DISCUSSION PAPER SERIES

IZA DP No. 6124

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November 2011

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zur Zukunft der Arbeit
Institute for the Study
of Labor

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IZA Discussion Paper No. 6124
November 2011

ABSTRACT

The Impact of the Macroeconomy on Health Insurance Coverage: Evidence from the Great Recession

This paper investigates the impact of the macroeconomy on the health insurance coverage of Americans using panel data from the Survey of Income and Program Participation (SIPP) for 2004-2010, a period that includes the Great Recession of 2007-09. We find that a one percentage point increase in the state unemployment rate is associated with a 1.67 percentage point (2.12%) reduction in the probability that men have health insurance; this effect is strongest among college-educated, white, and older (50-64 year old) men. We estimate that 9.3 million Americans, the vast majority of whom were adult men, lost health insurance due to a higher unemployment rate alone during the 2007-09 recession. We conclude with a discussion of how components of recent health care reform may influence this relationship in the future.

JEL Classification: I10, J3, J6, E32

Keywords: health insurance, Medicaid, SCHIP, recession, unemployment

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Introduction

The number of Americans lacking health insurance has long been a concern of policymakers, for a number of reasons. The uninsured tend to receive less medical care and thus be in worse health than the insured (Finkelstein et al 2011, Card et al., 2009; Doyle, 2005; also see the reviews in McWilliams, 2009 and Freeman et al., 2008). Moreover, uninsured individuals are at risk of severe financial loss, including bankruptcy, in the event of illness (Gross and Notowidigdo, 2011; Himmelstein et al., 2009). Concerns about the adverse consequences of uninsurance led the U.S. Congress, in March 2010, to establish a variety of incentives for employers to offer health insurance and for individuals to enroll in such plans, and to expand eligibility for public health insurance.

The high and rising cost of providing public health insurance is a budgetary concern for the federal and state governments, which have been hit by rising expenditures in public health insurance programs (Chernew et al., 2009). This strain on budgets rises with the number of people covered by Medicaid and the Children's Health Insurance Program (henceforth just Medicaid) during macroeconomic downturns, a consequence of the social safety net. According to the U.S. Census Bureau, Medicaid covered 15.9 percent of the U.S. population in 2010, up from 13.2 percent in 2007 (DeNavas –Walt el al., 2008, 2011), although it is not known to what extent this was due to the recession or longer-run trends.

In December of 2007, an economic expansion that began in November 2001 ended, and a recession began that lasted until June 2009 (NBER Business Cycle Dating Committee, 2011). With a duration of 18 months, it was the longest recession in the United States since 1933. It was also the most severe recession in the United States since World War II; from peak to trough, employment fell by 6.3% and output fell by 5.1% (Federal Reserve Bank of Minneapolis, 2011).

Figure 1 shows both the duration and severity (in terms of employment) of the 2007-09 recession relative to other postwar recessions.

This paper estimates the impact of the macroeconomy on the number of Americans with health insurance coverage, both overall and by source of coverage. By focusing on the recession of 2007-09, this paper extends and builds on previous work that has examined the impact of the macroeconomy on uninsurance during the previous (2001) recession (Cawley and Simon, 2005). It also contributes to the larger economics literature on the consequences of the 2007-09 recession, which has been dubbed the Great Recession (e.g. Farber, 2011; Hurd and Rohwedder, 2010).

While there is a large literature on the direct effect of the macroeconomy on health (e.g. Ruhm 2003; Ruhm 2000), there is relatively little published on the impact of the macroeconomy on health insurance. Cawley and Simon (2005) examined the relationship between state unemployment rate and the probability of health insurance coverage in the Survey of Income and Program Participation (SIPP) and estimated that 984,000 Americans, nearly all of whom were adult men, lost health insurance due to macroeconomic conditions during the 2001 recession. Gilmer and Kronick (2009) use data from the Current Population Survey (CPS) from 1980 to 2008 to project that the Great Recession could increase the number of uninsured Americans by 6.9 million, but their model (which focuses on the influence of per capita health spending, income, demographics and time trends) does not take into account the focus of this paper, the unemployment rate. While there are annual national estimates of the percent and number of Americans who are uninsured (e.g. Fronstin, 2011; DeNavas-Walt et al., 2011) there has been no analysis of how health insurance coverage was impacted by increases in the unemployment rate around the time of the Great Recession. Trends in annual data may reflect the continuing long

term decline in generosity of health insurance (Vistnes et al 2010). Our method of analysis identifies the impact of worsening macro-economic conditions measured by the state monthly unemployment rate, within a longitudinal survey, that allows us to investigate the heterogeneity of impact by demographic characteristics.

The relationship between unemployment rates and the probability of insurance coverage is likely to change over time in response to changes in health insurance markets and public health insurance programs; as a result, estimates from earlier papers may be out of date. For example, there have been declining trends (since the peaks reached in 2000) in both employer offers of health insurance (Vistnes et al., 2010) and employees covered through employer-sponsored insurance (Fronstin 2011); these secular changes may have altered the relationship between the unemployment rate and health insurance. Moreover, each recession has distinct characteristics that may imply a different relationship between the unemployment rate and coverage. For example, the 2007-09 recession was characterized by a drop in home prices, which may have inhibited unemployed workers from moving to areas with more job opportunities, a phenomenon that some have called "house lock" (Ferreira et al 2011). Likewise, extensions of the maximum duration of unemployment insurance benefits from 26 to up to 99 weeks in some states may have decreased the incentives for unemployed workers to quickly find new employment (although a recent evaluation of these expansions finds small effects on re-employment; see Rothstein, 2011). Another relevant change is that, in 2009, Congress instituted 65 percent subsidies for premiums associated with coverage through the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA); this legislation gives qualifying workers and their families who would otherwise lose their health insurance the option to temporarily extend that coverage. The new subsidy is available for a maximum of 15 months to those who lost jobs between September

2008 and May 2010 (US DOL 2011b). By making it easier for newly unemployed workers to continue on the health insurance plan of their former employer, these subsidies are likely to weaken the correlation between the unemployment rate and health insurance.

For these reasons, the relationship between the macroeconomy and health insurance found in older data may not apply to the Great Recession. In addition, the Great Recession was characterized by considerable variation in unemployment rates across states and over time, providing researchers with more power to accurately estimate the effect of the macroeconomy on health insurance. The purpose of this paper is to exploit that variation to generate accurate and up-to-date estimates of the impact of unemployment rates on health insurance coverage, both overall and by source of coverage, and for the entire population as well as for specific subgroups defined by gender, education, and age.

Conceptual framework

Our measure of the macroeconomy is the state unemployment rate, which is consistent with the previous literature on this topic (e.g. Cawley and Simon, 2005; Marquis and Long, 2001), as well as the literatures on the effect of the macroeconomy on health (e.g. Ruhm, 2003; Ruhm 2000) and health behaviors (e.g. Charles and DeCicca, 2008; Ruhm, 2005; Ruhm, 2002)

There are several mechanisms by which a high unemployment rate can result in the loss of employer-provided coverage. A high state unemployment rate is, by definition, associated with a higher probability that a resident of that state is unemployed. When those who were previously covered by employer-provided health insurance lose their jobs, they (and any dependents on the same policy) are likely to lose coverage from the former employer. Although COBRA allows eligible unemployed workers to temporarily purchase health insurance through

their former employers, take-up rates are low because of the high cost (Collins, 2011, Lambrew, 2001).

High unemployment rates may lower the probability of employer-provided coverage even among those who remain employed. When labor demand shifts in because of a poor macroeconomy, total labor compensation will fall. If wages are costly to renegotiate, employers may reduce compensation by shifting a greater share of health insurance costs to employees. Elasticity estimates suggest that this mechanism should result in little decline in coverage; among those offered employer-sponsored health insurance, take-up falls by less than one-tenth of a percent when premiums increase by one percent (Chollet and Liu, 2006). Due to decreased labor demand, previously full-time workers may have their hours reduced to the point that they are no longer eligible for health insurance benefits. At the extreme, employers may react to a poor macroeconomy by ceasing to offer health insurance (Marquis and Long, 2001).

The lower labor income that accompanies higher unemployment rates could also have an income effect, reducing private purchases of individual health insurance. On the other hand, some people might *gain* health insurance coverage during periods of high unemployment if their incomes fall to a level that qualifies for Medicaid. Holahan and Garrett (2009), using CPS data from 1990-2003, estimate that an increase in unemployment of one percentage point would expand coverage through Medicaid by 0.2 percentage points for non-elderly adults and by 0.79 percentage points for children.

Based on this framework and the existing literature, we hypothesize that an increase in the unemployment rate decreases the probability of coverage through one's own employer. We predict that an increase in the unemployment rate increases the probability of coverage through public health insurance. We hypothesize that, on net, unemployment rate is negatively

correlated with the probability of health insurance coverage through any source for adults, but that for children the sign of the net effect is ambiguous.

Methods

We estimate logit models in which the dependent variables are: an indicator variable for whether one has health insurance coverage through any source, an indicator for whether one receives health insurance coverage through one's own employer, and an indicator for whether the individual is covered by government-provided health insurance. The regressor of interest is state monthly unemployment rate. Models also control for respondent age, marital status, education, and family size.

All models control for both individual-specific and year-specific fixed effects; our identification of the effect of state unemployment rate on the probability of health insurance coverage comes from variation within people over time in deviations of the state unemployment rate from the national mean for that year. The research design requires that we control for year fixed effects because even before the recession, health care costs were rising (Chernew et al., 2009), employer offers of health insurance were declining (Vistnes et al., 2010), and the percentage of Americans covered by employer-sponsored insurance was falling (Fronstin, 2011). Because our data contain multiple observations of the same person over time, we are also able to include person fixed effects so that our estimates are not influenced by any time invariant unobserved characteristics that affect health insurance status. In subsequent models we control for employment status in order to examine the pathways by which the macroeconomy acts on insurance status.

After first estimating a model for men and women pooled, we estimate models separately by gender because labor force participation and attachment and eligibility for publicly provided health insurance may differ by gender; for example, low-income pregnant women are eligible for Medicaid coverage. Men and women also tend to differ in the extent to which they have dependent coverage available through a spouse. We also examine whether the relationship between unemployment rate and insurance coverage differs across age, education, and race/ethnic group.

Following standard practice, we cluster standard errors by state to account for the fact that individual outcomes are regressed on state-level measures of the macroeconomy. When a micro economic outcome is regressed on an aggregate regressor, unadjusted standard errors will be biased downwards, perhaps dramatically (Moulton, 1990). A related concern is serial correlation in standard errors for observations within states over time (Bertrand et al., 2004). We adjust for these issues by bootstrapping the standard errors within our logit specifications, selecting with replacement all observations in a particular state. We conduct 50 replications to estimate the bootstrap standard errors, using the range suggested in Efron and Tibshirani (1993). As expected, this adjustment considerably increases the standard errors.

Data: The Survey of Income and Program Participation (SIPP)

The Survey of Income and Program Participation (SIPP) is a nationally representative sample of Americans over the age of 15 that consists of a series of panels that are up to 4 years in length with sample sizes ranging from approximately 12,000 to 40,000 households. The SIPP, which started in 1984, interviews households at 4-month intervals; thus, there exist up to 12 interviews for each individual. Although each SIPP interview collects data on the current month

and, retrospectively, each of the 3 months between interviews, we use only the contemporaneous reports in order to avoid recall error.

This paper uses data from the 2004 and 2008 panels of the SIPP covering the period January 2004 through November 2010, and covering all 50 states plus the District of Columbia. There are special considerations for each of these panels. The sample for the 2004 panel was cut in half in September 2006 in response to budgetary pressures. The 2008 panel is still in the field at the time of this writing, so only 7 waves of those data are available.

Each SIPP wave contains information on the respondent's insurance coverage and the source of their coverage, for a particular month. We study the following outcomes in the SIPP: an indicator variable for whether one has health insurance coverage through any source, an indicator for whether one receives health insurance coverage through one's own employer, and an indicator for whether the individual is covered by government-provided health insurance (e.g. Medicaid or SCHIP).

The SIPP contains a wide variety of demographic and socioeconomic variables. In each regression, we control for the following characteristics that may influence insurance status: highest grade completed, age, number of children in the family, marital status, indicator variables for each individual, and indicator variables for each year. We exclude income from the set of regressors because wages and salary are determined simultaneously with fringe benefits such as health insurance.

The SIPP data are better suited to our research question than data from the CPS, which is another household survey with state identifiers that is available in the public domain. CPS data are the basis of the standard annual estimates of health insurance coverage in the U.S. population (DeNavas Walt et al 2011). However, the CPS only records whether the respondent was covered

by health insurance at any point in the past 12 months, making it impossible to determine whether the CPS respondent had coverage in any specific month. In contrast, the SIPP records an individual's insurance status in specific months, which enables one to match insurance status to the unemployment rate in that month. Another advantage is that the SIPP is longitudinal (whereas the CPS is cross-sectional); this feature enables us to estimate fixed effects models that eliminate the bias that would otherwise be caused by individual-specific, time-invariant heterogeneity.

The Bureau of Labor Statistics Local Area Unemployment Statistics Series is the source for monthly state unemployment rates. Unlike in the previous years, when certain small states were not separately identified, the 2004 and 2008 panels of the SIPP identify state of residence for individuals in all 50 states plus the District of Columbia. These state identifiers are used to merge state monthly unemployment rates to the SIPP data. We control for individual and year fixed effects, so our identifying variation of unemployment on health insurance coverage is within people over time in deviations from the national mean for that year.

Our final estimation samples from the pooled 2004-2010 SIPP years consist of the following numbers of person-month observations: 467,285 for men, 510,334 for women, and 416,648 for children.

Empirical Results

Summary Statistics

Table 1 lists summary statistics for the sample. On average during the time of our sample (January 2004-November 2010), the percent of respondents that were insured through any source was 78.6% for men, 83.0% for women, and 85.5% for children. Men and women are roughly

equally likely to be covered by employer-sponsored health insurance (63.0% vs. 62.6%) but men are more likely than women to have such coverage through their own employer (48.8% vs. 36.5%). Government health insurance programs are the source of coverage for 9.1% of men, 13.3% of women, and 29.2% of children.

Figure 2 shows changes in health insurance coverage for men, women and children by changes in the national unemployment rate. (The analyses in this paper use state unemployment rate but for the sake of clarity and simplicity we depict the national unemployment rate in Figure 2.) The national unemployment rate experienced a steep increase, rising from approximately 6.1 percent in August 2008 to approximately 10.1 percent in October 2009. Figure 2 indicates that as the unemployment rate rose in 2009, the percentage of the sample with health insurance coverage fell for men, remained roughly constant for women, and rose for children.

Logit Regressions

We initially estimate the probability that an individual has health insurance coverage as a function of the unemployment rate and basic demographic characteristics while excluding employment status, and then we re-estimate our models controlling for employment status in order to investigate the extent to which that variable is a mechanism by which the unemployment rate affects health insurance. Each cell of each of our tables contains, from top to bottom, the sample size, the logit fixed effects coefficient, the standard error in parentheses, the marginal effect italicized in brackets, and the mean of the dependent variable.

The first set of rows in Table 2 presents results for all sample respondents under the age of 65 (i.e. children plus male and female adults). The results indicate that a one percentage point increase in the unemployment rate has no significant impact on the probability of being insured through any source. However, when one looks by source of coverage one finds interesting

differences. A one percentage point increase in unemployment rate is associated with a 0.57 percentage point reduction in the probability of coverage through one's own employer. This is almost exactly offset by a 0.56 percentage point increase in the probability of coverage through public insurance, but that point estimate is not statistically significant.

These estimates, based on the pooled sample, may obscure differences across gender and age (i.e. adults and children). Subsequent rows in Table 2 present results estimated separately for adult men, adult women, and children. The second row of Table 2 corresponds to results for men, which are consistent with our hypotheses that higher unemployment rates are associated with a lower probability of health insurance coverage through any source, the man's own employer, and for coverage through any employer. Specifically, a one-percentage-point higher unemployment rate is associated with a 1.67 percentage point (2.12%) reduction in the probability of health insurance coverage through any source, a 1.01 percentage point (2.07%) reduction in the probability of coverage through the man's own employer, and a 0.78 percentage point (1.24%) reduction in the probability of coverage through any employer. The unemployment rate is not significantly associated with the probability of coverage through an employer as a dependent or through a government health insurance program.

The third set of rows in Table 2, which correspond to women, indicate that there is no significant association between unemployment rate and health insurance coverage, either overall or through any specific source. This is not simply a result of large standard errors; when one compares the marginal effects for men and women for coverage through any source or through an employer, in each case the marginal effects for women are half the size or smaller.

The fourth and bottom set of rows in Table 2, which correspond to children, show that a one-percentage-point higher unemployment rate is associated with a 1.37 percentage point

(4.69%) higher probability that a child is covered by government-provided health insurance. Although there is not a significant association between unemployment rate and the probability that a child is covered through any source, the sign of the marginal effect is positive. These results confirm that government health insurance programs for children operate counter-cyclically, as intended; when unemployment rates rise, and parents lose their jobs and family income declines, more children become enrolled in Medicaid and SCHIP, and as a result their health insurance status is not negatively affected.

One important way that the macroeconomy affects individuals' health insurance status is likely to be through their own employment status. For this reason, we measured the extent to which macroeconomic conditions are correlated with insurance status conditional on employment status. Specifically, we added indicator variables for current employment and for being unemployed to the set of regressors (being out of the labor force is the reference category). Results are presented in Table 3 for men (top set of rows) and women (bottom set of rows). Recall that without controlling for employment status, a one-percentage point rise in unemployment was associated with a 1.67 percentage point decrease in the probability of health insurance coverage for men. After controlling for employment status, the associated decrease is 1.18 percentage points; the association of unemployment rate with employer-provided coverage (either through one's own employer or through any employer) is no longer statistically significant, and the marginal effects fall by a third to a half.

We also examine the reason that individuals are uninsured. In the SIPP, adults who lack health insurance are asked the reasons they are uninsured; respondents are allowed to indicate more than one reason. To examine whether the unemployment rate affects the reason that people are uninsured, we restrict our sample to those who lack health insurance, and keep only the first

month in which the individual reports being uninsured. We then estimate a series of logit models in which the dependent variable equals one if the respondent answers yes to a specific reason for being uninsured. The set of regressors includes the state monthly unemployment rate and the same regressors used in the earlier models, except for the exclusion of individual fixed effects and the inclusion of state fixed effects.

Results are presented in Table 4. For men, a one percentage point higher unemployment rate is associated with a 1.23 percentage point increase in the probability that uninsurance is due to cost. A higher unemployment rate is also associated with lower probabilities that uninsurance is due to the following factors: insurance not being offered by an employer, the individual not being at the job long enough to qualify, and because insurance is not needed. For women, a one percentage point increase in the unemployment rate is associated with a 0.92 percentage point increase in the probability that uninsurance is due to cost, and a reduction in the probability that uninsurance is due to not being at the job long enough to qualify. Overall, people are more likely to attribute uninsurance to excessive cost during periods of high unemployment.

Extensions

Recent economic studies have documented how the Great Recession differentially affected various groups in the population. Elsby et al. (2010) find that unemployment during the Great Recession was particularly high among the less educated, ethnic minorities, and younger workers. They conclude that these differences arise from differences in the probability of becoming unemployed, but that the likelihood of reemployment is similar across these groups. Farber (2011) finds that rates of job loss during the Great Recession were higher among younger

and less educated workers, but that those of older workers and the better educated rose more than is typical during a recession.

Previous research based on older time periods also suggests that the impact of the macroeconomy on health insurance coverage may differ by education. For example, Glied and Jack (2003) examine CPS data for 1981-2002, converted to state-year-education group cells and find that unemployment rates affect health insurance coverage most for the highest educated.

As extensions, we conduct subgroup analyses by education, race, and age. We estimate the main models (those from Table 2, that do not control for employment status) for adults separately by education group: high school or less, some college, and bachelor's degree or more; the results are shown in Table 5. For men, a one percentage point rise in the unemployment rate is estimated to reduce the probability of coverage through any source by 1.73 percentage points for those with a high school education or less, 1.37 percentage points for those with some college, and 2.14 percentage points for those with a bachelor's degree or more education. Although these differences are not statistically significant, the point estimates suggest that those with the lowest and highest levels of education were most likely to lose health insurance during the Great Recession.

Among women, even when models are estimated separately by educational attainment, we continue to find that the unemployment rate is not significantly associated with the probability of insurance coverage; the exception is that a one percentage point rise in unemployment is associated with a 1.53 percentage point lower probability that women with a bachelor's degree or higher education receive employer-sponsored insurance as a dependent.

In other subgroup analyses, we estimate models separately by race (Table 6). The impact of unemployment rate on the probability of coverage is not significantly different for whites compared to African-Americans and Hispanics (pooled), but the pattern of point estimates suggests that the unemployment rate has a larger impact on health insurance coverage for whites. A one percentage point increase in the unemployment rate is associated with a 1.54 percentage point lower probability that an adult white male has coverage from any source, and a 0.95 percentage point reduction in the probability that an adult African-American or Hispanic male has coverage through any source. Among children, results indicate that whites are more likely to gain health insurance during periods of high unemployment (the estimate for African-Americans and Hispanics is positive, but smaller and not statistically significant).

Results for the average worker may obscure interesting differences across age groups. For example, younger workers may be hit harder if the last hired is the first fired, and older workers may have a harder time finding new employment after being laid off. We present results of models estimated separately by age group in Table 7. Among men, a one percentage point increase in the unemployment rate is associated with a decrease in the probability of coverage of 1.34 percentage points for men aged 18-34, 1.56 percentage points for men aged 35-49, and 2.5 percentage points for men aged 50-64. Thus, the effect of unemployment rate on the oldest group (50-64) is nearly double that on the youngest group (18-34). The magnitudes of the marginal effects for women also rise monotonically with age, but are in no case statistically significant.

These differences by education, race, and age could reflect several factors. First, we use the overall state monthly unemployment rate, so the differences in impact we observe could simply reflect differences in the unemployment rate for each education, race, and age group. In

particular, the Great Recession led to greater job losses among workers who were less educated (Elsby et al., 2010; Farber, 2011), younger (Elsby et al., 2010; Farber, 2011), and ethnic minorities (Elsby et al., 2010). Second, these groups may differ in the time and money cost of achieving coverage.

Discussion

The Great Recession of 2007-09 is the longest and deepest macroeconomic downturn in the United States since 1933. This paper documents the impact of higher unemployment rates on one important outcome: health insurance coverage.

We find substantial heterogeneity in this relationship across gender, race, and age, as well as source of insurance. For men, a one percentage point rise in the unemployment rate is associated with a 1.67 (2.12%) percentage point reduction in coverage through any source. This impact for men is greatest among whites (relative to African-Americans and Hispanics) and older (50-64) individuals. The age effect may be due to older workers being more likely to be laid off during periods of high unemployment, or having a harder time finding a new job after being laid off.

In contrast to the findings for men, among women the unemployment rate is in almost no case significantly correlated with the probability of coverage, and the point estimates of the marginal effects are much smaller than those for men. For children, a higher unemployment rate is associated with a 1.37 percentage point (4.69%) *higher* probability of public health insurance coverage, with the result that there is no statistically significant effect on the probability of health insurance coverage through any source (the point estimate is positive). Subgroup analyses indicate that health insurance coverage is most sensitive to the unemployment rate for white, as

opposed to African-American and Hispanic, children. Our findings for children confirm that government health insurance programs work counter-cyclically to protect children from losing health insurance during macroeconomic downturns.

As hypothesized, the loss of employment is an important pathway through which a higher unemployment rate leads to a lower probability of health insurance coverage for men. However, even controlling for employment status, men still face a 1.18 percentage point lower probability of coverage when the unemployment rate rises by 1 percentage point. This may be due to employers dropping coverage, employers cutting hours such that some men no longer qualify for health insurance, employers raising workers' share of the overall premium so more male workers decline coverage, or lower incomes that result in fewer purchases of individual coverage. When the unemployment rate is high, the uninsured are more likely to report that their uninsurance is due to the high cost of coverage, which is consistent with employers shifting more of the premium to workers and lower family incomes being important mechanisms for the relationship between the unemployment rate and the probability of coverage.

A logical comparison for these results are those of Cawley and Simon (2005), who examine SIPP data for 1990-2000. They find that a one percentage point increase in the unemployment rate was associated with a much smaller reduction in the probability that men have health insurance through any source: 0.7 percentage points versus the 1.67 percentage point effect found here (compare Cawley and Simon (2005) Table 1, row 1 column 1 to this paper's Table 2, row 2 column 1). They also found that a one percentage point increase in the unemployment rate was predicted to decrease women's coverage through an employer by 0.7 percentage points (see their Table 2, row 1, column 2) whereas in the more recent data our corresponding estimate is half that size and not statistically significant (see Table 2, row 3,

column 4). They also find that a one percentage point increase in unemployment is associated with a 0.8 percentage point increase in the probability that a child is covered by public health insurance (see their Table 3, row 1, column 3); the corresponding estimate from the more recent data is 1.37 percentage points (see Table 2, row 4, column 5). In summary, a comparison of the two time periods (1990-2000 to 2004-2010) indicates that the impact of the unemployment rate on health insurance coverage worsened for men, became less severe for women, and improved for children.

This paper's estimates of the correlation between health insurance coverage and unemployment rate during 2004-2010 can be used to estimate the number of Americans who lost health insurance during the Great Recession, which lasted from December 2007 until June 2009. During that period, the national unemployment rate rose from 5.0% to 9.5% (U.S. Department of Labor, 2011).[1] Based on this change, our regression results, and Census estimates of the U.S. population of men aged 18–64, women aged 18–64, and children under age 18 in the year 2008 (U.S. Census Bureau, 2011), we estimate that roughly 9.3 million adult Americans lost health insurance during the Great Recession. This is the difference in the number of Americans who had health insurance coverage at the macroeconomic peak in December 2007 compared to the trough in June 2009; the number who ever lost health insurance during the Great Recession is undoubtedly higher due to the fact that there is churning in the ranks of the uninsured (Swartz, 1994). This macroeconomic impact fell much more heavily on men; the 9.3 million total includes 7.1 million men and 2.2 million women. Thus, the Great Recession lived up to its name; for comparison, during the 2001 recession, we estimate that 984,000 adult Americans lost health insurance (the vast majority of whom were adult males). The difference in estimates is

[1] The national unemployment rate continued to rise after what the NBER classifies as the end of the 2009 recession (peaking at 10.1% in October 2009), but we consider the trough of the economy to be that determined by the NBER.

driven by both a much greater increase in unemployment rate (a 4.5 percentage point increase during the Great Recession compared to a 1.3 percentage point increase during the 2001 recession), and a much larger effect on men of each percentage point rise in unemployment. In contrast to adults, our point estimates imply that 4.2 million children under the age of 18 *gained* health insurance during the Great Recession.

We caution that the 95% confidence intervals around our aggregate estimates are very large; for men it ranges between 11.9 million and 2.4 million losing health insurance, for women it ranges between 5.2 million losing coverage and 0.9 million gaining it, and for children it ranges between 73,000 and 8.4 million gaining coverage.

Our estimate that 9.3 million adult Americans lost health insurance during the Great Recession is similar to the calculation reported by the Commonwealth Fund (based on Commonwealth Biennial Health Insurance Surveys) that, between 2008 and 2010, 9 million adults lost health insurance following the loss of a job (Collins et al., 2011); however, our estimate also includes those who lost coverage without changing employment status. Our estimate is also higher than that of Gilmer and Kronick (2009), who estimate, using a model that does not consider unemployment rate, that 6.9 million Americans lost health insurance during the Great Recession.

In the future, the reforms passed by the U.S. Congress in the 2010 Patient Protection and Affordable Care Act (PPACA) will likely moderate the impact of the unemployment rate on the probability of insurance coverage. The PPACA offers incentives for employers to offer, and individuals to take up, coverage; provides subsidies for coverage of low-income families through public and private policies; and changes the regulation of health insurance prices in the individual market. Many features of the law are expected to cushion the impact of future

recessions on health insurance coverage, particularly for adults. For example, the availability of well-functioning markets ("exchanges") for individual insurance together with limits on raising premia with age could reduce the impact of recession on the health insurance status of older workers.

One main feature of the PPACA is an expansion in Medicaid eligibility for adults living in families earning less than 133 percent of the poverty level. To provide suggestive evidence on how this provision may affect the future impact of the macroeconomy on health insurance coverage, we conducted a simple thought experiment. We re-estimated the main model for any insurance coverage (the results for which were reported in Table 2) for both men and women, after imposing the following condition: those adults who are uninsured and have incomes below 133 percent of the federal poverty level are assumed to be covered by Medicaid. This is a gross simplification of what may happen in reality for several reasons. To keep our though experiment simple, we assume away any behavioral adjustments that may occur and assume full take-up by eligible adults. We also do not factor in the individual mandate, or changes that may result from subsidies for those whose family income is between 133 and 400 percent of the poverty line, which may change behavior among those who do not qualify for the Medicaid expansion.

Compared to the original specification in Table 2 that showed a one percentage point increase in the unemployment rate is associated with a statistically significant 1.67 percent decrease in the probability of obtaining any coverage for men, under full take-up of the new Medicaid provisions of the PPACA, the impact of the unemployment rate on health insurance coverage for men is not statistically significant. As the various components of the PPACA are implemented, it will become possible for researchers to more accurately simulate and test how reforming the current system of health insurance in the US will affect the association of the

unemployment rate with the probability of uninsurance and the functioning of the social safety net.

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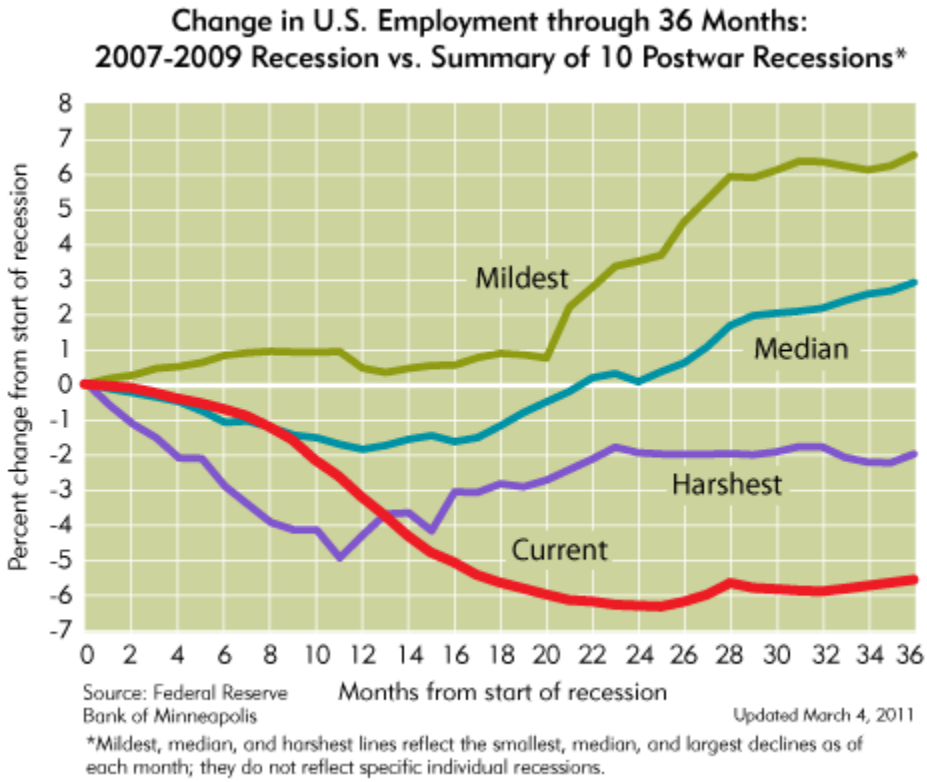
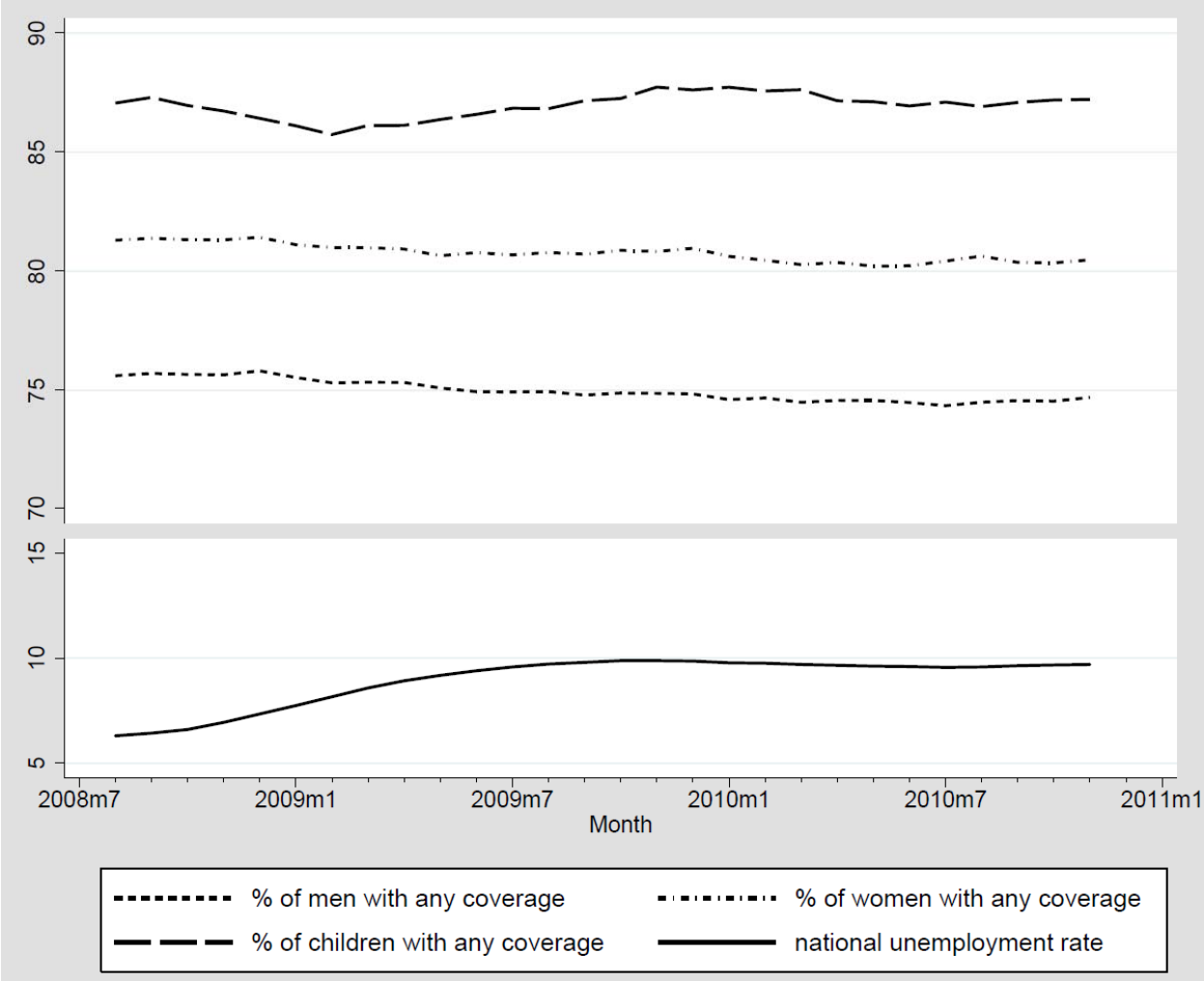
Figure 1: Change in Employment in Current Versus Historic Recessions



Source: Federal Reserve Bank of Minneapolis. World Wide Web content.
http://www.minneapolisfed.org/publications_papers/studies/recession_perspective/index.cfm
Accessed October 20, 2011

Figure 2. Percentage of Men, Women and Children with Any Insurance Coverage, and National Unemployment Rate



Notes: Source: 2008 SIPP panel, non elderly respondents, using only observations from the fourth reference months.

Table 1. Means of Key Variables

	Men	Women	Children
Health Insurance Status			
Indicator: covered by any HI	0.786	0.830	0.855
Indicator: covered by own employer HI	0.488	0.365	
Indicator: covered by employer HI as a dependent	0.142	0.261	0.478
Indicator: covered by employer HI (in own name or as a dependent)	0.630	0.626	
Indicator: covered by government HI	0.091	0.133	0.292
Employment Status			
Indicator: employed	0.794	0.681	
Indicator: unemployed	0.045	0.038	
Indicator: not in a labor force	0.161	0.281	
Unemployment Rate			
State monthly unemployment rate	6.571	6.563	6.497
Number of observations	467,285	510,334	416,648

Notes: Data: pooled 2004-2010 waves of the SIPP. The sample consists of: column 1: all men between the ages of 18 and 64; column 2: all women between the ages of 18 and 64; column 3: all children under the age of 18.

Table 2. Probability of Health Insurance Coverage
Logit Regression (with person- and year-specific fixed effects)

	Any source	Employer own coverage	Employer dependent coverage	Employer all coverage	Government provided
ALL	(N=1,394,267)	(N=977,619)	(N=1,394,267)	(N=977,619)	(N=1,394,267)
unemployment rate	-0.0124	-0.0276 **	0.0017	-0.0258	0.0227
	(0.015)	(0.012)	(0.015)	(0.016)	(0.021)
	[-0.0030]	*[-0.0057]*	*[0.0004]*	*[-0.0057]*	*[0.0056]*
mean of dependent variable	0.823	0.424	0.286	0.628	0.166
MEN	(N=467,285)	(N=467,285)	(N=467,285)	(N=467,285)	(N=467,285)
unemployment rate	-0.0707 ***	-0.0464 ***	0.0224	-0.0363 **	0.0061
	(0.023)	(0.014)	(0.030)	(0.017)	(0.034)
	[-0.0167]	*[-0.0101]*	*[0.0056]*	*[-0.0078]*	*[0.0006]*
mean of dependent variable	0.786	0.488	0.142	0.630	0.091
WOMEN	(N=510,334)	(N=510,334)	(N=510,334)	(N=510,334)	(N=510,334)
unemployment rate	-0.0214	-0.0066	-0.0114	-0.0155	-0.0117
	(0.017)	(0.016)	(0.020)	(0.021)	(0.024)
	[-0.0050]	*[-0.0012]*	*[-0.0025]*	*[-0.0034]*	*[-0.0025]*
mean of dependent variable	0.830	0.365	0.261	0.626	0.133
CHILDREN	(N=416,648)		(N=416,648)		(N=416,648)
unemployment rate	0.0533		0.0050		0.0550 *
	(0.033)		(0.036)		(0.029)
	[0.0126]		*[0.0011]*		*[0.0137]*
mean of dependent variable	*0.855*		*0.478*		*0.292*

Notes: (1) Cells of the table contain: coefficient, bootstrapped standard errors in parentheses, and marginal effects in italics.
(2) Superscripted notations next to the coefficients indicate the level of statistical significance from a two-tailed t-test. *** denotes the 1% level, ** denotes the 5% level and * denotes the 10% level.
(3) Bootstrapped standard errors are clustered at the state level.
(4) Data: pooled 2004-2010 waves of the SIPP. The sample consists of : row 1: all non-elderly under the age of 65 (except columns 2 and 4: all non-elderly adults between the ages of 18 and 64 regardless of employment status); row 2; all men between the ages of 18 and 64 regardless of employment status; row 3: all women between the ages of 18 and 64 regardless of employment status, and ; row 4: all children under the age of 18.
(5) 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 in own name and 0 otherwise; column 3: indicator variable that equals 1 if individual is covered by employer health insurance as a dependent and 0 otherwise; column 4: indicator variable that equals 1 if individual is covered by employer health insurance either in own name or as a dependent and 0 otherwise; column 5: indicator variable for any type of government-provided health insurance.
(6) Other regressors are individual fixed effects, year-specific fixed effects, highest grade completed, marital status, presence of children in the family, and age .

Table 3. Probability of Health Insurance Coverage
Logit Regression (with person- and year-specific fixed effects)
With controls for labor force status

	Any source		Employer own coverage		Employer dependent coverage		Employer all coverage		Government provided	
MEN	(N=467,285)		(N=467,285)		(N=467,285)		(N=467,285)		(N=467,285)	
unemployment rate	-0.0564	**	-0.0289		0.0205		-0.0206		0.0035	
	(0.021)		(0.021)		(0.032)		(0.019)		(0.032)	
	[-0.0118]		*[-0.0052]*		*[0.0051]*		*[-0.0049]*		*[0.0006]*	
Indicator: employed	0.554	***	1.916	***	-0.255	***	1.359	***	-1.017	***
	(0.042)		(0.068)		(0.049)		(0.044)		(0.061)	
	[0.121]		*[0.416]*		*[-0.0636]*		*[0.327]*		*[-0.162]*	
Indicator: unemployed	-0.623	***	-0.372	***	-0.0164	***	-0.395	***	-0.411	***
	(0.031)		(0.069)		(0.061)		(0.039)		(0.060)	
	[-0.142]		*[-0.0719]*		*[-0.0041]*		*[-0.0965]*		*[-0.0741]*	
WOMEN	(N=510,334)		(N=510,334)		(N=510,334)		(N=510,334)		(N=510,334)	
unemployment rate	-0.0139		0.0115		-0.0124		-0.0009		-0.0193	
	(0.020)		(0.018)		(0.021)		(0.024)		(0.027)	
	[-0.0028]		*[0.0015]*		*[-0.0030]*		*[-0.0002]*		*[-0.0048]*	
Indicator : employed	0.450	***	2.261	***	-0.357	***	1.276	***	-0.794	***
	(0.025)		(0.067)		(0.037)		(0.052)		(0.045)	
	[0.0919]		*[0.417]*		*[-0.0841]*		*[0.293]*		*[-0.193]*	
Indicator: unemployed	-0.438	***	-0.130	***	-0.120	***	-0.350	***	-0.162	***
	(0.040)		(0.067)		(0.048)		(0.042)		(0.046)	
	[-0.0944]		*[-0.0175]*		*[-0.0289]*		*[-0.0815]*		*[-0.0401]*	

Notes: (1) See Notes (1)-(6) under Table 2.
(2) Model includes as regressors, in addition to variables listed under Note 6 of Table 2, an indicator for being employed, and an indicator for being unemployed .
(3) The means of dependent variables are the same as those in Table 2.

Table 4: Reason a Person is Uninsured, as a Function of the Unemployment Rate
Logit Regression (with state- and year-specific fixed effects)

	too expensive, can't afford	HI not offered by employer	not at job long enough to qualify	job layoff, job loss, unemployment	not eligible-part time or temp	haven't needed health insurance
MEN	(N=28,645)	(N=28,645)	(N=28,645)	(N=28,645)	(N=28,645)	(N=28,645)
unemployment rate	0.0795 **	-0.0883 **	-0.108 ***	0.0210	-0.0004	-0.128 ***
	(0.030)	(0.040)	(0.036)	(0.037)	(0.047)	(0.037)
	[0.0123]	*[-0.0142]*	*[-0.0082]*	*[0.0011]*	*[-0.00001]*	*[-0.0048]*
mean of dependent variable	0.792	0.208	0.089	0.064	0.029	0.044
WOMEN	(N=25,891)	(N=25,891)	(N=25,891)	(N=25,891)	(N=25,891)	(N=25,891)
unemployment rate	0.0716 **	-0.0684	-0.116 ***	0.0306	-0.0274	-0.0958
	(0.028)	(0.044)	(0.043)	(0.030)	(0.041)	(0.068)
	[0.0092]	*[-0.0098]*	*[-0.0073]*	*[0.0013]*	*[-0.0009]*	*[-0.0025]*
mean of dependent variable	*0.807*	*0.172*	*0.072*	*0.049*	*0.036*	*0.032*

Notes: (1) See Notes (1)-(3) under Table 2.
(2) Sample is limited to the first month of being uninsured for each individual in the SIPP (2004-2010).
(3) Dependent variables—column 1: indicator variable that equals 1 if the reason a person is uninsured is "too expensive, can't afford" and 0 otherwise; column 2: indicator variable that equals 1 if the reason a person is uninsured is "HI not offered by employer" and 0 otherwise; column 3: indicator variable that equals 1 if the reason a person is uninsured is "not at job long enough to qualify" and 0 otherwise; column 4: indicator variable that equals 1 if the reason a person is uninsured is "job layoff, job loss, unemployment" and 0 otherwise; column 5: indicator variable that equals 1 if the reason a person is uninsured is "not eligible-part time or temp" and 0 otherwise; column 6: indicator variable that equals 1 if the reason a person is uninsured is "haven't needed health insurance" and 0 otherwise.
(4) Other regressors are state fixed effects, year-specific fixed effects, highest grade completed, marital status, presence of children in the family, and age.

Table 5. Probability of Health Insurance Coverage, by Education
Logit Regression (with person- and year-specific fixed effects)

	Any source	Employer own coverage	Employer dependent coverage	Employer all coverage	Government provided
MEN					
High school or less	(N=188,164)	(N=188,164)	(N=188,164)	(N=188,164)	(N=188,164)
unemployment rate	-0.0709 ***	-0.0727 ***	0.0061	-0.0640 ***	0.0402
	(0.023)	(0.021)	(0.035)	(0.024)	(0.047)
	[-0.0173]	*[-0.0180]*	*[0.0010]*	*[-0.0140]*	*[0.0065]*
mean of dependent variables	0.675	0.364	0.127	0.491	0.133
Some college	(N=161,132)	(N=161,132)	(N=161,132)	(N=161,132)	(N=161,132)
unemployment rate	-0.0589 *	-0.0155	0.0345	0.0034	-0.0673
	(0.035)	(0.028)	(0.036)	(0.027)	(0.043)
	[-0.0137]	*[-0.0018]*	*[0.0029]*	*[0.0008]*	*[-0.0127]*
mean of dependent variables	0.809	0.499	0.163	0.663	0.078
Bachelor's degree or more	(N=117,989)	(N=117,989)	(N=117,989)	(N=117,989)	(N=117,989)
unemployment rate	-0.106 **	-0.0623 **	0.0432	-0.0536	0.0209
	(0.041)	(0.028)	(0.046)	(0.037)	(0.069)
	[-0.0214]	*[-0.0149]*	*[0.0078]*	*[-0.0112]*	*[0.0052]*
mean of dependent variables	0.922	0.674	0.131	0.805	0.034
WOMEN					
High school or less	(N=187,884)	(N=187,884)	(N=187,884)	(N=187,884)	(N=187,884)
unemployment rate	-0.0034	-0.0073	0.0241	0.0063	-0.0158
	(0.024)	(0.024)	(0.031)	(0.026)	(0.033)
	[-0.0008]	*[-0.0010]*	*[0.0055]*	*[0.0012]*	*[-0.0035]*

mean of dependent variables	0.742	0.250	0.220	0.470	0.214
Some college	(N=190,050)	(N=190,050)	(N=190,050)	(N=190,050)	(N=190,050)
unemployment rate	-0.0261	0.0049	-0.0115	-0.0066	-0.0231
	(0.024)	(0.023)	(0.032)	(0.023)	(0.037)
	[-0.0059]	*[0.0011]*	*[-0.0026]*	*[-0.0017]*	*[-0.0043]*
mean of dependent variables	0.844	0.368	0.0287	0.655	0.112
Bachelor's degree or more	(N=132,400)	(N=132,400)	(N=132,400)	(N=132,400)	(N=132,400)
unemployment rate	-0.0776	-0.0074	-0.0625 *	-0.0582	0.0314
	(0.051)	(0.021)	(0.034)	(0.038)	(0.046)
	[-0.0190]	*[-0.0013]*	*[-0.0153]*	*[-0.0118]*	*[0.0077]*
mean of dependent variables	0.937	0.526	0.292	0.818	0.034

Notes: (1) See Notes (1)-(5) under Table 2.
(2) Other regressors are individual fixed effects, year-specific fixed effects, age, marital status, and presence of children in the family.

Table 6: Probability of Health Insurance Coverage, by Race
Logit Regression (with person- and year-specific fixed effects)

	White (non-Hispanic)	African-American or Hispanic
MEN	(N=331,275)	(N= 102,721)
unemployment rate	-0.0615 **	-0.0840 ***
	(0.024)	(0.030)
	[-0.0154]	*[-0.0095]*
mean of dependent variable	0.836	0.628
WOMEN	(N=349,708)	(N=122,699)
unemployment rate	-0.0237	-0.0110
	(0.018)	(0.033)
	[-0.0051]	*[-0.0027]*
mean of dependent variable	0.871	0.717
CHILDREN	(N=244,452)	(N=135,216)
unemployment rate	0.0617 **	0.0509
	(0.025)	(0.051)
	[0.0138]	*[0.0124]*
mean of dependent variable	*0.886*	*0.797*

Notes: (1) See Notes (1)-(4) under Table 2.
(2) A dependent variable in each column is an indicator variable that equals 1 if individual covered by health insurance from any source and 0 otherwise.
(3) Other regressors are individual fixed effects, year-specific fixed effects, age, highest grade completed, marital status, and presence of children in the family (The last three variables are not included in the regressions for children.).

Table 7: Probability of Health Insurance Coverage, by Age
Logit Regression (with person- and year-specific fixed effects)

	18-34 years	35-49 years	50-64 years
MEN	(N=165,372)	(N=163,411)	(N=138,502)
unemployment rate	-0.0574 **	-0.0683 **	-0.105 ***
	(0.027)	(0.032)	(0.039)
	[-0.0134]	*[-0.0156]*	*[-0.0250]*
mean of dependent variable	0.693	0.810	0.870
WOMEN	(N=175,088)	(N=178,729)	(N=156,517)
unemployment rate	-0.0076	-0.0277	-0.0526
	(0.020)	(0.027)	(0.044)
	[-0.0019]	*[-0.0069]*	*[-0.0112]*
mean of dependent variable	*0.775*	*0.842*	*0.879*

Notes: (1) See Notes (1)-(4) under Table 2.
(2) A dependent variable in each column is an indicator variable that equals 1 if individual covered by health insurance from any source and 0 otherwise.
(3) Other regressors are individual fixed effects, year-specific fixed effects, highest grade completed, marital status, and presence of children in the family (The last three variables are not included in the regressions for children.).