA enactment (before March 2010) and after ACA implementation (after September 2010).

Table 3. Main DD Results by Health Status, Effect of ACA on Coverage of Young Adults 19-25 years

	Any source		Employer dependent coverage (through parents)		Individually purchased insurance in own name		Employer own coverage		Government provided
Self-reported health is "Excellent"									
ACA Enactment Effect (Mar-Sep, 2010)	-0.0018		0.0294	***	0.0056		-0.0275	***	-0.0108
	(0.011)		(0.008)		(0.006)		(0.009)		(0.010)
ACA Implementation Effect (Oct-, 2010)	0.0282	***	0.0779	***	-0.0101	*	-0.0446	***	-0.0055
	(0.010)		(0.010)		(0.005)		(0.008)		(0.008)
Dependent Variable Means									
Treatment, before ACA enactment	0.742		0.313		0.044		0.215		0.088
Control, before	0.847		0.386		0.023		0.190		0.146
Treatment, after ACA implementation	0.768		0.406		0.032		0.164		0.091
	0.845		0.370		0.025		0.194		0.162
Self-reported health is less than "Excellent"									
ACA Enactment Effect (Mar-Sep, 2010)	-0.0046		0.0198	**	-0.0020		-0.0096		-0.0113
	(0.009)		(0.010)		(0.004)		(0.008)		(0.009)
ACA Implementation Effect (Oct-, 2010)	0.0356	***	0.0678	***	-0.0063		-0.0241	**	0.0012
	(0.013)		(0.010)		(0.004)		(0.010)		(0.009)
Dependent Variable Means									
Treatment, before ACA enactment	0.633		0.199		0.030		0.198		0.142
Control, before	0.749		0.216		0.023		0.223		0.206
Treatment, after ACA implementation	0.676		0.273		0.025		0.165		0.156
Control, after	0.754		0.211		0.022		0.211		0.227

Notes: (1) Sample weighted estimates from 2008 SIPP panel, using from August 2008 to November 2011.Number of observations is 51,577 in upper rows, and 74,214 in lower rows.

(2)Those in less than excellent health is defined as those whose self-reported health status is very good, good, fair or poor. Information on self-reported health is obtained from Wave 4 Topical Module.

(3) See Notes (2)-(8) under Table 2.

Table 4. DDD Results, Effect of ACA on Coverage of Young Adults 19-25 years

	Any source		Employer dependent coverage (through parents)		Individually purchased insurance in own name		Employer own coverage	Government provided	
ACA Enactment Effect (Mar-Sep, 2010)	0.0400	***	0.0140		0.0053		-0.0115	0.0321	*
	(0.014)		(0.009)		(0.007)		(0.011)	(0.018)	
ACA Implementation Effect (Oct, 2010-)	0.0687	***	0.0973	***	-0.0132	*	-0.0233	0.0130	
	(0.024)		(0.010)		(0.007)		(0.015)	(0.022)	
Dependent Variable Means									
Among those whose parents do not have ESI									
Treatment, before	0.435		0		0.031		0.104	0.215	
Control, before	0.658		0		0.017		0.064	0.479	
Treatment, after	0.461		0		0.032		0.103	0.234	
Control, after	0.684		0		0.017		0.075	0.499	
Among those whose parents have ESI									
Treatment, before ACA enactment	0.793		0.525		0.032		0.154	0.054	
Control, before	0.912		0.715		0.015		0.075	0.081	
Treatment, after ACA implementation	0.857		0.603		0.021		0.145	0.056	
Control, after	0.903		0.674		0.017		0.100	0.083	

Notes: (1) Number of observations is 91,743. (2) Cells of the table contain: coefficients, and standard errors in parentheses. Coefficients in the first row are from the interaction of a dummy variable for treatment group (19-25 years old), a dummy variable for the period after ACA enactment but before implementation (March-September, 2010) and a dummy variable that indicates that a parent has employer sponsored insurance, and coefficients in the second row are from the interaction of a dummy variable for treatment group, a dummy variable for the period after ACA implementation (October 2010 and onwards) and a dummy variable that indicates that a parent has employer sponsored insurance. (3) Data: pooled waves of the 2008 SIPP panel. We use the data for period from August 2008 to November 2011. The population is young adults aged from 16-29 (except for the removal of 26 years olds) for whom parent's information is available. Only 4th reference month observations from the SIPP are used in the regression. (4) Other regressors are a dummy variable that indicates that a parent has employer sponsored insurance, and its interactions with a dummy variable for the period after ACA enactment but before ACA implementation, with a dummy variable for the period after ACA implementation, and with a dummy variable for each year of age, and with year fixed effects, and all the variables included in the DD regressions in Table 2. (5) Means of dependent variables are obtained for treatment and control groups before ACA enactment (before March 2010) and after ACA implementation (after September 2010) for those whose parents do not have ESI and those whose parents have ESI. (6) See also Notes (3), (4), (6), under Table 2.

Table 5. The Effect of the ACA Dependent Provision on Parent's Own ESI Coverage

	Parent has ESI
ACA Enactment Effect	0.0119
(Mar-Sep, 2010)	(0.008)
ACAI Implementation Effect	0.0062
(Oct, 2010-)	(0.008)
Dependent Variable Means	
Treatment, before ACA enactment	0.689
Control, before	0.666
Treatment, after ACA implementation	0.667
Control, after	0.634

Notes: (1) Number of observations is 91,743.
(2) Data: pooled waves of the 2008 SIPP panel. We use the data for period from August 2008 to November 2011. The population is young adults aged from 16-29 (except for the removal of 26 years olds) for whom parent's information is available. Only 4th reference month observations from the SIPP are used in the regression.
(3) Dependent variable is an indicator variable that equals 1 if individual's parent has employer sponsored insurance and 0 otherwise.
(4) See Notes (2)-(4) and (7)-(8) under Table 2.

Table 6. Placebo Test Results: Randomly Selected Months between February 2009 and January 2010 as Policy Date

	Distribution of the coefficients of the placebo laws		Number of coefficient estimates that are significant in the placebo law regressions (out of 17 estimates for each row)		Estimated effects in Table 2	
	Mean	Standard deviation	Significant at 5 percent level	Significant at 10 percent level	Enactment effect (Mar-Sep 2010)	Implementation effect (Oct 2010-)
Any source	0.0100	0.0077	1	1	-0.0017	0.0317 ***
Employer dependent coverage (through parents)	0.0050	0.0047	0	0	0.0239 ***	0.0701 ***
Individually purchased insurance in own name	-0.0007	0.0033	1	0	0.0024	-0.0081 ***
Employer own coverage	0.0031	0.0033	0	0	-0.0170 ***	-0.0309 ***
Government provided	0.0002	0.0046	0	0	-0.0105 *	-0.0024

Data for the first column come from August 2008 to February 2010 of the SIPP 2008 panel. Note: We selected each possible month between September 2008 and January 2010 one at a time. We then estimated the main model using each separate placebo date for defining the "Implement" variable. We show here the means and standard deviations of the coefficients we obtained. The last two columns repeat estimates from Table 2 for comparison.

Appendix Table A1. Main DD Results, Effect of ACA on Coverage of Young Adults 19-25 years

	Any source		Employer dependent coverage (through parents)		Individually purchased insurance in own name		Employer own coverage		Government provided	
Effect of the passage of ACA (March-Sep, 2010)	-0.0015		0.0237	***	0.0024		-0.0170	***	-0.0102	*
	(0.007)		(0.006)		(0.003)		(0.005)		(0.005)	
ACA First Implementation Phase (Oct 2010-Feb 2011)	0.0248	**	0.0486	***	-0.0039		-0.0219	***	0.0008	
	(0.010)		(0.008)		(0.003)		(0.007)		(0.007)	
ACA Second Implementation Phase (Mar-Sept, 2011)	0.0325	***	0.0718	***	-0.0087	***	-0.0275	***	-0.0085	
	(0.009)		(0.008)		(0.003)		(0.007)		(0.006)	
ACA Second Implementation Phase (Oct-Nov, 2011)	0.0263	**	0.1030	***	-0.0115	**	-0.0569	***	-0.0082	
	(0.011)		(0.014)		(0.005)		(0.014)		(0.013)	
Dependent Variable Means										
Treatment, before ACA enactment	0.665		0.234		0.035		0.204		0.123	
Control, before	0.781		0.280		0.023		0.208		0.182	
Treatment, between ACA passage and implementation	0.665		0.257		0.037		0.185		0.126	
Control, between passage and implementation	0.780		0.263		0.023		0.208		0.204	
Treatment, during ACA Earlier Implementation Period	0.688		0.285		0.028		0.177		0.135	
Control, Earlier Implementation	0.777		0.266		0.021		0.204		0.199	
Treatment, during ACA Later Implementation Period	0.709		0.315		0.024		0.173		0.131	
Control, Later Implementation	0.783		0.263		0.023		0.210		0.202	
Treatment, during ACA Post Implementation Period	0.713		0.336		0.026		0.153		0.133	
Control, Post Implementation	0.795		0.256		0.028		0.220		0.200	

Notes: See Notes to Table 2. The only difference stems from the use of three dummy variables (instead of one) to define a post implementation effect. The dummy variable for Oct 2010-Feb 2011 captures the effect of the law after most plan anniversary dates, Mar-Sept 2011 captures the cumulative effect of the law for plan anniversary dates through September 2011. The dummy variable Oct-Nov 2011 captures the effect of the law after all plans are in compliant with the federal provision.

Appendix Table A2. DD results by States with and without State Laws

	Any source		Employer dependent coverage (through parents)		Individually purchased insurance in own name		Employer own coverage		Government provided	
States that enacted laws										
ACA Enactment Effect (Mar-Sep, 2010)	-0.0028		0.0224	***	0.0054		-0.0210	***	-0.0128	*
	(0.007)		(0.007)		(0.004)		(0.007)		(0.007)	
ACA Implementation Effect (Oct-, 2010)	0.0290	**	0.0687	***	-0.0064	**	-0.0311	***	-0.0069	
	(0.011)		(0.009)		(0.003)		(0.008)		(0.007)	
Dependent Variable Means										
Treatment, before ACA enactment	0.684		0.250		0.032		0.211		0.120	
Control, before	0.790		0.291		0.023		0.215		0.169	
Treatment, after ACA implementation	0.719		0.323		0.024		0.180		0.128	
Control, after	0.797		0.281		0.024		0.218		0.188	
States that never enacted laws										
ACA Enactment Effect (Mar-Sep, 2010)	-0.0028	*	0.0285	*	0.0017	*	-0.0106	*	-0.0142	*
	(0.011)		(0.009)		(0.006)		(0.007)		(0.007)	
	0.0340	***	0.0736	***	-0.0091	**	-0.0313	***	0.0017	
ACA Implementation Effect (Oct-, 2010)	(0.008)		(0.010)		(0.004)		(0.010)		(0.011)	
Dependent Variable Means										
Treatment, before ACA enactment	0.633		0.207		0.040		0.193		0.128	
Control, before	0.766		0.262		0.023		0.195		0.204	
Treatment, after ACA implementation	0.674		0.281		0.029		0.156		0.141	
Control, after	0.759		0.233		0.022		0.196		0.221	

Data: pooled waves of the 2008 SIPP panel. Note: (1) States in the first set include 23 states that enacted state laws before our data period starts in August 2008 (Colorado, Delaware, Florida, Idaho, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Missouri, Montana, New Hampshire, New Jersey, New Mexico, North Dakota, Rhode Island, South Dakota, Texas, Utah, Virginia, and West Virginia), seven states that enacted laws between August 2008 and March 2010, when the ACA was passed (Connecticut, Illinois, Louisiana, New York, Pennsylvania, Washington, and Wisconsin), and Ohio (enacted the law in July 2010). States in the second set includes the rest of the U.S. states.(2) Number of observations is 100,011 in upper rows and 50,986 in lower rows.
(3) See Notes (2)-(8) under Table 2.

Table A3. The Availability of Parent's Information, by Age and Age Group, Post Reform Enactment

Age	Availability of Parent's Information
16 years old	94.3%
17 years old	93.6%
18 years old	91.7%
19 years old	88.4%
20 years old	82.9%
21 years old	75.9%
22 years old	66.2%
23 years old	57.6%
24 years old	48.8%
25 years old	39.9%
27 years old	29.0%
28 years old	24.4%
29 years old	21.1%

Age group	Availability of Parent's Information
16-18 years old	93.2%
19-25 years old	67.0%
27-29 years old	24.8%

Data: pooled waves of the 2008 SIPP panel. Note: Estimates from March 2010 to November 2011.

Table A4. DD Results for DDD sample

	Any source	Employer dependent coverage (through parents)	Individually purchased insurance in own name	Employer own coverage	Government provided
ACA Enactment Effect (Mar-Sep, 2010)	-0.0109	0.0142 *	0.0014	-0.0026	-0.0226 ***
	(0.007)	(0.008)	(0.004)	(0.006)	(0.008)
ACA Implementation Effect (Oct-, 2010)	0.0379 ***	0.0681 ***	-0.0075 **	-0.0139 **	-0.0115
	(0.008)	(0.009)	(0.003)	(0.007)	(0.007)
Dependent Variable Means					
Treatment, before ACA enactment	0.682	0.362	0.032	0.139	0.104
Control, before	0.827	0.476	0.015	0.071	0.214
Treatment, after ACA implementation	0.725	0.402	0.025	0.131	0.115
Control, after	0.823	0.427	0.017	0.091	0.235

Notes: (1) Number of observations is 91,743.

(2) Data: pooled waves of the 2008 SIPP panel. We use the data for period from August 2008 to November 2011. The population is young adults aged from 16-29 (except for the removal of 26 years olds) for whom parent's information is available. Only 4th reference month observations from the SIPP are used in the regression.

(3) See Notes (2)-(4) and (6)-(8) under Table 2.

Table A5. Descriptive Results of Marginal Cost Analysis: Family vs. non-family coverage

	% of young adults with dependent coverage through parents after the mandate	N
Family coverage	29.1%	1144
Non-family coverage	20.9%	2550

Data: pooled waves of the 2008 SIPP panel. Notes: (1) The population is young adults (19-25 years old) who meet the following two criteria: (a) their parents had ESI during the four-month period before the passage of ACA (November 2009 -February 2010), and (b) do not have dependent coverage through parent's ESI during the period.
(2) Rows indicate types of parent's ESI obtained from the information of siblings in the SIPP. The first row is family coverage (coverage that includes a spouse and children), and the second row is non-full family coverage.

Table A6. The Regression Results of Marginal Cost Analysis: Family vs. non-family coverage

	Employer dependent coverage (through parents)
Indicator for parents having family coverage before ACA	0.0953 *** (0.025)

Data: pooled waves of the 2008 SIPP panel. Note: (1) The population is the same as those included in Table A4. Number of observation is 3,694.
(2) Coefficient is from a dummy variable for parents having non-single ESI coverage during the four-month period before the passage of ACA (November 2009 -February 2010).
(3) Other regressors are control variables included in the main specification.

Table A7. DD Results using Aggregated Quarterly Data and Wild Cluster Bootstrap-t Procedure

	Any source	Employer dependent coverage (through parents)		Individually purchased insurance in own name	Employer own coverage		Government provided
ACA Enactment Effect							
(March-Sep, 2010)	0.007	0.039	**	0.001	-0.019	**	-0.014
p-value	0.118	0.040		0.432	0.022		0.126
ACA Implementation Effect							
(October 2010-)	0.037 ***	0.092	***	-0.009 **	-0.036	***	-0.007
p-value	0.001	0.001		0.017	0.003		0.243

Data: pooled waves of the 2008 SIPP panel. Note: Dependent variables are the fraction of those with each insurance type calculated at year-quarter level for treatment and control groups. Number of observations is 28. Explanatory variables are an indicator for the quarters after the mandate, an indicator for treatment group, and an interaction of these two terms. We cluster on year-quarter and perform wild cluster bootstrap-t test with 999 replications, following an example in Cameron, Gelbach and Miller (2008).

Table A8. DD Results with Marginal Effects of Interactions in Logits

	Any source		Employer dependent coverage (through parents)		Individually purchased insurance		Employer own coverage		Government provided	
Logit with Ai & Norton(2003) correction										
ACA Enactment Effect (Mar-Sep, 2010)	-0.0006		0.0245	***	-0.0015		-0.0157	***	-0.0114	**
	(0.007)		(0.006)		(0.004)		(0.005)		(0.005)	
ACA Implementation Effect (Oct, 2010-)	0.0326	***	0.0638	***	-0.0093	***	-0.0246	***	-0.0024	
	(0.008)		(0.008)		(0.003)		(0.007)		(0.006)	
LPM model, modified										
ACA Enactment Effect (Mar-Sep, 2010)	-0.0008		0.0249	***	0.0024		-0.0162	***	-0.0114	**
	(0.007)		(0.006)		(0.003)		(0.005)		(0.005)	
ACA Implementation Effect (Oct, 2010-)	0.0332	***	0.0717	***	-0.0081	***	-0.0297	***	-0.0038	
	(0.008)		(0.007)		(0.002)		(0.006)		(0.006)	

Data: pooled waves of the 2008 SIPP panel. Note: Estimates in the first set of rows are logit marginal effects calculated using the correction proposed by Norton and Ai (2003).We omitted the square of percent of FPL in this specification, relative to our main specification in Table 2, because it was causing non-convergence. We also estimated the logit specification above without sample weights. For comparison we provide comparable linear probability model estimates as well.