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PUBLIC HEALTH INSURANCE, LABOR SUPPLY, AND EMPLOYMENT LOCK

Craig Garthwaite
Tal Gross
Matthew J. Notowidigdo

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ABSTRACT

We study the effect of public health insurance eligibility on labor supply by exploiting the largest public health insurance disenrollment in the history of the United States. In 2005, approximately 170,000 Tennessee residents abruptly lost public health insurance coverage. Using both across- and within-state variation in exposure to the disenrollment, we estimate large increases in labor supply, primarily along the extensive margin. The increased employment is concentrated among individuals working at least 20 hours per week and receiving private, employer-provided health insurance. We explore the dynamic effects of the disenrollment and find an immediate increase in job search behavior and a steady rise in both employment and health insurance coverage following the disenrollment. Our results suggest a significant degree of "employment lock" – workers employed primarily in order to secure private health insurance coverage. The results also suggest that the Affordable Care Act – which similarly affects adults not traditionally eligible for public health insurance – may cause large reductions in the labor supply of low-income adults.

Craig Garthwaite
Department of Management and Strategy
Kellogg School of Management
Northwestern University
2001 Sheridan Road
Evanston, IL 60208
and NBER
c-garthwaite@kellogg.northwestern.edu

Matthew J. Notowidigdo
University of Chicago
Booth School of Business
5807 South Woodlawn Avenue
Chicago, IL 60637
and NBER
noto@chicagobooth.edu

Tal Gross
Department of Health Policy and Management
School of Public Health
Columbia University
600 West 168th Street, Sixth Floor
New York, NY 10032
and NBER
tg2370@columbia.edu

1. INTRODUCTION

The United States is unique among industrialized countries in its tight linkage between health insurance and employment. Government health insurance programs cover the disabled, low-income parents, and those older than 65, but few other adults qualify for public coverage. Americans without access to public or employer-provided insurance can purchase health insurance through the individual, non-group market, but that market is believed to face adverse-selection pressures (Hackman, et al., 2013; Hendren, 2013). As a result, many Americans can only access affordable health insurance through their employer, and thus expansions of public health insurance can have large effects on the labor market.

The 2010 Affordable Care Act (ACA) is the largest public health insurance expansion since the creation of the "Great Society" programs in the 1960s. The ACA will weaken the link between employment and health insurance through the creation of a series of state-based individual insurance exchanges. An individual mandate will require that nearly all individuals purchase health insurance, which may relieve adverse-selection pressures. Additionally, low-income individuals participating in the exchanges will receive large tax subsidies, and those earning less than 138 percent of the poverty line regardless of their family or disability status are expected to receive public health insurance through a large Medicaid expansion.

Few empirical estimates exist that can help policymakers and economists predict the labor market impacts of a reform such as the ACA.[1] Previous studies focus primarily on the disincentives for work created by Medicaid's strict earnings limits, restrictions that are effectively removed under the ACA (Yelowitz, 1995; Meyer and Rosenbaum, 2000). Other studies focus on the relationship between health insurance and job mobility or retirement but are unable to examine how the availability of heavily subsidized health insurance might affect these outcomes (Madrian, 1994; Gruber and Madrian, 1997). Additionally, previous studies of public health insurance focus (by necessity) on

[1] Currie and Madrian (1999) and Gruber and Madrian (2004) summarize the existing research on employment and health insurance.

traditional Medicaid beneficiaries such as pregnant women, women receiving cash welfare, and children in low-income families (Dave et al., 2013). By contrast, the ACA will primarily affect non-disabled, childless adults and relatively higher-income families (Kenney et al., 2012). Very little is known about how this distinct sub-population will react to changes in public health insurance eligibility.

In this paper, we exploit a unique policy reform in Tennessee to estimate the effect of public health insurance eligibility on the labor supply of childless adults. In 2005, Tennessee discontinued its expansion of TennCare, the state's Medicaid system. The TennCare disenrollment was the largest public health insurance disenrollment in the history of the United States. Approximately 170,000 adults (roughly 4 percent of the state's non-elderly, adult population) abruptly lost public health insurance coverage over a three-month period.

We exploit both across- and within-state variation in exposure to the disenrollment. First, we use the sharp change in eligibility in Tennessee to estimate difference-in-difference models, which compare outcomes in Tennessee after the disenrollment to outcomes in Tennessee before the disenrollment and to other states in the American south. Second, we note that the disenrollment disproportionately affected a particular sub-population – childless adults – which was unaffected by policy changes in other states. We exploit this fact to estimate triple-difference models which compare outcomes among childless adults in Tennessee to other adults in Tennessee before and after the disenrollment. The disproportionate effect of the disenrollment on childless adults allows us to focus on a policy-relevant sub-population that has received little attention in the existing literature on public health insurance eligibility. Relative to previous work, we believe that the sudden policy change and large scale of the policy reform leads to especially transparent results. In particular, most of our results are plainly evident in aggregate time-series data.

We find that the TennCare disenrollment caused a large and immediate labor supply increase. The increased employment is concentrated among individuals working more than 20 hours per week

and who report having private, employer-provided health insurance. Indeed, we find a similarly large increase in private health insurance following the disenrollment, suggesting that public health insurance had been "crowding out" private health insurance (Cutler and Gruber, 1996). When we explore the dynamic effects of the disenrollment, we find an immediate increase in job search behavior and a steady rise in both employment and health insurance coverage. The pattern of changes in labor supply and the crowdout behavior suggest that disenrollees entered the labor market and gained employment in order to procure health insurance. This finding is consistent with both large valuations of health insurance as well as strong work disincentives from public health insurance that are unrelated to strict income-based eligibility limits.

Overall, our results demonstrate that public health insurance eligibility can have large effects on the labor market. Additionally, our estimates may provide useful guidance regarding the likely labor supply impacts of the ACA. As discussed above, both TennCare and the ACA target demographic groups not traditionally eligible for public health insurance, such as adults without dependents and with incomes above the federal poverty line. Additionally, unlike traditional Medicaid programs, as beneficiaries in the TennCare expansion program earned additional income, their insurance premiums and copayments increased, but they did not lose coverage.[2] Similarly, under the ACA, individuals in health insurance exchanges will experience decreased subsidies as their income increases. Appendix Table A1 presents TennCare premiums in 2004 and estimated ACA exchange premiums. These premiums are very similar across the programs.

Because of the broad similarities between the two programs, in the final section of this paper we extrapolate from our estimates in order to assess the likely labor market impacts of the ACA. Applying our labor supply estimates nationally, we estimate that the ACA may have significant effects on the labor supply of low-income workers with employer-provided insurance who are not currently

[2] In addition, to remain eligible for TennCare, individuals in the expansion population had to be ineligible for group health coverage from another source. Again, this is similar to the ACA, where in order to qualify for tax subsidies in the non-group insurance exchanges, individuals have to be ineligible for affordable coverage (less than 9.5 percent of income) from their employer.

eligible for free or heavily subsidized health insurance. Our results suggest that ACA-related decreases in labor supply among this group of low-income workers could reduce the aggregate employment rate by between 0.3 and 0.6 percentage points. Importantly, this predicted reduction would be driven by changes in labor supply and therefore would not necessarily imply a welfare loss for individuals choosing to exit the labor force. Additionally, considerable caution should be exercised in interpreting these predictions, and we provide a number of important caveats below. However, our findings suggest that institutional features of health insurance in the US can cause a phenomenon we call "employment lock." [3] This occurs when individuals supply labor primarily to secure private health insurance through an employer. If such individuals could instead acquire affordable health insurance apart from their employer, many of them would exit the labor force entirely. As a result of employment lock, policies that expand access to health insurance apart from employers (such as the ACA) may have large labor market effects.

The remainder of the paper proceeds as follows. Section 2 describes Tennessee's Medicaid program and the particular policy change that we study. Section 3 discusses the previous literature. Section 4 describes the data sources we use in our analysis. Section 5 describes the effects of the disenrollment on labor supply and health insurance coverage. Finally, Section 6 uses our results to assess the likely consequences of the ACA on labor markets and concludes.

2. TENNESSEE'S HEALTH CARE REFORM

In the late 1980s, Tennessee, like many other states, expanded its Medicaid program to include low-income pregnant women and their children. Those expansions, and rising healthcare costs more generally, resulted in dramatic growth in Tennessee's Medicaid spending. From 1988 to 1994,

[3] We use the term "employment lock" rather than "job lock", since a large literature uses the latter to indicate the role of employer-provided health insurance on reduced job mobility. By contrast, we focus on the role of employer-provided health insurance on the decision to work at all.

Medicaid expenditures in Tennessee increased from approximately $692 million to nearly $2.7 billion (Chang and Steinberg, 2009).

In 1994, facing a primarily Medicaid-driven budget deficit of approximately $250 million, Tennessee enacted health care reform designed to simultaneously control costs and expand coverage (Wright, 2001). Under a waiver from the US Department of Health and Human Services, Tennessee enrolled all existing Medicaid recipients in managed care insurance plans. The state used the planned savings from these managed care contracts to fund a novel public health insurance expansion aimed at individuals, regardless of income, that were either "uninsured" or "uninsurable."[4]

The lack of a specific income requirement makes this reform particularly unique. To our knowledge, all previous expansions of public health insurance have placed strict limits on the total income qualified beneficiaries can earn. As a result, many TennCare expansion program enrollees had unusually high incomes for adults receiving public health insurance. In 1995, approximately 40 percent of enrollees in the TennCare expansion program had incomes above 100 percent of the poverty line, with 6.3 percent having incomes between 200 and 400 percent and 1.3 percent have incomes above 400 percent of the poverty line (Wooldridge et al., 1996).

The demographics of the TennCare expansion population were also markedly different from traditional Medicaid beneficiaries in Tennessee. Individuals in the expansion program were far more likely to be white and between the ages of 21 and 64 than traditional Medicaid enrollees. Reflecting back on the purposes of the program, the Executive Director of the Kaiser Commission on Medicaid and the Uninsured said "TennCare was bold, it was comprehensive, it looked at the whole low-income population and was seen by many as a model for how we might provide coverage to the low-income population, especially by bringing in childless adults who historically have never been eligible

[4] In order to avoid gaming of the system, the state required that individuals attempting to qualify for the coverage as "uninsured" on January 1, 1994, had to be uninsured as of March 1, 1993. To qualify as "uninsurable," individuals had to submit documentation demonstrating that they were previously denied private health insurance coverage (Moreno and Hoag, 2001).

for Medicaid" (Rowland, 2005). Similarly, Wooldridge et al. (1996) said that the TennCare expansion opened Medicaid up to "able-bodied" adults regardless of family status.

The 1994 TennCare expansion faced financial difficulties that foreshadowed its ultimate unraveling. By 2001, the system faced a budget shortfall of over $300 million (Chang and Steinberg, 2009). In 2002, Phil Bredesen, a former managed care executive, was elected as the Governor of Tennessee on a platform of reforming TennCare. At the time he said, "[e]verybody in the state of Tennessee knows somebody on TennCare they don't think should be on TennCare. It needs to be the bronze package, not the platinum package" (National Journal, 2010).

In 2002, a modified TennCare waiver changed the eligibility of the uninsurable category to require a medical review of "insurability" rather than just a letter stating that private coverage had been previously denied. The Bureau of TennCare also began a process of "re-verification" in which all TennCare enrollees were required to schedule appointments to determine if they remained eligible for benefits (Kaiser Health News, 2002). The vast majority of individuals who responded to the request retained coverage. However, nearly 200,000 individuals did not respond and were immediately removed from the Medicaid rolls (TennCare Quarterly Report, 2003). As part of a court settlement, these individuals received an extended grace period to demonstrate eligibility that resulted in many re-qualifying for benefits (Ruble, 2003).

Figure 1 presents quarterly enrollment counts for both the entire TennCare system and the Uninsured and Uninsurable category from 2002 through 2009. Two primary impacts of the 2002 re-verification process can be seen during the earliest quarters in the graph. First, in early 2003, approximately 100,000 people were removed from the Medicaid rolls. Most of these individuals had not responded to repeated requests for re-verification despite the threat of lost coverage. Thus it is unlikely that these individuals were frequent users of TennCare-covered medical services.[5] Second,

[5] Suggestive evidence of this lack of medical expenditures can be found in TennCare enrollment and expenditure data. In the last quarter of 2002 TennCare Spending was approximately $890 million for 1.4 million enrollees. In the last quarter of 2003, there were 1.3 million remaining enrollees but spending increased to $1.1 billion. In stark contrast on July 15, 2005 there were 1.35 million enrollees and quarterly expenditures were $1.3 billion. By July 15, 2006, enrollments fell to

the distribution of enrollees by category shifted. Approximately 20 percent of TennCare enrollees moved from the expansion population to traditional Medicaid. Following re-verification, overall TennCare enrollments remained fairly stable at approximately 1.3 million, with everyone in the expansion category being unable to qualify for traditional Medicaid coverage either as a result of their income level or categorical restrictions such as being a childless adult. Appendix Figure A1 presents annual enrollment levels by eligibility category from 1996 through 2009.

In November 2004, Governor Bredesen announced that TennCare would cease to cover adults over the age of 19 who didn't qualify for traditional Medicaid (Chang and Steinberg, 2009).[6] Over the next several months there was great debate in the press and courts about whether the disenrollment would actually occur. Beginning in the late July 2005, Tennessee disenrolled individuals over the age of 19 who only qualified for coverage in an expansion category. On January 15, 2005, TennCare had approximately 1,337,000 enrollees, on January 15, 2006 enrollment was reduced to approximately 1,200,000 and on January 15, 2007 there were approximately 1,170,000 TennCare beneficiaries. These reductions came almost entirely from the expansion population, which fell from approximately 223,000 enrollees to 35,000 over this period. Given the earlier re-verification process, few of these individuals were able to re-qualify for traditional Medicaid and permanently lost public health insurance coverage. On January 15, 2009 the TennCare population remained at approximately 1,170,000.

As a result of the disenrollment, approximately 4 percent of the non-elderly adult population of Tennessee lost insurance coverage over a period of several months. The disenrollment changed the

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1.2 million and quarterly expenditures fell to $950 million, a 30 percent decrease. Provider payments excluding pharmaceutical expenditures fell by 14 percent over that time period.

[6] At the same time, there was also a reduction in certain services for the remaining enrollees. Perhaps the most significant reduction in benefits for those retaining coverage affected the generosity of prescription drug coverage. In 2004, these drugs accounted for 33 percent of overall TennCare spending. Effective August 1, 2005, TennCare beneficiaries retaining coverage were limited to 5 prescription drug refills per month of which no more than 2 could be brand name medications (Blue Cross Blue Shield, 2005). From 2005 to 2006, total TennCare spending fell by approximately $1.7 billion, with nearly $1.23 billion of this reduction coming from reduced pharmacy payments. After the reform, prescription drugs accounted for only 21 percent of overall TennCare expenditures (TennCare Annual Report, 2005).

ability of certain categories of enrollees to receive coverage at any income level. According to the Tennessee Justice Center, which organized many of the legal challenges to the disenrollment, "most working adults cannot qualify [for TennCare]. Non-disabled childless adults under 65 cannot get TennCare, no matter how poor they are. Many parents whose children have turned 18 are also unable to get TennCare" (Tennessee Justice Center, 2012).

The 2005 TennCare disenrollment was the largest decrease in publicly provided insurance coverage in American history.[7] A similar decrease in insurance coverage for the entire United States would have involved approximately 8.4 million people. By comparison, 5.5 million Americans lost insurance coverage during the "Great Recession" (DeNavas-Walt et al., 2012).

Despite the size of the TennCare disenrollment, it remains a relatively understudied phenomenon. In the economics literature, to our knowledge, no authors have examined this policy change. Outside of economics, Emerson et al. (2012) examine the impact of the disenrollment on emergency room utilization in Davidson County. They find an increase in the use of emergency room services by uninsured patients after the disenrollment compared to prior to the policy change. The authors also document an increase in bad debt write-offs for these facilities. Similarly, Hearvin et al. (2011) find a small decrease in the total number of emergency room visits before and after the disenrollment. Along with this small decrease, there was a large shift in the payer-mix of emergency department visits in favor of uninsured patients.

Finally, Farrar et al. (2007) conduct focus groups and examine health care utilization for a sample of providers before and after the TennCare cuts. From 2004 to 2005, there was a 1.5 percent decrease in the percentage of uninsured patients in the emergency department at these facilities. By

[7] Two other contractions were relatively large but still smaller than the policy change examined in this paper. In 2005, Missouri implemented a large cutback that affected approximately 100,000 enrollees or 1.6 percent of the state population. Importantly, this involved the reduction of generosity from a more traditional Medicaid program. Family eligibility for Medicaid was reduced from 75 percent of the poverty line to the Temporary Assistance for Needy Families income levels of 17 – 22 percent of income after accounting for disregards (Zuckerman et al., 2009). In 2002, as TennCare re-verified the eligibility of enrollees there was a short-term disenrollment of approximately 128,000 individuals. Unlike the permanent disenrollment studied in this paper, the following year over half of these individuals were back on Medicaid. These patterns are depicted in Appendix Figure A1.

contrast, from 2005 to 2006, there was a 25 percent increase in the number of uninsured patients treated in the emergency room. In a focus group of health care providers, one respondent reported: "[i]t's not that we're seeing more people, I believe it's the same people who used to be insured and now are not."

In contrast to the TennCare disenrollment, two other recent changes in public health insurance have received more attention in the economics literature: the 2006 Massachusetts Health Reform and the 2008 Oregon Medicaid Expansion. In 2006, Massachusetts enacted a broad health reform intended to achieve universal coverage. This included an individual mandate, an employer mandate, a Medicaid expansion, a state-based insurance exchange, and tax subsidies for low-income individuals. These reforms increased the percentage of the population insured from 88.2 percent in 2004–2005 to 93.8 percent in 2008–2009 (Kolstad and Kowalski, 2012a). A series of authors have examined the impacts of these reforms on health outcomes and the use of medical services (Kolstad and Kowalski, 2012a; Miller, 2012; Courtemanche and Zapata, 2012). More closely related to this work is that of Kolstad and Kowalski (2012b), who examine the effect of the reform on wages and find reductions in wages that are approximately equal to the value of employer-provided health insurance.

In 2008, Oregon initiated a period of open enrollment in their Medicaid expansion program for non-categorically eligible individuals aged 19–64 with incomes below 100 percent of the poverty line and assets below $2,000. Given that the demand for the Oregon expansion would likely exceed supply, state officials created a lottery for enrollees. Finkelstein et al. (2012) and Baicker et al. (2013) use this lottery to identify the causal effect of health insurance on both self-reported and objective outcomes. To date, these authors have not systematically examined the impact of this reform on labor market outcomes.

Relative to these other reforms, the TennCare disenrollment affected a different population. Table 1 presents descriptive statistics for the populations affected by the reforms in Tennessee, Massachusetts, Oregon, as well as predictions for the likely beneficiaries of the ACA Medicaid

expansions.[8] As would be expected, childless adults were disproportionately affected by the TennCare disenrollment. Similarly, approximately 82 percent of those newly eligible for Medicaid under the ACA are expected to be adults without children. By contrast, those newly on public insurance in Massachusetts were roughly evenly split by childless status.

Those affected by the TennCare disenrollment were generally older than the beneficiaries of the ACA and the Massachusetts health reform. The age distribution in Tennessee was similar to those affected by the Oregon Medicaid lottery.[9] In Tennessee, Oregon, and Massachusetts, the affected individuals were slightly more likely to be female while those predicted to receive insurance under the ACA are more likely to be male. Examining the racial breakdown of the affected population, those affected in Tennessee, Massachusetts, and the ACA are similarly likely to be black. As a result of state demographics, relatively few participants in the Oregon lottery were black. Similarly, there were very few Hispanic individuals affected by the TennCare disenrollment.

Taken together, these demographics suggest that the TennCare disenrollment can provide information about the behavior of a group that is demographically similar to the individuals newly eligible for Medicaid under the ACA. On some dimensions – particularly the presence of children in the home – this empirical setting is more similar to the ACA than other previously studied reforms.

3. Existing Literature on the Impact of Public Health Insurance on Labor Supply

Most studies that examine the relationship between public health insurance eligibility and labor supply find, at most, a weak relationship. Moffitt and Wolfe (1992) estimate that changes in Medicaid availability alter the labor supply of female heads of household with the highest valuation of

[8] The estimates for Tennessee and Massachusetts come from our calculations in the CPS based on changes in the publicly insured population before and after the reform, while those for Oregon come from Finkelstein et al. (2012). The ACA estimates are taken from Kenney et al. (2012).

[9] The differences in ages likely result from the individual mandate to purchase insurance that was part of the Massachusetts reform and the ACA. We explore the role of age in more detail below in our analysis of heterogeneous treatment effects.

Medicaid. Similarly, Yelowitz (1995) examines the labor supply impact of Medicaid earnings eligibility limits and finds small changes in labor supply caused by changes in Medicaid availability. Meyer and Rosenbaum (2000) recalculate the AFDC income thresholds used in this earlier study and claim that the labor supply effect is driven by AFDC and not Medicaid. In a survey article, Gruber and Madrian (2004) argue that the literature has found, at most, a weak relationship between public health insurance eligibility and labor supply. However, these authors also state that "the last word has clearly not been written on this topic," and suggest that new sources of variation may provide more insight into the relationship.

Previous work examining public health insurance and labor supply focused on settings in which traditional Medicaid enrollees suffer a complete loss of coverage once they earn more than a particular income threshold. This creates a "Medicaid notch" in enrollees' budget sets. For example, contemporaneous work by Dave et al. (2013) examines the labor supply decision of pregnant women after the Medicaid expansions of the late 1980s and 1990s. Following these expansions, low-income pregnant women had access to public health insurance as long as their income remained below certain thresholds. Following the Medicaid expansion, these authors find decreased labor supply for women who gave birth within the past year, with the largest effects for unmarried women with less than a high school education.

To our knowledge, all past expansions of Medicaid have involved an income-based criterion for eligibility. As a result, previous studies have focused on the effect of Medicaid notches. And yet, large notches are not created by more recent expansions, such as TennCare and the ACA. Under TennCare, enrollees in the expansion population were exempt from Medicaid's income thresholds. If enrollees earned more than 100 percent of the poverty line, they retained their coverage and were required to pay premiums on a sliding scale based on their earnings. Once enrollees earned more than 400 percent of the poverty line, their premium was unsubsidized, but was much less costly than insurance purchased in the non-group market. In 1995, over 40 percent of the expansion population

was paying some premiums (Wooldridge et al., 1996). Similarly, under the ACA, as individuals earn more than 138 percent of the poverty line, they must purchase heavily subsidized insurance coverage through state-based exchanges. These subsidies continue until 400 percent of the poverty line, after which coverage is unsubsidized

Given that TennCare did not involve a Medicaid notch, the disenrollment isolates the effect of access to health insurance rather than the effect of notch-related work disincentives. In this way, our analysis also relates to the literature on health-insurance-driven "job lock." Madrian (1994) finds that access to employer-provided health insurance decreases the voluntary turnover rate by 25 percent. Gruber and Madrian (1997) find that regulations allowing separated workers continued access to health insurance increases the number of employment separations and the length of time spent without employment. Similar to our results, these studies document a strong relationship between overall access to health insurance and a variety of labor market outcomes.

Public health insurance eligibility may affect labor supply if those who lose eligibility for public insurance enter the labor market so that they can find private health insurance. In this sense, changes in labor supply can partially explain how public health insurance crowds out private health insurance. Beginning with Cutler and Gruber (1996), economists have debated the degree to which such crowdout exists. Cutler and Gruber, along with a number of subsequent studies, found crowdout estimates of roughly 50 percent, suggesting that half of the individuals who benefit from a public health insurance expansion would otherwise have been covered in the private market (e.g. Cutler and Gruber, 1996; LoSasso and Buchmueller, 2004; Gruber and Simon, 2008). Other studies have found little evidence of crowdout (e.g. Card and Shore-Sheppard, 2004; Ham and Shore-Sheppard, 2005; Levine, McKnight, and Heep, 2011). Gruber and Simon (2008) summarize this literature, which contains crowdout estimates ranging from 0 to 60 percent, and demonstrate that previous crowdout estimates are sensitive to the sample population and time period. Within this expansive literature, our

analysis is most closely related to recent work examining crowdout in the context of the Massachusetts health reform by Kolstad and Kowalski (2012a).

The uncertainty in the literature over crowdout has made it difficult to estimate the effects of large policy changes such as the ACA. For example, a report by the Center for Budget and Policy Priorities said, "[c]ontrary to claims by some critics, the Medicaid expansion in the new health reform law will overwhelmingly provide coverage to people who otherwise would be uninsured, rather than shift people who already have private coverage to Medicaid" (Broaddus and Angeles, 2010). In contrast, an analysis for the State of Indiana by the Milliman consulting firm assumed crowdout rates ranging from 50 to 100 percent (Damler, 2010). Given the demonstrated importance of the sample and time period for estimating crowdout, few empirical estimates exist that can be used to evaluate the behavior of the population receiving new public coverage under the ACA.

To our knowledge, all pervious crowd-out studies, except for contemporaneous work by Dave et al. (2013), ignore labor supply as a potential underlying mechanism for crowdout. For example, Cutler and Gruber (1996) focus their analysis exclusively on the private health insurance status of workers. Our results suggest that public health insurance expansions affect who works and therefore, changes in labor supply are critical to fully understanding crowdout.

4. DATA

Our primary data on health insurance coverage and labor market outcomes come from the Current Population Survey (CPS). The CPS is a monthly survey of approximately 50,000 households and it is the primary data set for labor force characteristics of the US civilian, non-institutionalized population. We use data from the March Annual Social and Economic Supplement of the CPS which contains additional questions on the income, poverty, and health insurance status of respondents. We restrict the CPS sample to individuals between ages 21 and 64 without an advanced degree. We use this

sample to determine whether an individual was insured, what form of health insurance coverage they possessed, whether they were working, and the number of hours worked.

Table 2 presents summary statistics from 2004 for Tennessee and all other Southern states. In general, Tennessee is similar to the rest of the South. A notable and unsurprising exception is the much larger share of the Tennessee population covered by public health insurance. This is likely a result of the generosity of the TennCare expansion. Overall employment rates are also broadly similar, with Tennessee having a slightly lower overall employment rate, more people working less than 35 hours and fewer people working more than 35 hours a week. Childless adults compose a similar share of the population in Tennessee versus the rest of the South. Racial composition and education is also broadly similar between Tennessee and the rest of the South, with Tennessee's population being slightly less educated and more likely to be white.

5. The Effect of the TennCare Cuts on Health Insurance Coverage and Labor Supply

This section presents our main empirical results. We first study how the TennCare disenrollment affected public health insurance coverage. We then examine changes in labor supply. In Section 5.3 we demonstrate how a preference for health insurance coverage partially explains the change in labor supply, and in Section 5.4 we estimate the dynamics of the response. Finally, in Section 5.5 we examine how changes in insurance coverage and labor supply varied by demographic group.

5.1. The Effect of the TennCare Disenrollment on Public Health Insurance Coverage

To identify the causal effect of the disenrollment on public health insurance coverage, we first estimate state-by-year difference-in-difference regressions of the following form:

$$y_{st} = \alpha_s + \delta_t + \beta I\{s = TN\} \cdot I\{t \geq 2006\} + \varepsilon_{st}. \quad (1)$$

The variable y_{st} represents an outcome for state s and year t, such as the share of the population with public health insurance coverage. The model includes state fixed effects (α), year fixed effects (δ), and an error term (ε) that is assumed to be uncorrelated with other unobserved determinants of the outcome variable.

The key coefficient of interest is β, which is the difference-in-difference estimate of the effect of the TennCare disenrollment. This coefficient is identified by comparing outcomes in Tennessee after the disenrollment to outcomes in Tennessee before the disenrollment and to other Southern states.[10] The key identifying assumption is that outcomes in Tennessee would not have evolved differently to other Southern states in the absence of the disenrollment. Below, we probe the validity of this assumption by studying pre-existing time trends in the outcomes of interest.

One concern with all cross-state analyses is that the results may be driven by large shocks such as recessions or contemporaneous national policy changes that differentially affect some states. To address such concerns, we restrict our analysis to the years between 2000 and 2007. This time period provides two full years of data after the TennCare disenrollment, but avoids potential confounding effects arising from the 2008 recession, which began in December of 2007 (National Bureau of Economic Research, 2008).

We begin by examining unadjusted sample means. Figure 2 presents the share of residents who report having public health insurance in Tennessee and in other Southern states. Given the small cell sizes arising from this disaggregation, we group CPS respondents into two-year bins.[11] From 2000–2005, the percent of the population with public health insurance in Tennessee and other Southern states were evolving similarly. In 2006, however, we observe a sudden break in trend for Tennessee, with the share of Tennessee residents who report being publicly insured dropping by roughly 4

[10] We use the United States Census Bureau definition of Southern states which includes Alabama, Arkansas, Delaware, the District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, Tennessee, Texas, Virginia, South Carolina, and West Virginia. Panel B of Appendix Table A2 presents regression estimates when the sample includes all states. These results are very similar to our baseline estimates.

[11] The figure presents means by two-year bins for illustrative purposes. In the regression results that follow, the sample always consists of annual observations.

percentage points. By contrast, there was little change in the share of publicly insured residents in other Southern states.

Panel A of Table 3 presents regression estimates of equation (1). The first column presents regression estimates with the state-by-year mean public insurance coverage rate as the outcome of interest. Following the TennCare disenrollment, public coverage rates in Tennessee decreased by a statistically significant 4.6 percentage points compared to other Southern states. [12]

Such a pattern could be driven by Tennessee-specific shocks other than the 2005 TennCare disenrollment. To examine the robustness of our results to such possible confounding factors, we next exploit the fact that the disenrollment primarily targeted childless adults.[13] We would expect the changes in coverage to be concentrated among these childless adults. This suggests a "triple-difference" analysis, which compares childless adults in Tennessee to other adults in Tennessee before and after the disenrollment. The triple-difference regression model we estimate takes the following form:

$$y_{ist} = \gamma_i \times \alpha_s + \gamma_i \times \delta_t + \alpha_s \times \delta_t + \beta I\{i = childless\} \cdot I\{s = TN\} \cdot I\{t \geq 2006\} + \varepsilon_{st}. \qquad (2)$$

The variable y_{ist} represents the outcome of interest for state s, in year t, and for demographic group i (either childless adults or other adults). Additionally, the triple-difference model includes a full set of state (α), year (δ), and demographic group (γ) fixed effects, and all of the two-way interactions between each of the three sets of fixed effects. This specification controls for any unobservable common shocks that affected all childless adults across the country in a given year as well as unobservable shocks that affected all adults in Tennessee in a given year. For example, shocks to

[12] The statistical inference in all of the tables that follow is based on standard errors that are robust to auto-correlation between observations in the same state. Such standard errors raise two important concerns. First, the regressions are based on a relatively small number of clusters, 17 states. Second, the regressions have only one treated cluster, Tennessee. We have explored alternative strategies for inference, including non-parametric block bootstrap and wild block bootstrap methods, and we have found broadly similar results. Even these procedures, however, may not perform well with only a single treated cluster. This is an important additional motivation for the triple-difference specification, which is robust to arbitrary state-by-year shocks.

[13] Consistent with the eligibility rules, the CPS data, as well as the prior literature, we use the term "childless adults" to indicate adults between the ages of 21 and 64 who do not have children under the age of 18 living with them.

labor demand that differ across states (but not differentially by childless status) would not lead to bias in this specification.

As above, the key coefficient of interest is the estimate of β, which is the triple-difference estimate of the effect of the TennCare disenrollment on childless adults relative to other adults. This model relies on different assumptions than the difference-in-difference model above. In particular, by controlling for state-by-year fixed effects, the triple-difference model is identified by comparing childless adults to other adults in Tennessee before and after the disenrollment. These results therefore address the concern that Tennessee would have evolved differently than other Southern states even in the absence of the TennCare disenrollment. Instead, the model is based on the identifying assumption that, within Tennessee, the two demographic groups would have evolved similarly in the absence of the disenrollment.[14]

While our main estimates use other Southern states as the comparison group during the time period 2000–2007, our results are not sensitive to this sample selection. To demonstrate this point, Appendix Figures A2 to A7 and Appendix Table A2 present estimates from samples of both different length (extending to 2011) and composition (extending to the entire US). All of these estimates are fairly similar in size and precision to our main estimates.

As above, we again begin with a comparison of unadjusted sample means. Figure 3 presents the share of CPS respondents who report public coverage for four groups: respondents with children in Tennessee, respondents without children in Tennessee, and then the same sub-groups in other Southern states. The figure depicts a striking pattern. Childless Tennessee adult residents experienced a sudden drop in public coverage in 2006 and 2007. That drop was roughly 6 percentage points in magnitude and was a clear break in the group's pre-existing trend. By contrast, Tennessee residents with children experienced no such trend break. Moreover, we do not observe such a pattern in other

[14] Our triple-difference estimates are based on state-by-year-by-childless-status cell means. However, there may be concerns that demographic shifts caused by other factors could confound these aggregate results. Appendix Table A3 presents regressions using individual-level CPS data. Panel A presents estimates without any demographic controls. Panel B includes covariates for gender, age, education and interactions between the three. These estimates are remarkably similar, which demonstrates that changes in demographic composition cannot account for our results.

Southern states for either group of adults. In this way, Figure 3 summarizes our "triple-difference" strategy. The results strongly suggest that the drop in public coverage occurred precisely for the sub-group disproportionately affected by the TennCare disenrollment, with no evidence of a similar change among adults with children.

Panel B of Table 3 presents results based on estimates of the triple-difference model in equation (2). The sample consists of coverage rates by state, year, and childless status. Column (1) presents estimates with mean public health insurance as the dependent variable. The results suggest a 7.3 percentage-point drop in public coverage for childless Tennessee residents after the TennCare disenrollment. In 2004, childless adults represented approximately 48 percent of all adults aged 21 to 64. The triple-difference estimates thus imply an aggregate decline in public health insurance coverage of 3.6 percentage points, which is similar (though somewhat below) the baseline difference-in-difference estimate of 4.6 percentage points.

5.2. The Effect of the TennCare Disenrollment on Labor Supply

The estimates above demonstrate that the TennCare disenrollment caused a sudden decrease in public health insurance. That decrease was concentrated among childless adults. We next examine whether this loss of insurance affected labor supply.

Figure 4 presents employment rates by state and year from 2000 to 2007. Between 2000 and 2005, employment fell in both Tennessee and the rest of the south. After 2005, employment rose slightly in both groups of states. However, beginning in 2005, Tennessee experienced a sudden employment increase that the rest of the south did not experience.

Figure 5 presents trends in employment across Tennessee and other Southern states, with the CPS sample split based on whether the respondent is a childless adult. The figure demonstrates that the employment increase seen in Figure 4 is driven by a sudden break in trend for childless residents of Tennessee after the TennCare disenrollment. By contrast, Tennessee residents with children did

not experience such a change. Moreover, we do not see a similar pattern in other Southern states for either group of adults.[15]

The magnitude of changes in public health insurance coverage and employment among childless adults in Tennessee following the disenrollment are extremely unusual and highly unlikely to be simply an artifact of the relatively small cell sizes in the CPS.[16] To highlight this, we compute two-year changes in public health insurance coverage and employment over time for childless adults within each state during the 2000–2011 time period. In Figures 6, we plot the histogram of changes for the full sample of Southern states. The vertical line in the figure indicates the decline in public health insurance coverage for childless adults in Tennessee between 2004 and 2006, which was approximately 6.9 percentage points. This decline is larger than *any* other two-year decline for any of the other state during the 2000–2011 time period. We repeat this same exercise for employment in Figure 7 and similarly find that the increase in employment among childless adults in Tennessee is extremely unusual. The increase in employment rate of 5.7 percentage points for childless adults in Tennessee is larger than *any* other two-year increase for any of the other observations (including changes for childless adults in Tennessee in other years). Appendix Tables A8 and A9 contain histograms for a sample containing all states. For both public insurance and employment, the change in Tennessee is larger than any other two-year change in any state in the US.

We next quantify the changes in employment demonstrated by Figures 4 and 5 with a regression analysis. Column (2) of Table 3 presents regressions estimating the impact of the TennCare disenrollment on employment. Panel A presents difference-in-difference estimates of equation (1), in which state-year employment rates are the outcome of interest. We find a statistically significant 2.5 percentage-point increase in employment rates following the disenrollment. Panel B presents triple-difference estimates of equation (2) for employment. The estimates suggest a 4.6 percentage-point

[15] Appendix Figure A3 presents similar estimates to Figure 5 for the longer time period of 2000–2011. The figure shows a large and persistent increase in employment for childless adults in Tennessee compared to other adults in Tennessee and childless adults in other Southern states.

[16] Additionally, the cell sizes themselves are not particularly small. Roughly 800–1,200 childless adults in Tennessee meet our sample selection criteria for each year.

increase in employment for childless adults in Tennessee. The employment rate in our sample is 71 percent, suggesting that the TennCare disenrollment resulted in an approximately 6 percent increase in employment over the following two years.[17]

Columns (3) to (5) of Table 3 present estimates of the employment changes based on the number of hours worked in the previous week. The triple-difference results in Panel B suggest that almost all of the employment increase was concentrated among individuals working more than 20 hours per week. Column (4) presents the estimated change in employment for individuals working less than 20 hours per week. This estimate is both small in magnitude and statistically insignificant at conventional levels. By contrast, column (4) suggests an increase in employment between 20 and 34 hours per week. Finally, column (5) suggests that the majority of the employment response is among childless adults working 35 or more hours per week.

Given the details of the reform, we interpret the increase in employment to be a change in labor supply rather than labor demand. We evaluate this indirectly by studying changes in average wages, since an increase in labor supply suggests that we should observe a decrease in wages. Table 4 estimates the effect of the disenrollment on average wages. The first column suggests a 2.3 percent decrease in wages. The second column presents estimates when the outcome of interest is a "residualized" wage measure that accounts for age, gender, education, and their interactions. We find a 1.8 percent decrease in wages with this measure.

The remaining columns of Table 4 test whether the increase in employment comes from people who are out of the labor force and not simply those who were unemployed. These estimates suggest that the employment increase following the disenrollment comes primarily from people entering the labor force. Taken together, these wage and labor force participation estimates suggest that the

[17] Appendix Table A4 presents the full set of interactions for this triple-difference specification. These results demonstrate that the employment changes for TennCare exist almost entirely among childless adults, with no confounding trends for other groups.

employment increase after the TennCare disenrollment is primarily driven by an increase in aggregate labor supply.

As a final robustness check, we examine the effect of the disenrollment on CPS respondents who are older than 65. Those older than 65 are nearly all on Medicare, and thus the disenrollment should have had a limited effect on their labor supply and public health insurance coverage. The first two columns of Table 5 present the public health insurance and employment difference-in-differences estimates for individuals under age 65, and the last two columns present those estimates for those older than age 65.[18] Reassuringly, the estimates for the over-65 sample are small in magnitude and statistically insignificant.

These substantial labor supply increases suggest that some disenrollees may have entered the labor market once they lost coverage. If this is true, we should also observe a change in job search behavior. To investigate this directly, we use a proxy for aggregate job search behavior using data from Google Trends. Figures 8 and 9 present a graphical analysis of Google Trends data for the time period surrounding the TennCare disenrollment. These data are derived from searches on google.com and represent the relative prevalence of particular search terms over time. We normalize these data to their initial value in January of 2004. Figure 8 presents the relative prevalence of the term "TennCare" among internet users in Tennessee. If individuals affected by the disenrollment were actively using google.com for information, we should see a change in search behavior for this term around prominent dates for changes in the program. Accordingly, there are two prominent peaks: in November of 2004 and then in July of 2005. The first peak corresponds to the first date when Governor Bredesen announced the TennCare disenrollment, while the second peak corresponds to the date when the disenrollment actually began. Between these two dates, substantial uncertainty existed regarding whether the state would actually follow through on the announced disenrollment. The pattern of search behavior in Figure 8 provides suggestive evidence that

[18] Very few seniors have children at home, and so we do not estimate our triple-difference specification using this sample.

google.com was a source of information for people interested in information about TennCare during the disenrollment.

We now turn our attention explicitly to job search behavior. Figure 9 presents Google Trends data for the search term "job openings" in Tennessee and in other Southern states. In Tennessee, Google searches for "job openings" rose sharply in July 2005 and peaked in August of 2005, when the TennCare disenrollment began. There is no similar change in search behavior among residents of other Southern states. We interpret these results as strong evidence of an aggregate increase in job search behavior, which is consistent with an increase in aggregate labor supply in response to the disenrollment.

5.3. Labor Supply and Access to Private Health Insurance

The TennCare expansion program, like the ACA, did not involve income eligibility thresholds. Instead, as TennCare enrollees earned more income, they simply paid higher premiums. As a result, the employment estimates above are not a consequence of discontinuities in enrollees' budget sets. Instead, the change in employment suggests that the loss of access to health insurance itself pushed disenrollees into the labor market. Disenrollees who wanted to remain insured may have found that securing employment was the only way to do so. This mechanism for labor supply changes is further supported by the concentration in employment increases for individuals working more than 20 hours a week. While health benefits are more common among full-time employees, a large number of employers also offer health insurance benefits to part-time employees working at least 20 hours per week.[19]

To directly explore this point, we next examine whether the disenrollment affected rates of private health insurance coverage. An increase in private insurance coverage would partly explain the

[19] For example, Starbucks offers its "partners" health benefits after they work 160 hours over a two month period, and employees retain benefits if they work 240 hours a quarter.
http://assets.starbucks.com/assets/7343fbbdc87845ff9a000ee009707893.pdf . Similarly, Costco offers a "Choice Plus" plan for hourly part time employees working an average of 20 hours per week.
http://custom.aetna.com/costco/WhoIsEligible.shtml. Kim (2011) details 5 additional large national employers offering benefits for part-time employees.

employment increase we observe above. It would also suggest that the childless adults affected by the disenrollment exhibited substantial crowdout. Figure 10 presents the share of residents with private health insurance coverage and finds the opposite pattern relative to the trend in public insurance coverage in Figure 2. In 2006, the share of Tennessee residents reporting private coverage sharply increased. By contrast, there was no change in the share of residents of other Southern states reporting private coverage. Figures 2 and 10 together suggest substantial crowdout.

Figure 11 presents private coverage rates with the CPS sample split based on childless status. Childless adults in Tennessee experienced a sudden increase in private coverage in 2006 and 2007. This was a break from the group's pre-existing time trend as, until the TennCare disenrollment, private coverage had been becoming rarer with each passing year. By contrast, Tennessee residents with children in their household experienced no increase in private coverage in 2006 and 2007. There was also no sharp change for either group in other Southern states.

Figures 3 and 11 thus show that childless adults – the sub-population disproportionately affected by the TennCare disenrollment and the future ACA expansion – were especially likely to report a loss of public coverage and a gain of private coverage in the years following the disenrollment.[20] These changes were a sharp, sudden break from pre-existing trends, and the changes in coverage after the disenrollment were large relative to previous year-over-year changes. These figures present strong visual evidence that the TennCare disenrollment both sharply reduced public health insurance coverage but also sharply increased private health insurance coverage.

To further explore access to private health insurance as the mechanism underlying our labor supply results, we now estimate equation (1) with the outcome of interest being an indicator function for whether CPS respondents are working and have private health insurance through an employer. Column (3) of Table 6 presents those estimates, and suggests that a majority of the estimated increase

[20] One might be concerned that the pattern in such figures is an artifact of the relatively short time period after the disenrollment. Appendix Figures A4 and A5 are similar to Figures 3 and 7, but present data for 2000 through 2011. These appendix figures suggest that, while the post-2007 trend is volatile, the overall pattern is qualitatively similar to the results from 2000–2007. Similarly, Panel C of Appendix Table A3 presents triple-difference regression estimates for this longer time period. These results are similar to the main estimates.

in employment following the TennCare disenrollment is accounted for by increases in employment among workers with employer-provided health insurance.

Appendix Table A5 provides estimates for other categories of employment responses and insurance coverage. Column (1) presents the change in adults without children reporting insurance from an employer. The estimate in Column (2) demonstrates that the disenrollment caused a decrease in individuals working without employer-provided insurance. This could occur either from individuals moving to a job offering insurance or taking up a previously declined offer for health benefits. Column (3) suggests that there was little change in the share of people employed but without insurance from any source, suggesting that the individuals leaving employment without employer-provided insurance in Column (3) likely had insurance from another source. Finally, column (4) suggests little change in the number of individuals who were covered by the individual market. The lack of an increase for this type of insurance should not be surprising given that enrollees in the TennCare expansion program were intended to be ineligible for individual insurance.

The large labor supply increase suggests TennCare disenrollees may place a large value on health insurance. We gauge the magnitude of this valuation by calculating the wage increase that would be necessary to generate a similar change in labor supply. In Table 3, we observe a 6.5 percent (95-percent confidence interval: 5.1 – 8.0 percent) increase in labor supply for childless adults following the TennCare disenrollment. Chetty et al. (2011) survey the labor supply literature and find a mean Hicksian extensive margin labor supply elasticity of 0.25. Based on this elasticity, it would take a 26.2 percent increase in wages (95 percent confidence interval: 20.5 – 31.8 percent) to generate a similar change in extensive-margin labor supply.

To understand whether this implied wage increase is reasonable, we consider both the average incomes of the disenrollees and the average premium for employer-provided insurance. The vast majority of enrollees in the TennCare expansion group had incomes below 200 percent of the

poverty line, which in 2004 was $9,310 for a single adult. At 75, 100, and 200 percent of the federal poverty line, a 26.2 percent wage increase is approximately $1,830, $2,400, and $4,900, respectively.

In 2006, the average price of employer-provided insurance in Tennessee was approximately $3,700 per year (AHRQ, 2006). Furthermore, given the high rate of insurance denials in the non-group market, some of these disenrollees may not have been able to obtain non-group coverage at any price (Hendren, 2013). These individuals might place an even larger value on access to coverage than would be implied by the premium for group coverage. Thus this calculation suggests both that the TennCare disenrollees placed a large value on health insurance and that the labor supply increase is of a reasonable magnitude, given the actual price of health insurance.

Many Americans find health insurance not through Medicaid or an employer, but through other federal programs such as the Social Security Disability Insurance program (SSDI). Many of those targeted by the TennCare expansion program – low-income adults in poor health – are especially likely to apply for SSDI, which may in turn affect their labor market behavior (Autor and Duggan, 2003). SSDI beneficiaries are eligible for Medicare benefits after a 24-month waiting period. During the waiting period (and throughout their time in the program) SSDI enrollees cannot engage in substantial gainful activity (SGA), which was defined in 2005 for a non-blind individual to be earning more than $830 per month. This requirement likely precludes many job opportunities offering private insurance. Therefore, following the disenrollment, many applicants to SSDI may be no longer have been able to use TennCare as a health insurance source during their waiting period for Medicare. This would create a large gap in health insurance coverage for these individuals and might make SSDI less attractive as a source of insurance as compared to labor force participation. Appendix Figure A10 plots the relative number of SSDI applicants from Tennessee versus the rest of the south.[21] The number of applicants from Tennessee sharply decreased after 2005 relative to the rest of the south,

[21] We are restricted to state-year analysis because data on SSDI applications below the state level are not publicly available.

although the rates converge during the Great Recession. This suggests that reductions in the generosity of Medicaid may in turn decrease the attractiveness of SSDI for some individuals.

The large changes in private insurance in Figures 10 and 11 also suggest potentially large crowdout from the TennCare disenrollment. We now turn to a regression analysis to estimate the magnitude of the crowdout. Column (4) of Table 6 presents regression estimates with any private health insurance coverage as the outcome of interest. Panel A presents the difference-in-difference estimates from equation (1) and suggests that private coverage rates in Tennessee increased by 1.6 percentage points after the disenrollment. Based on these regressions, we estimate crowdout as the ratio of the decrease in public coverage to the increase in private coverage. The results in Panel A lead to a crowdout estimate of 34.6 percent (standard error: 9.1).[22] Panel B presents triple-difference estimates. Childless adults in Tennessee exhibited a 3.4 percentage-point increase in private coverage. The associated crowdout estimate for childless adults is thus 47.2 percent (standard error: 8.6).

The point estimates based on the triple-difference specification in Panel B are not identical to the difference-in-difference estimates in Panel A. The triple-difference estimates involve the sub-population most likely to have lost TennCare coverage, and thus we should expect the changes in both public and private health insurance coverage to be larger in Panel B relative to Panel A. However, the crowdout estimates across the two panels are also of different magnitudes. Though the differences are not statistically significant at conventional levels, these differences could arise for a number of reasons. First, the difference-in-difference estimates could be biased due to unobserved state-by-year shocks. Alternatively, these results could suggest heterogeneity in crowdout among different socioeconomic groups. As a result, we explore this heterogeneity in greater detail below.

Despite the fact that the disenrollment was a *contraction* of public health insurance generosity, our crowdout estimates are remarkably similar to earlier estimates based on *expansions* in public insurance

[22] We calculate standard errors for our crowdout estimates using the delta method. The standard errors from this procedure should be a reliable approximation to the true standard errors because the denominator is always far from zero and estimated very precisely in all of our specifications. We find very similar standard errors when using a nonparametric block bootstrap, re-sampling states with replacement.

programs (Cutler and Gruber, 1996; LoSasso and Buchmueller, 2007; Gruber and Simon, 2008). This symmetry in the magnitude of crowdout is interesting and provides some suggestive evidence that our labor supply estimates may also display a similar symmetry.[23] This seems particularly likely in our setting, because our observed labor supply increase appears to be a primary mechanism for securing private health coverage.

5.4. The Dynamics of Labor Supply and Health Insurance Coverage Responses

The estimates above demonstrate that a large fraction of TennCare disenrollees secured both employment and private health insurance coverage following the disenrollment. In this section, we investigate the speed with which the disenrollees were able to secure employment and insurance coverage. Since we interpret our main labor supply results as reflecting a demand for access to private health insurance, the speed with which individuals are able to enter the labor force and secure employment likely plays an important role in these individuals' ability to secure private health insurance coverage quickly.

To investigate monthly changes in employment, we use data from the Bureau of Labor Statistics Local Area Unemployment Statistics (LAUS). State-level LAUS data are employment estimates produced through a joint federal and state cooperative and incorporate information from the CPS, Current Employment Statistics, and state unemployment insurance records. By combining multiple sources, LAUS data provide a monthly, state-level employment estimate with less variation than any of the individual component data sources.[24] Because of the unique reliability of these estimates, they

[23] We cannot estimate the impact of the initial expansion of TennCare on labor supply for several reasons. In 1994, the expansion did not have as large of a differential effect on health insurance for individuals with and without children. Medicaid expansions occurring after 1994 created more categorical eligibility and take-up for adults with children. Given this fact, our triple-difference strategy is not applicable to this earlier setting. Additionally, the enrollment following the 1994 expansion was less abrupt than the 2005 disenrollment, making it less ideal for a purely cross-state (difference-in-difference) analysis.

[24] More specifically, the LAUS is developed using a signal-plus-noise methodology that accounts for actual changes in the labor force beyond time trends and seasonality. More information is available at: http://www.bls.gov/lau/laumthd.htm#states.

are used for many government tasks such as the determination of budgetary allocations for Federal programs.

Figure 12 presents the monthly LAUS data from 2004 to 2007 for Tennessee and all other Southern states.[25] Prior to the middle of 2005, the estimated employment rates in the two groups of states follow very similar trends.[26] However, at approximately the same time as the TennCare disenrollment, the estimated Tennessee employment rate surged and, over the course of the next year, increased by approximately 2 percentage points. This increase in employment is very similar to the difference-in-differences estimate in Table 3.

Given the sudden changes in labor supply in the LAUS, we would expect a similarly quick change in health insurance coverage. Unfortunately, the CPS data only measures the health insurance outcomes of interest at an annual frequency and does not allow estimation of within-year changes in coverage. Therefore, to explore the dynamics of health insurance coverage, we supplement our CPS results with data from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is an annual, state-based telephone survey designed to measure the health and health habits of the US population. The survey is administered by individual states and data is then aggregated into a single annual file by the Centers for Disease Control. We construct a sample of individuals aged 21–64 who do not have a college degree.[27] Unfortunately, the BRFSS contains only a single question about health insurance: whether respondents are covered by insurance from any source. As a result, we cannot separately identify the changes in private and public coverage using these data. However, an advantage of the BRFSS over the March CPS is that the survey is fielded in each month and can

[25] In order to ease the comparison to our earlier estimates, these data are converted to employment rates using population estimates from the CPS.

[26] There appears to be a very slight increase in employment in Tennessee in the months just before the disenrollment. Given that the disenrollment was announced in advance, it is not surprising that there may have been some anticipatory behavior among disenrollees.

[27] Given the demographic questions in the BRFSS, we cannot exactly replicate our preferred CPS sample, which contains no respondents with an advanced degree but does include those with a college degree. In the BRFSS, we can only identify if individuals are college graduates but not if they have a post-graduate degree.

therefore be used to explore the dynamics of overall health insurance coverage before and after the disenrollment.

Figure 13 presents the average insurance coverage rates by month for Tennessee and all other Southern states from 2004 to 2007. From 2000 until the middle of 2005 the two sets of states followed similar trends. In the last quarter of 2005, immediately following the TennCare disenrollment, the percentage of individuals reporting any insurance coverage was 8.0 percentage points below the pre-treatment mean. Over the next two quarters, the percentage insured recovered and the post-treatment mean was 4.9 percentage points higher than the nadir, implying a crowdout rate of approximately 61 percent. Beyond verifying the CPS crowdout estimates, these results demonstrate that TennCare disenrollees secured private insurance fairly quickly.

The results from the LAUS and BRFSS data suggest that TennCare disenrollees secured both employment and health insurance coverage several months, not years, after the disenrollment. To our knowledge, previous work on crowdout has not examined the speed with which individuals make labor and private health insurance market adjustments in response to such policy changes. As such, we view this as an important area for future work.

5.5. Heterogeneity in Labor Supply and Crowdout

Both the labor supply responses and the amount of crowdout of private health insurance are likely a function of preferences for health insurance coverage, access to the private health insurance market, and the extent to which access to public health insurance provides a strong work disincentive. As a result, the observed labor supply response and crowdout are both likely to vary by socioeconomic group. Thus we next investigate how the labor supply and crowdout effects vary across the population. Overall, we find broadly similar labor supply and crowdout estimates across demographic groups, with a few exceptions. We also find that groups which exhibit large labor supply responses also exhibit large crowdout, which we interpret as strong evidence that changes in labor supply are the primary channel driving crowdout in our setting.

Panel A of Table 7 presents labor supply and crowdout estimates by age.[28] We divide CPS respondents into two age groups: 21 to 39 and 40 to 64. Both age groups experienced a large decline in public health insurance coverage. Interestingly, we find no statistically significant increase in private insurance coverage for the younger age group. By contrast, we observe a large increase in private insurance among 40 to 64 year olds, resulting in a crowdout rate of 48 percent. Older adults also appear to have increased their labor supply to a greater degree than younger adults (although this difference is not statistically different at conventional levels). Overall, this pattern suggests that older adults value health insurance more than the young, and that they are more likely to enter the labor force in order to maintain access to health insurance. Such a contrast might be driven by expected medical costs. Average medical expenditures are strongly positively associated with age (Hartman et al., 2008). In 2002, individuals aged 19–44 accounted for 43 percent of the bottom half of medical spenders and only 19 percent of the top 5 percent of medical spenders. By contrast, individuals aged 44–64 make up 16 percent of the bottom half of medical spenders and 33 percent of the top 5 percent (Conwell and Cohen, 2005). Older adults are also more likely to be insured. While 65 percent of the young childless adults had health coverage, nearly 74 percent of the older individuals had private coverage.

Panel B of Table 7 presents the impact of the TennCare disenrollment by education. We divide the sample by whether respondents were high school dropouts as opposed to high school graduates. Even though TennCare did not have traditional earnings eligibility limits, its beneficiaries had low incomes. As would be expected, less-educated adults in Tennessee experienced a large decline in public health insurance coverage after the disenrollment. Approximately half of the less-educated adults who lost public coverage were able to find private coverage. This suggests that even the least-

[28] Appendix Table A6 Panel A presents the triple-difference crowdout estimates by gender. Both men and women exhibit a large and similarly sized decrease in public insurance after the policy change. Women experience a slightly larger increase in private coverage after the disenrollment. However, that difference is not statistically significant; the *p*-value for a test of equality of the crowdout estimates is 23 percent. Both men and women exhibited large labor supply increases after the disenrollment.

educated adults on public health insurance still had access to private health insurance. By contrast, more-educated adults experienced small changes in both public and private coverage. Less-educated childless adults in Tennessee also saw large increases in employment.

Finally, Panel C of Table 7 examines the effect of the disenrollment by self-reported health status. Individuals in relatively poor health had a much larger decline in public health insurance than individuals in good health. This is unsurprising; those in poor health had much higher rates of public health insurance, and the uninsurable category of the TennCare expansion was aimed at individuals who had been denied coverage in the non-group insurance market. Those in poor health had a larger absolute increase in both labor supply and private insurance coverage but their crowdout rate was lower than for those reporting good health.[29]

Overall, the results in Table 7 are as expected. Those who lost coverage were not concentrated in one age group or gender, but were more likely to be high school dropouts. In addition, older adults appear to have been more likely to increase employment and gain private health insurance coverage. Otherwise, all groups exhibited broadly similar labor supply responses and crowdout.

6. CONCLUSION

This paper studies the largest reduction of Medicaid eligibility in the history of the United States. We find strong evidence that public health insurance affects labor supply decisions. The changes in labor supply appear to be a means of securing access to private health insurance. Taken together, our results suggest both a strong work disincentive from public health insurance eligibility and a high valuation of health insurance among the individuals exposed to the disenrollment.

Our results are potentially informative about the likely consequences of the ACA, because those who lost TennCare coverage were unlike typical Medicaid beneficiaries but very similar to individuals

[29] The crowdout rate for individuals reporting good health is not statistically different from 1.

targeted by the ACA.[30] Our results suggest a far larger increase in Medicaid enrollments from the ACA than is currently estimated. In 2011, approximately 8.9 million Americans with incomes below 139 percent of the poverty line were covered by employer-provided health insurance. If all states implement the Medicaid expansion, our estimates suggest that approximately 4.2 million of these privately insured individuals will move into public coverage. To place this number in perspective, the Congressional Budget Office estimated that if all states implemented the ACA Medicaid expansion, there would be 16 million additional Medicaid enrollees (CBO, 2010a). In an earlier analysis, the CBO estimated that only 10 percent of the new Medicaid enrollees will previously have had private coverage (CBO, 2009). Our results suggest much larger crowdout among childless adults, which may result in a 16 percent increase in public health insurance enrollees under the ACA.[31]

Our results also speak to the potential for the ACA to decrease aggregate labor supply. In a 2010 Budgetary Outlook, the CBO estimated that all of the combined features of the ACA will result in an approximately 0.5 percentage-point decline in the aggregate employment rate (CBO, 2010b). This amounts to approximately 800,000 individuals leaving employment. The CBO based this estimate on a number of different factors, but the empirical evidence available to the CBO could not fully account for how lower-income Americans without children would respond to the availability of free or heavily subsidized health insurance.

Our estimates suggest that the labor supply consequences for this population could be substantial. In particular, our estimates demonstrate substantial "employment lock" – that is, individuals working primarily to secure private health insurance through an employer. Using CPS data, we estimate that between 840,000 and 1.5 million childless adults in the US currently earn less

[30] It is important to recognize that this paper studies a large *contraction* in eligibility for public health insurance, but that the ACA is an *expansion* of eligibility. We cannot be certain that the effects of expansions are simply symmetric to the effects of contractions. At the same time, as discussed above, we emphasize that our estimates of crowdout are very similar to many previous estimates in the literature that are based on expansions of eligibility, which suggests that our labor supply estimates may also be relevant for future expansions, as well.

[31] The magnitude of the potential crowdout onto heavily subsidized insurance exchanges is even greater. Approximately 15.3 million individuals between 139 and 250 percent of the federal poverty line have employer-provided insurance with an additional 2.4 million having individual coverage. The subsidy cost for these individuals is paid in full by the federal government.

than 200 percent of the poverty line, have employer-provided insurance, and are not eligible for public health insurance.[32] Applying our labor supply estimates directly to this population, we predict a decline in employment of between 530,000 and 940,000 in response to this group of individuals being made newly eligible for free or heavily subsidized health insurance. This would represent a decline in the aggregate employment rate of between 0.3 and 0.6 percentage points from this single component of the ACA. One must exercise considerable caution when directly applying our results to the ACA, but our results appear to indicate that the soon-to-be-enacted health care reform may cause substantial declines in aggregate employment.[33]

We also emphasize that our predicted employment declines arise from changes in labor supply and not labor demand. Therefore, the effects do not necessarily imply a welfare loss for individuals choosing to leave the labor force after receiving access to non-employer provided health insurance. Changes in labor demand from the ACA may be important, as well, but they are well beyond the scope of our analysis.

Lastly, apart from contributing to the analysis of the likely effects of the ACA, we believe that our empirical estimates inform recent theoretical work that extends models of optimal social insurance to capture realistic features of health insurance markets. For example, Chetty and Saez (2010) augment the classic framework of Baily (1978) to show how the magnitude of crowdout affects the optimal

[32] This population is estimated as follows. First, we impose the same sample restrictions on the national CPS sample that we impose in our empirical analysis, focusing on childless adults aged 21–64 without an advanced degree. Second, within this sample, we focus on adults who are currently working at least 20 hours per week and have private, employer-provided health insurance. For 2012, we estimate the size of this population to be 3.6 million adults. In order to compute the share of this population eligible for public health insurance, we compute the share of this population that is enrolled in public health insurance and then we scale this estimate using a range of take-up estimates (52 and 68 percent) from a recent meta-analysis by Sommers et al. (2012). We subtract these estimates from 3.6 million to arrive at the estimates in the main text.

[33] For example, employment lock could exist for individuals earning more than 200 percent of the poverty line who cannot obtain insurance in the individual market at any price. Given that a small fraction of the TennCare population earned incomes above 200 percent of the poverty line, it is not appropriate to directly apply our estimates to this population. Future work should examine the degree to which individuals in these income brackets are also suffering employment lock. Additionally, the labor market in Tennessee during the reform in 2005 was very different from the national labor market in the aftermath of the Great Recession. To the extent that labor market tightness affects the extent to which labor supply responds to changes public health insurance eligibility, this will cause the labor supply consequences of TennCare and ACA to diverge. Finally, other features of the ACA such as the increased expenditure of federal funds could increase aggregate economic activity.

generosity of public health insurance. In this paper, we document spillovers onto the labor market that are not captured by existing theoretical models and yet are likely also important determinants of optimal public health insurance eligibility and generosity.

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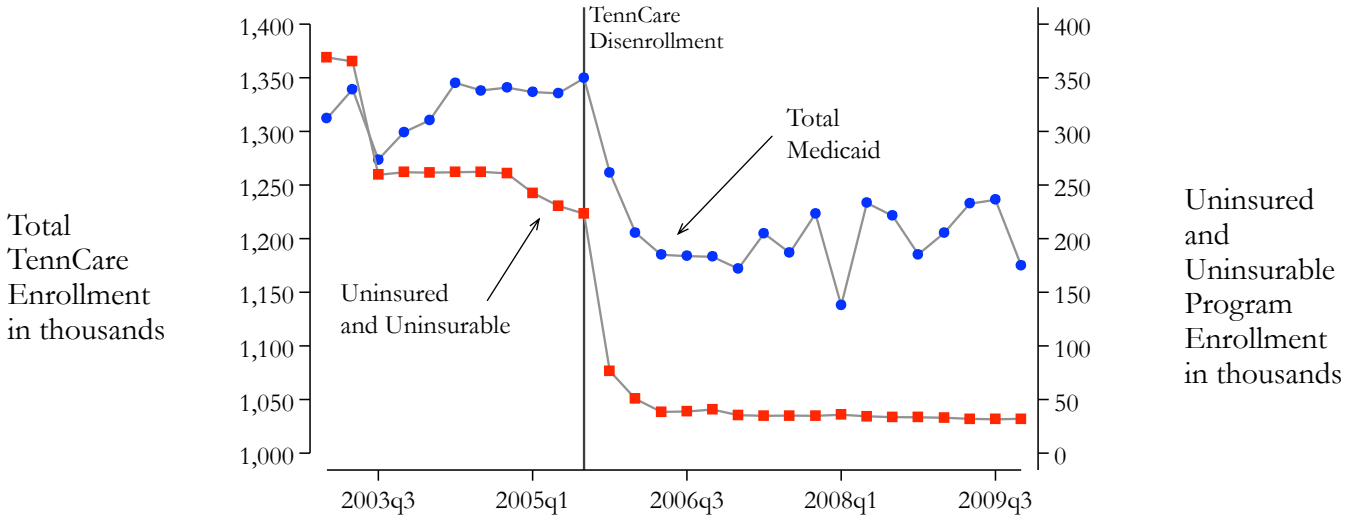
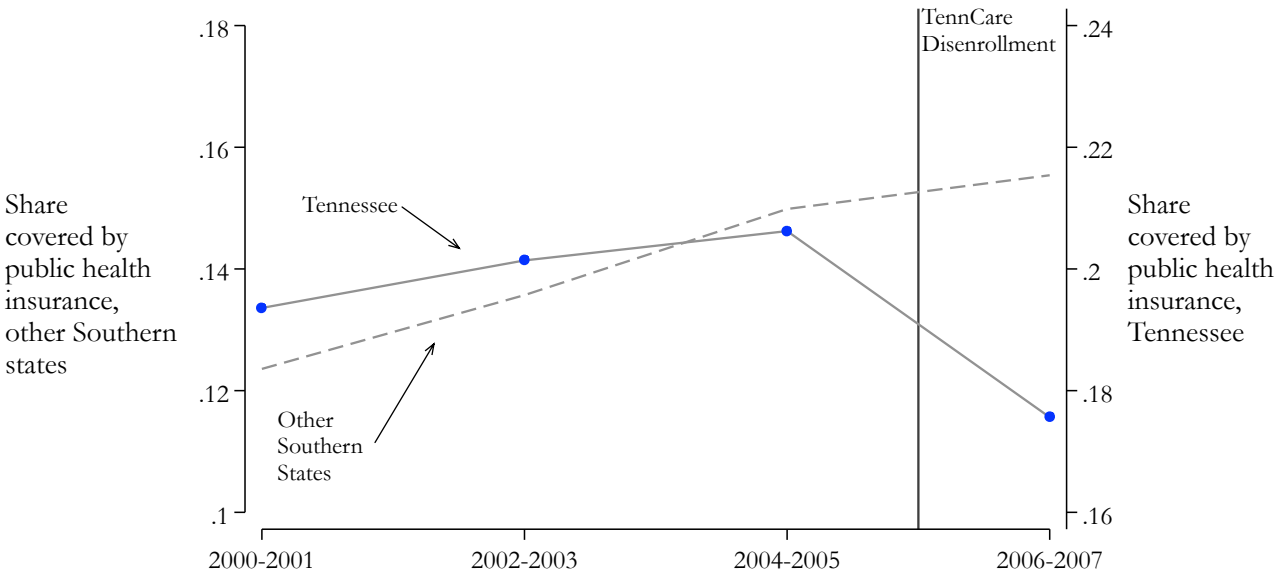
Figure 1. Quarterly Medicaid Enrollment in Tennessee



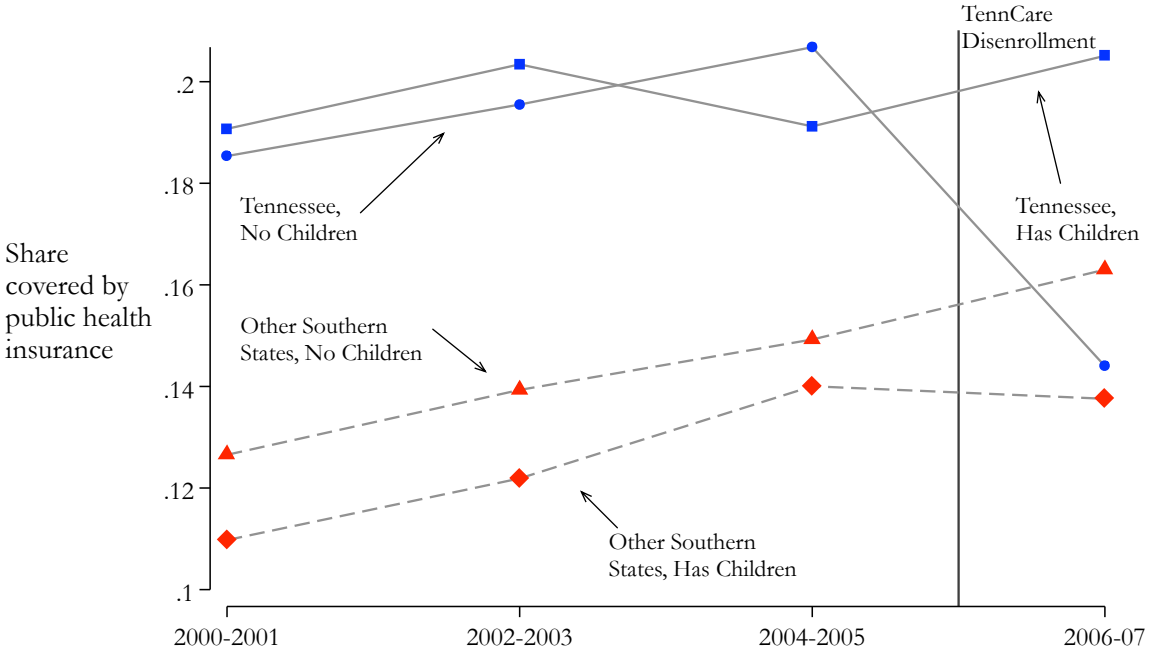
Note: This figure presents enrollment numbers reported in TennCare quarterly reports. Tennessee disenrolled most of those in the Uninsured and Uninsurable program in the last quarter of 2005.

Figure 2. Share Publicly Insured



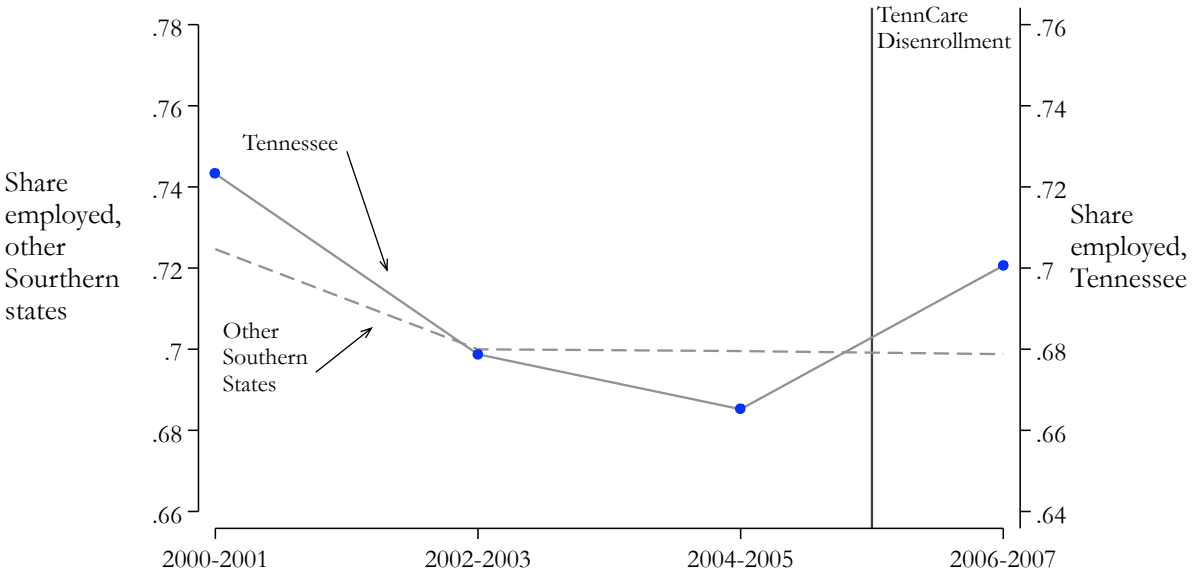
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being covered by public health insurance in Tennessee versus other Southern states. The figure presents means by two-year cells. See text for details.

Figure 3. Share Publicly Insured, Triple Difference



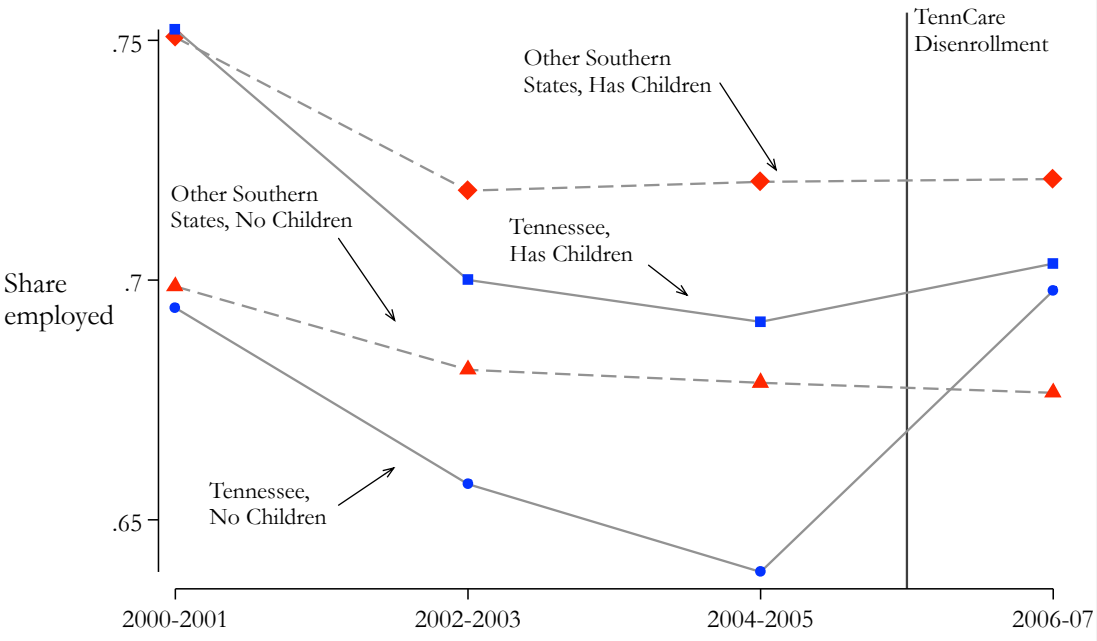
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being covered by public health insurance in Tennessee versus other Southern states. The figure presents means by two-year cells. See text for details.

Figure 4. Share Employed



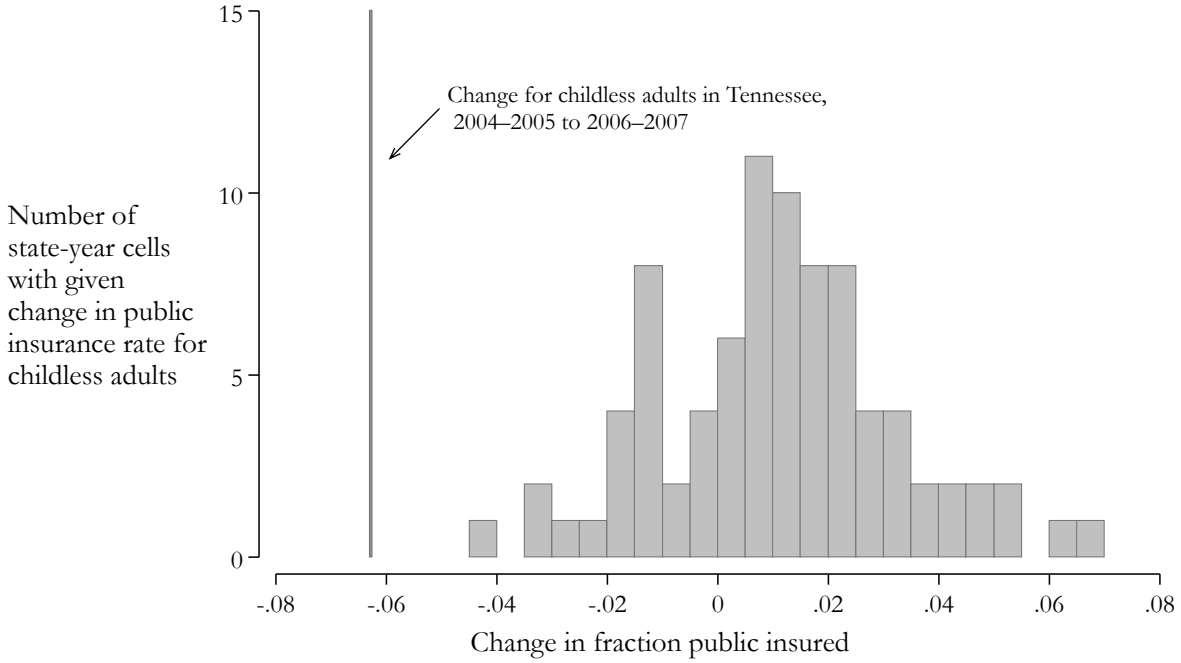
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being employed in Tennessee versus other Southern states. The figure presents means by two-year cells. See text for details.

Figure 5. Share Employed, Triple Difference



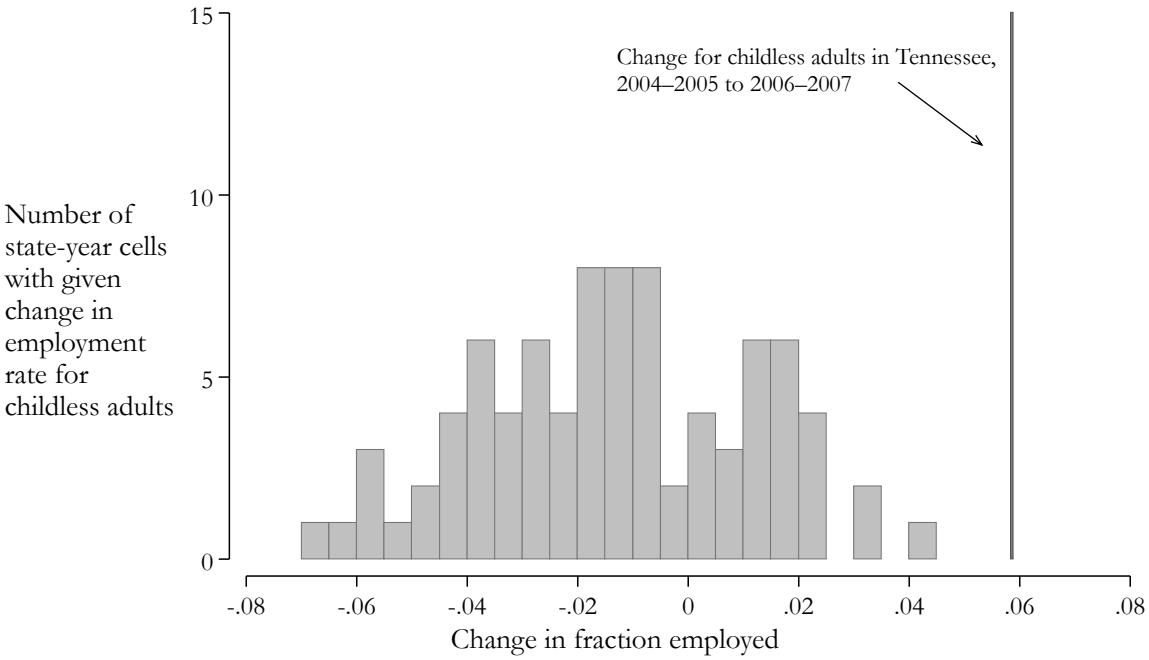
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being employed in Tennessee versus other Southern states. The figure presents means by two-year cells. See text for details.

Figure 6. The Distribution of Changes in the Public Insurance Rate



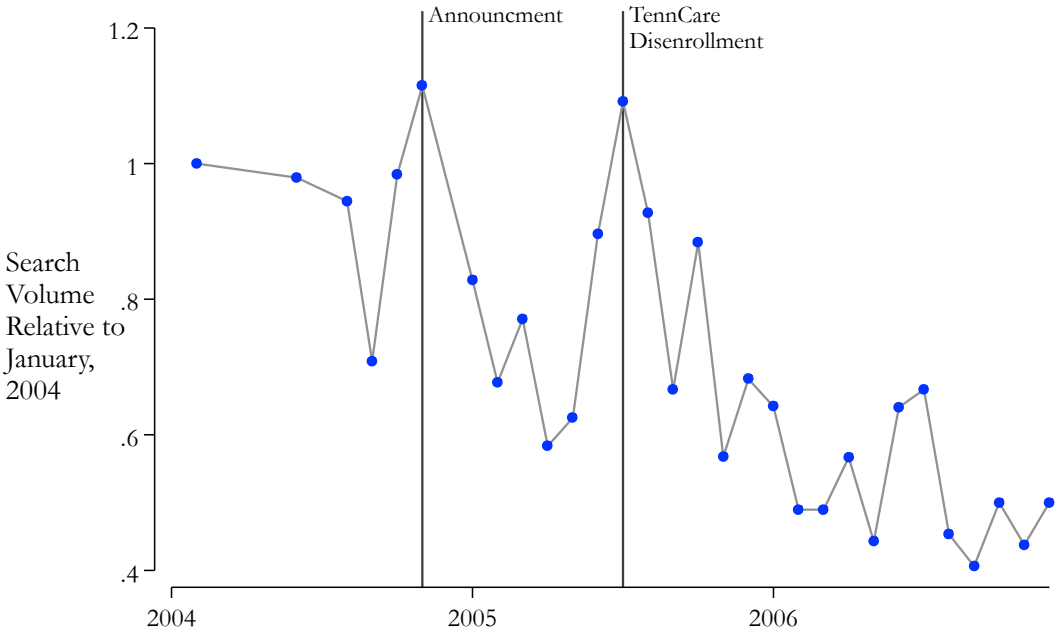
Note: This figure presents a histogram of two-year changes in the share of adults ages 21–64 without an advanced degree having public health insurance for each state in the south. The changes are computed separately for each state-year for adults without children in the household. The two-year changes are computed across means of two-year cells. The vertical line indicates the change for childless adults in Tennessee before and after the TennCare disenrollment.

Figure 7. The Distribution of Changes in the Employment Rate



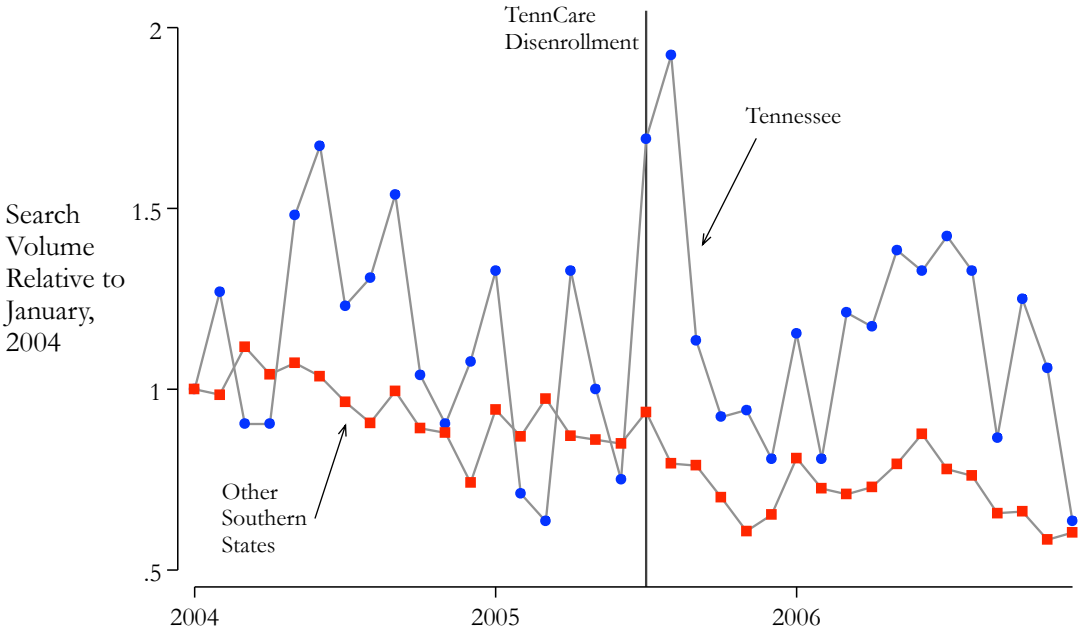
Note: This figure presents a histogram of two-year changes in the employment rate of adults, ages 21–64, without an advanced degree. The changes are computed separately for each state-year for adults without children in the household. The two-year changes are computed across means of two-year cells. The vertical line indicates the change for childless adults in Tennessee before and after the TennCare disenrollment.

Figure 8. Searches on Google in Tennessee for Word "TennCare"



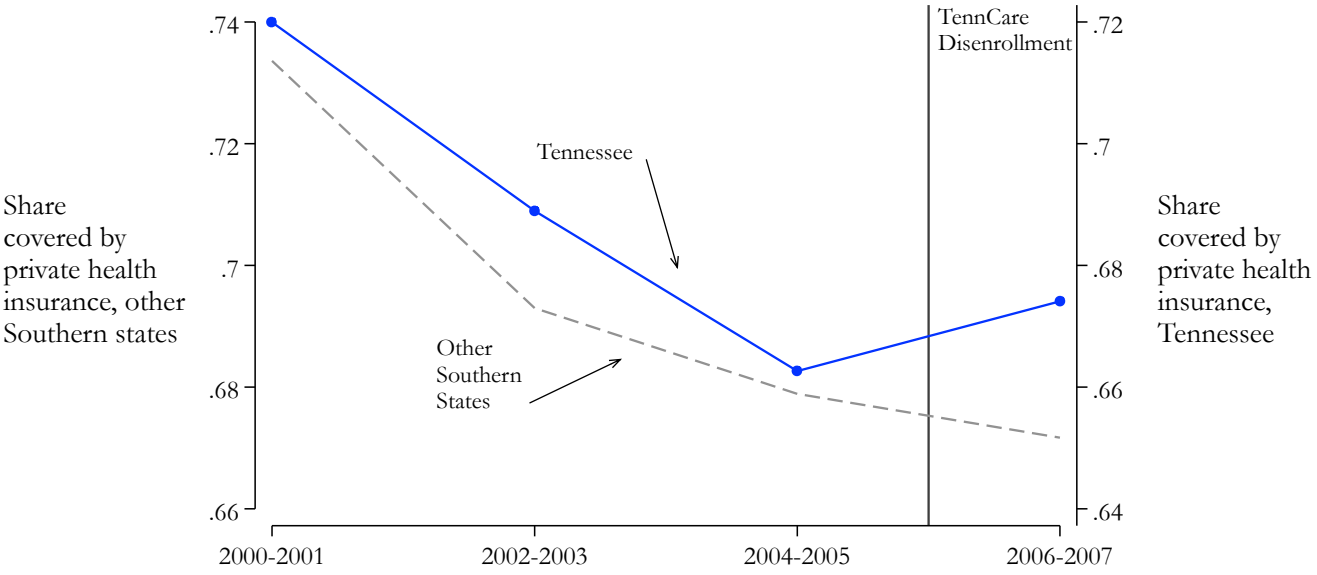
Note: This figure presents Google search volume for the word "TennCare." The numbers are normalized by Google to represent relative changes in search volume over time, but not the absolute magnitude. We then divide each month's number by the value in January of 2004. In November of 2004, Governor Bredesen announced the process that ultimately led to the disenrollments. The disenrollments then began in July of 2005.

Figure 9. Searches on Google for Phrase "Job Openings"



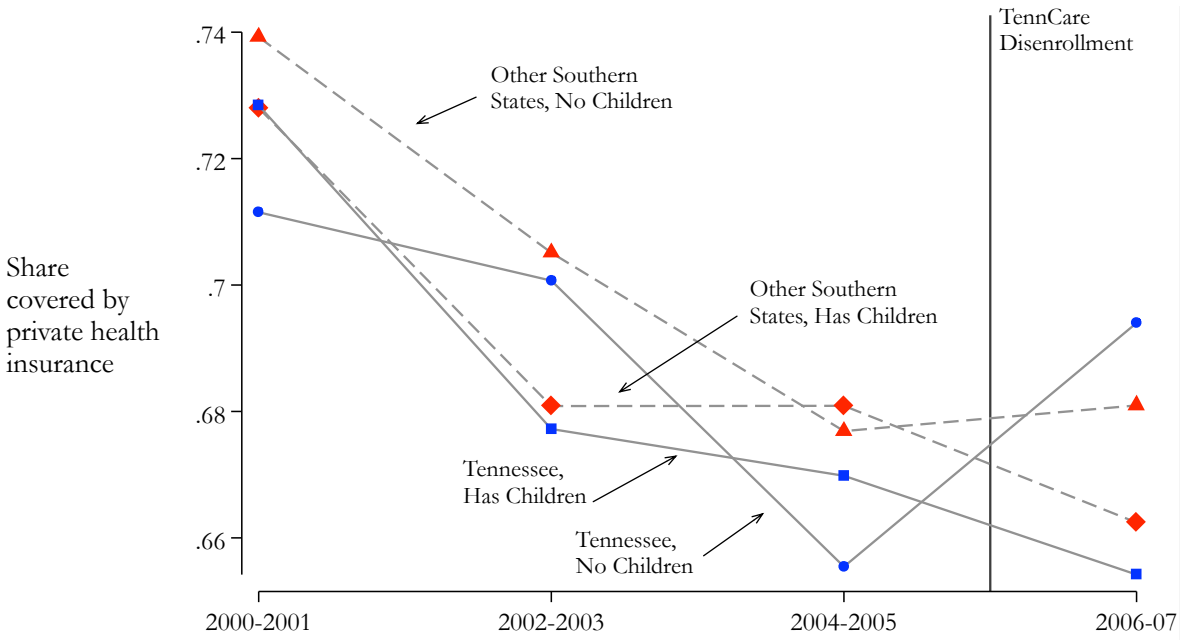
Note: This figure presents Google search volume for the phrase "job openings." The numbers are normalized by Google to represent relative changes in search volume over time, but not the absolute magnitude. We then divide each month's number by the value in January of 2004.

Figure 10. Share Privately Insured



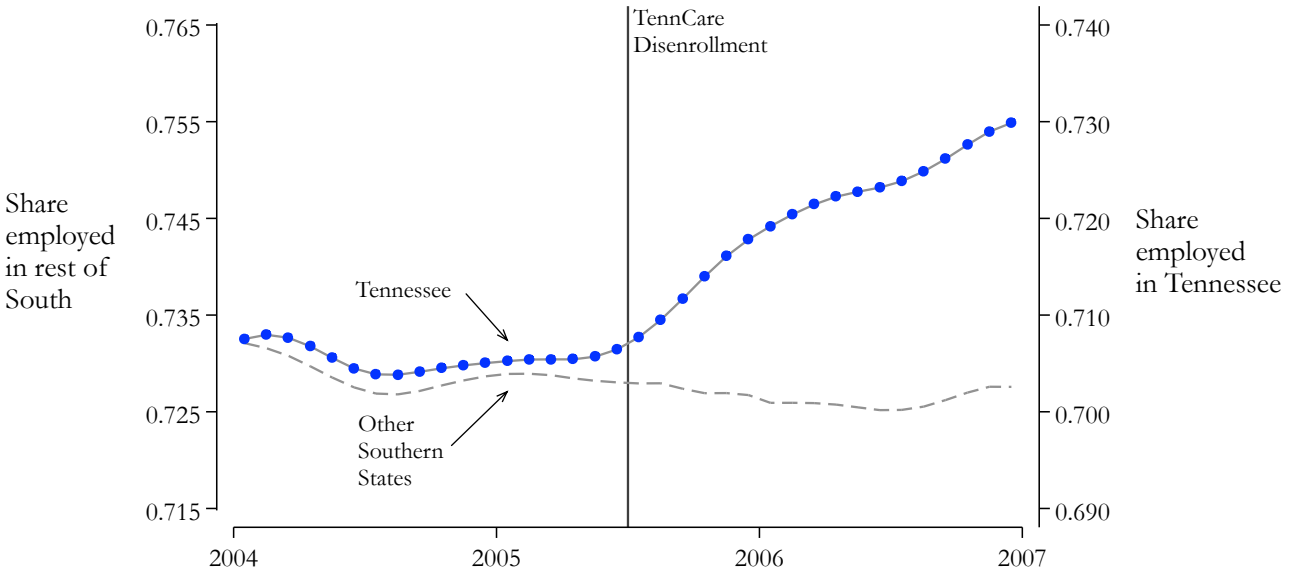
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being privately insured in Tennessee versus other Southern states. The figure presents means by two-year cells. See text for details.

Figure 11. Share Privately Insured, Triple Difference



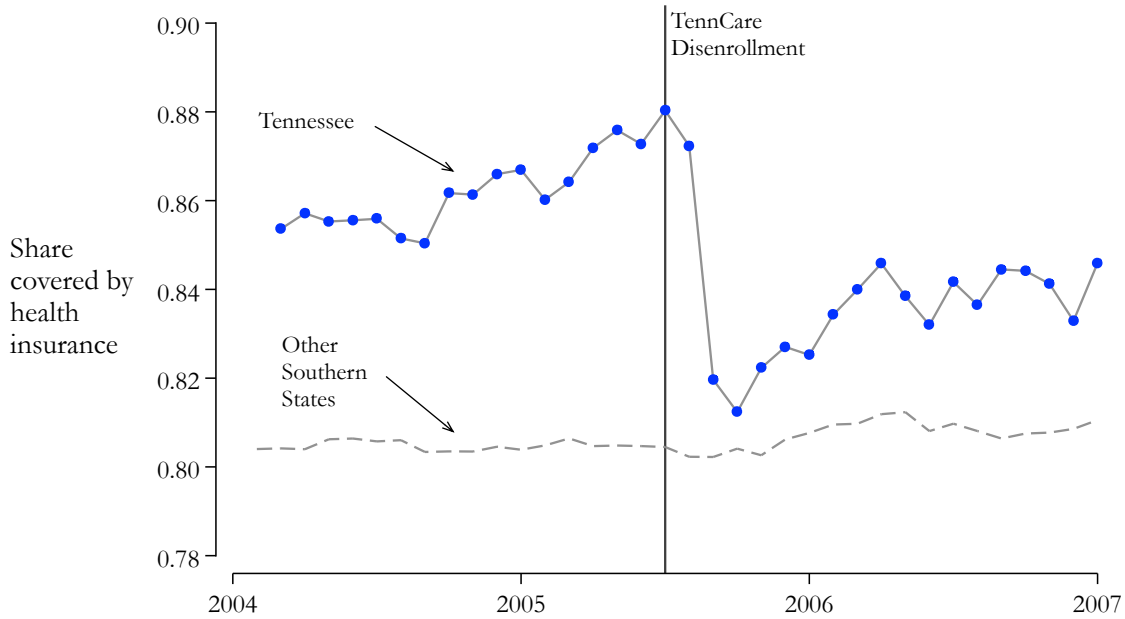
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being privately insured in Tennessee versus other Southern states. The figure presents means by two-year cells. See text for details.

Figure 12. Share Employed By Month, LAUS



Note: This figure presents the estimated monthly employment rate using data from the Local Area Unemployment Statistics (LAUS) for Tennessee versus other Southern states. See text for details.

Figure 13. Share Insured By Month, BRFSS



Note: This figure presents the share of respondents to the Behavioral Risk Factor Surveillance System ages 21–64 who report being insured each month for Tennessee versus other Southern states. Both lines are trailing 8-month moving averages, and for Tennesse the trailing moving average is computed separately for the time periods before and after August 2005. See text for details.

Table 1. Descriptive Statistics of Individuals Affected by Four Recent Health Reform Efforts

	TennCare Disenrollment	Affordable Care Act	MA Health Reform	Oregon Medicaid Lottery
Children				
Child in the Household	8.9%	17.6%	49.4%	Not Available
No Child in Household	91.1%	82.4%	50.7%	Not Available
Age				
19 to 24	15.0%	26.1%	29.4%	
25 to 34	15.1%	26.0%	34.3%	73.3%
35 to 54	40.6%	34.5%	31.6%	
55 to 64	29.3%	13.4%	16.6%	26.7%
Sex				
Male	41.9%	53.0%	44.3%	44.3%
Female	58.2%	47.0%	55.7%	55.7%
Race				
White	75.9%	54.9%	77.2%	82.0%
Black	22.8%	18.7%	19.5%	3.8%
Other	1.3%	25.7%	3.3%	14.2%
Education				
High School Drop Out	33.8%	Not Available	25.7%	17.7%
High School Graduate	52.9%	Not Available	36.5%	49.1%
Any College Attendance	13.3%	Not Available	37.8%	33.2%

Note: Numbers for the TennCare Disenrollment are based on the change in public health insurance amongst CPS respondents from 2004–2005 to 2006–2007. Numbers for the ACA come from Kenny et al. (2012). The numbers for the Massachusetts health reform are based on the change in public health insurance amongst CPS respondents from 2004–2006 to 2008–2009. Numbers for the Oregon Medicaid lottery come from Finkelstein et al. (2012). The only available age breakdown for the Oregon lottery population is 20–50 and 55–64.

Table 2. Summary Statistics for Tennessee and All Other Southern States

	Tennessee	Other Southern States
Any Public Coverage	23.0%	15.3%
Any Private Coverage	64.5%	65.4%
Working	67.8%	68.9%
Working < 20 hours per week	6.8%	6.1%
Working 20-35 hours per week	10.5%	10.0%
Working > 35 hours per week	50.4%	52.7%
Has Children	44.3%	45.3%
High School Dropout	16.1%	15.8%
High School Graduate	37.5%	34.9%
Some College	46.4%	49.3%
White	81.2%	76.6%
Black	16.8%	19.6%
Other	2.1%	3.8%

Note: Coverage and employment numbers come from authors' tabulation of CPS.

Table 3. The Effect of TennCare Disenrollment on Employment
Dependent Variable: The share of CPS respondents reporting the given outcome

	(1)	(2)	(3)	(4)	(5)
	Has Public Health Insurance	Employed	Employed and Working <20 hours per week	Employed and Working 20-35 hours per week	Employed and Working ≥35 hours per week
			A. Difference-in-Difference Estimates		
Tennessee × Post 2005	- 0.046	0.025	- 0.001	0.001	0.025
	(0.004)	(0.004)	(0.002)	(0.002)	(0.004)
	[0.000]	[0.000]	[0.396]	[0.643]	[0.000]
R^2	0.871	0.867	0.392	0.418	0.819
			B. Triple-Difference Estimates		
Tennessee × Post 2005 × No Children	- 0.073	0.046	0.002	0.018	0.026
	(0.006)	(0.010)	(0.006)	(0.005)	(0.010)
	[0.000]	[0.000]	[0.757]	[0.002]	[0.018]
R^2	0.952	0.941	0.665	0.824	0.918
Mean of dep. variable	0.139	0.705	0.037	0.097	0.572

Note: For Panel A, N = 136; the sample consists of state-by-year means; state and year fixed effects not shown. For Panel B, N = 272; the sample consists of means for each state, year, and childless status; state fixed effects, year fixed effects, childless fixed effects, and fixed effects for all possible pairwise interaction terms not shown. The standard errors in parenthesis are robust to autocorrelation between observations from the same state; associated p-values in brackets. We restrict the sample to southern states from 2000 through 2007.

Table 4. The Effect of TennCare Disenrollment on Wages, Unemployment, and Labor Force Participation
Dependent Variable: Mean of the given variable among CPS respondents

	(1)	(2)	(3)	(4)
	Log Wage	Residualized Log Wage	Unemployed	In Labor Force
Tennessee × Post 2005	- 0.023	- 0.018	- 0.012	0.044
× No Children	(0.016)	(0.012)	(0.003)	(0.010)
	[0.174]	[0.174]	[0.000]	[0.000]
R^2	0.963	0.970	0.772	0.949

Note: N = 272; the sample consists of means for each state, year, and childless status; state fixed effects, year fixed effects, childless fixed effects, and fixed effects for all possible pairwise interaction terms not shown. The standard errors in parenthesis are robust to autocorrelation between observations from the same state; associated p-values in brackets. We restrict the sample to southern states from 2000 through 2007. To calculate the residual wage, we regress the logarithm of wages on a fifth-degree polynomial of age, an indicator function for gender, an indicator function for high school dropout, high school graduate, some college, and a college degree; and all two-way interactions between age, gender, and education variables.

Table 5. The Effect of TennCare Disenrollment on Public Insurance and Employment for Those Older Than 65

Dependent Variable: The share of CPS respondents reporting the given outcome

	(1)	(2)	(3)	(4)
	A. Younger than 65		B. Older than 65	
	Has Public Health Insurance	Employed	Has Public Health Insurance	Employed
Tennessee × Post 2005	- 0.046	0.025	0.001	0.002
	(0.004)	(0.004)	(0.004)	(0.006)
	[0.000]	[0.000]	[0.855]	[0.712]
R^2	0.871	0.867	0.701	0.455

Note: N = 272. The sample consists of means for each state and year. State fixed effects and year fixed effects not shown. The standard errors in parenthesis are robust to autocorrelation between observations from the same state.

Table 6. The Effect of the TennCare Disenrollment on Private Insurance
Dependent Variable: The share of CPS respondents reporting the given outcome

	(1)	(2)	(3)	(4)	(5)
	Has Public Health Insurance	Employed	Employed with Private Insurance through Employer	Has Private Health Insurance	Crowdout: Δ Private / Δ Public
			A. Difference-in-Difference Estimates		
Tennessee × Post 2005	- 0.046	0.025	0.015	0.016	- 0.346
	0.004	(0.004)	(0.004)	(0.004)	(0.091)
	0.000	[0.000]	[0.005]	[0.001]	[0.002]
R^2	0.871	0.867	0.916	0.927	
			B. Triple-Difference Estimates		
Tennessee × Post 2005 × No Children	- 0.073	0.046	0.042	0.034	- 0.472
	(0.006)	(0.010)	(0.011)	(0.010)	(0.086)
	[0.000]	[0.000]	[0.001]	[0.004]	[0.000]
R^2	0.952	0.941	0.942	0.948	
Mean of dep. variable	0.139	0.705	0.515	0.694	

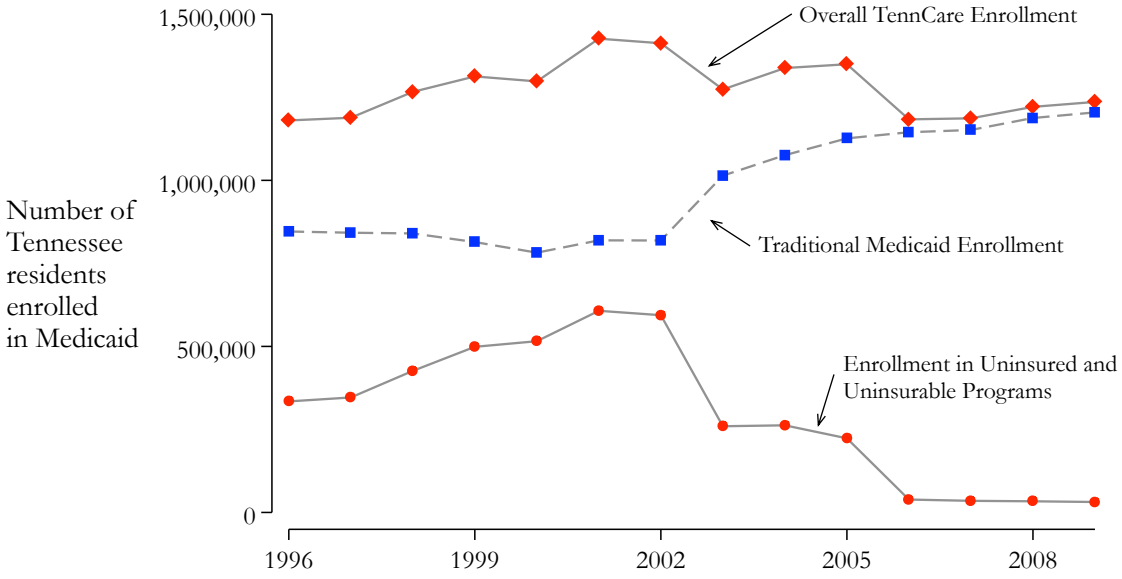
Note: For Panel A, N = 136; the sample consists of state-by-year means; state and year fixed effects not shown. For Panel B, N = 272; the sample consists of means for each state, year, and childless status; state fixed effects, year fixed effects, childless fixed effects, and fixed effects for all possible pairwise interaction terms not shown. The standard errors in parenthesis are robust to autocorrelation between observations from the same state; associated p-values in brackets. We restrict the sample to southern states from 2000 through 2007.

Table 7: Heterogeneity in the Degree of Crowdout
Dependent Variable: The share of CPS respondents reporting the given outcome

	(1)	(2)	(3)	(4)	(5)
	Public Coverage	Employed	Employed with Private Insurance through Employer	Private Coverage	Crowdout Estimate
			A. Heterogeneity by Age		
Triple-difference estimate for ages 21-39	- 0.070	0.010	- 0.003	0.013	- 0.180
	(0.009)	(0.013)	(0.018)	(0.016)	(0.141)
	[0.000]	[0.451]	[0.881]	[0.425]	[0.203]
Mean for ages 21-39	0.107	0.739	0.495	0.650	
Triple-difference estimate for ages 40-64	- 0.083	0.060	0.058	0.040	- 0.484
	(0.009)	(0.014)	(0.012)	(0.009)	(0.059)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Mean for ages 40-64	0.155	0.691	0.543	0.735	
p-value of test for equality across rows	[0.345]	[0.013]	[0.007]	[0.142]	[0.021]
R^2	0.947	0.930	0.914	0.934	
			B. Heterogeneity by Education		
Triple-difference estimate for high school dropouts	- 0.289	0.125	0.087	0.153	- 0.531
	(0.019)	(0.025)	(0.022)	(0.025)	(0.050)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Mean for high school dropouts	0.257	0.533	0.246	0.377	
Triple-difference estimate for those with a high school diploma	- 0.034	0.034	0.036	0.014	- 0.419
	(0.008)	(0.009)	(0.012)	(0.012)	(0.206)
	[0.000]	[0.001]	[0.006]	[0.227]	[0.042]
Mean for high school graduates	0.118	0.736	0.563	0.750	
p-value of test for equality across rows	[0.000]	[0.002]	[0.054]	[0.000]	[0.588]
R^2	0.948	0.956	0.979	0.980	
			C. Heterogeneity by Health Status		
Triple-difference estimate for those who report good health	- 0.018	0.020	- 0.014	0.028	- 1.566
	(0.010)	(0.014)	(0.016)	(0.014)	(0.607)
	[0.086]	[0.143]	[0.387]	[0.053]	[0.010]
Mean for good health	0.065	0.791	0.608	0.797	
Triple-difference estimate for those who report poor health	- 0.091	0.053	0.061	0.039	- 0.426
	(0.006)	(0.011)	(0.011)	(0.011)	(0.078)
	[0.000]	[0.000]	[0.000]	[0.002]	[0.000]
Mean for poor health	0.165	0.675	0.483	0.657	
p-value of test for equality across rows	[0.000]	[0.070]	[0.001]	[0.547]	[0.047]
R^2	0.955	0.951	0.943	0.954	

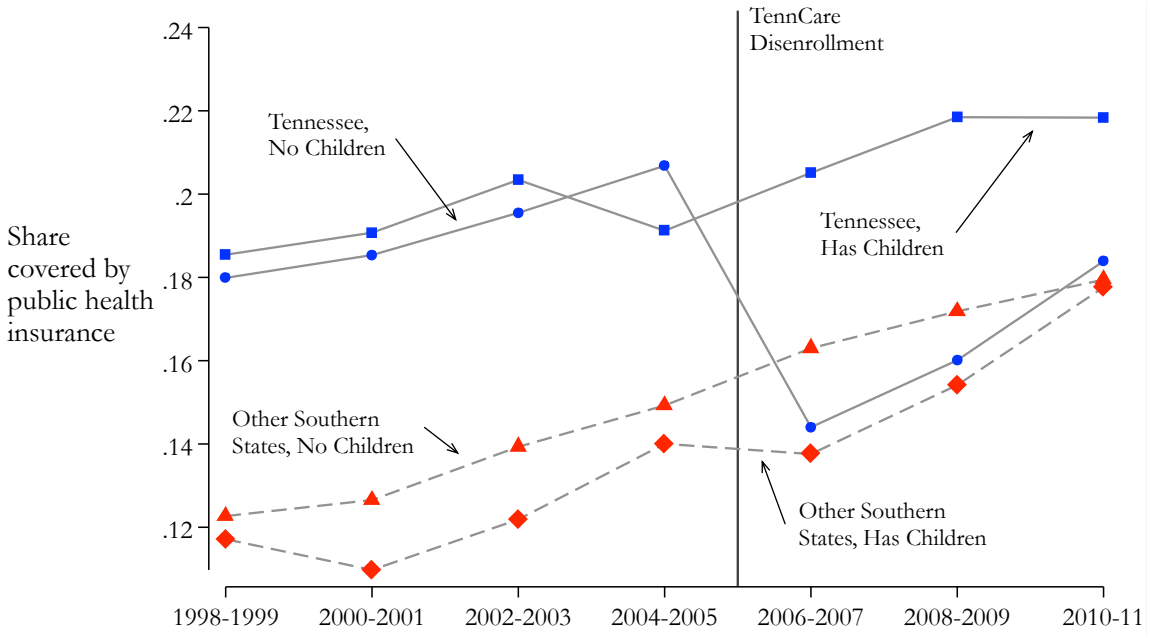
Note: N = 544. The sample consists of means for each state, year, childless status, and group. State fixed effects, year fixed effects, group fixed effects, and fixed effects for all possible pairwise interaction terms not shown. The standard errors in parenthesis are robust to autocorrelation between observations from the same state. We restrict the sample to southern states from 2000 through 2007. "Good health" corresponds to respondents who report "excellent" health, and "poor health" corresponds to respondents who give any other response.

Appendix Figure A1. Long-Term Trends in Tennessee Medicaid Enrollment



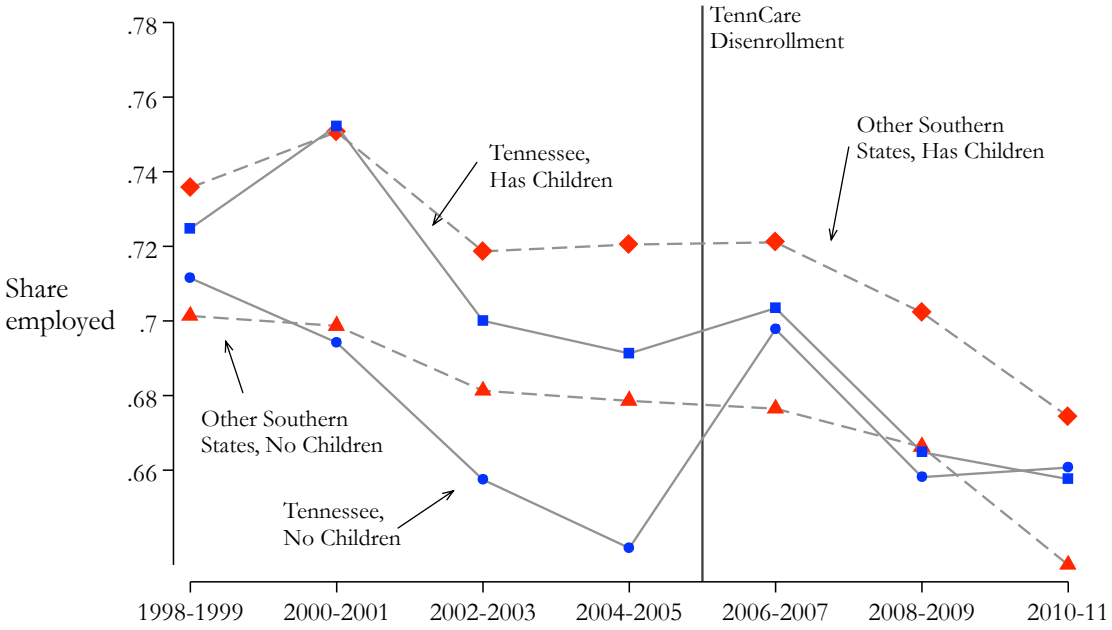
Note: The data for this figure come from quarterly reports for TennCare.

Appendix Figure A2. Share Publicly Insured, Triple Difference, Long-Term Trends



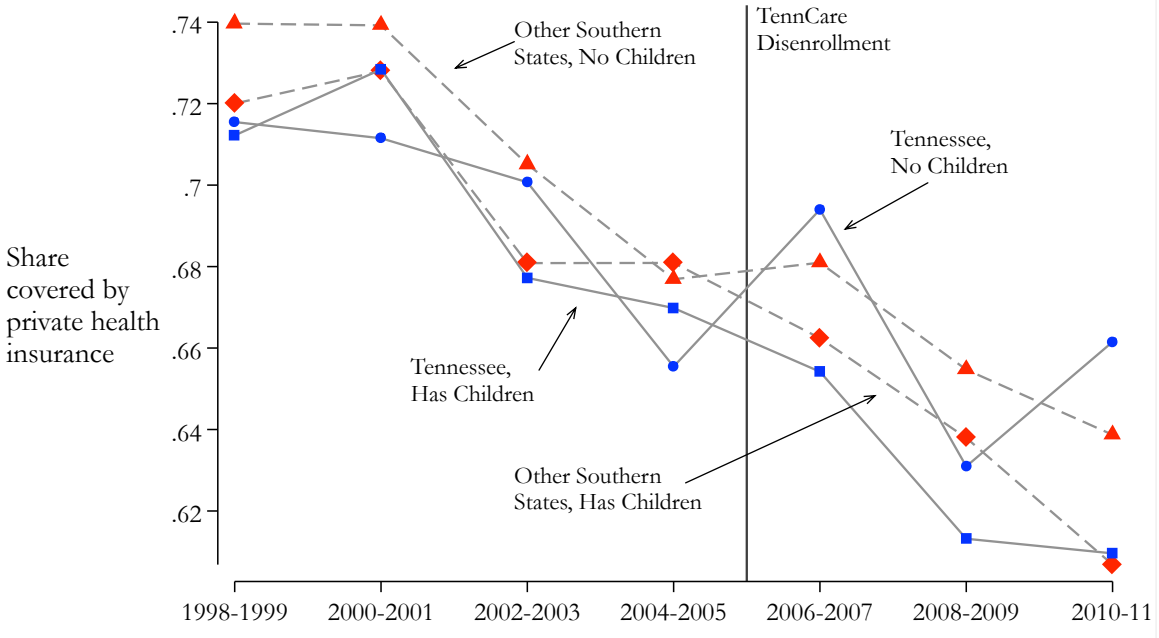
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being publicly insured in Tennessee versus other Southern states. The figure presents means by two-year cells. See text for details.

Appendix Figure A3. Share Employed, Triple Difference, Long-Term Trend



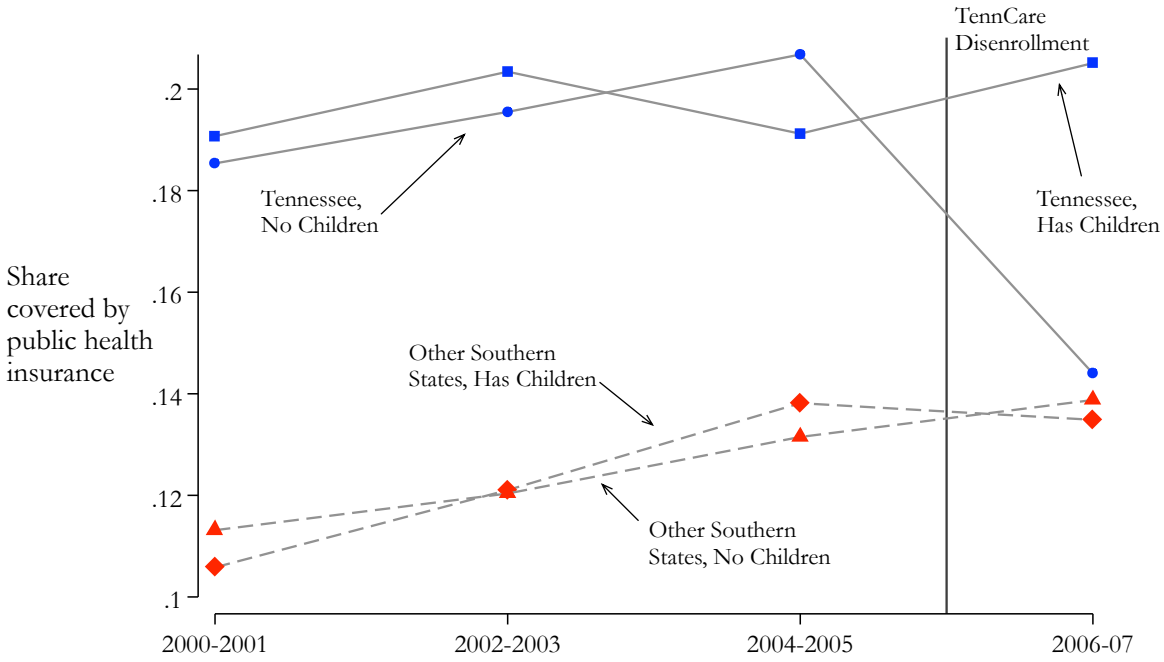
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being employed in Tennessee versus other Southern states. The figure presents means by two-year cells. See text for details.

Appendix Figure A4. Share Privately Insured, Triple Difference, Long-Term Trends



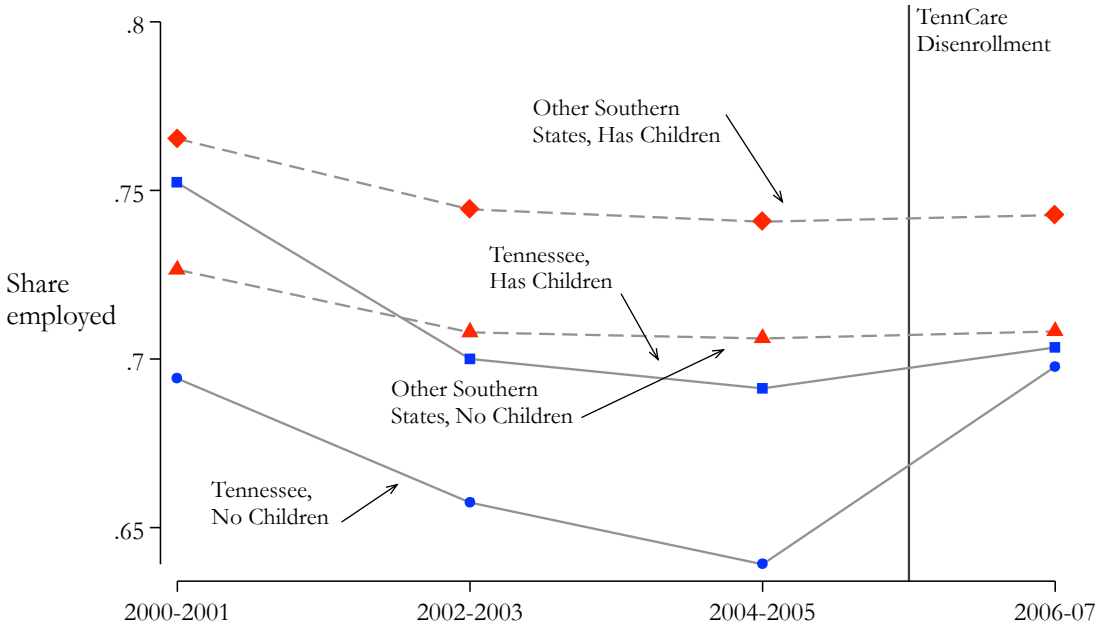
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being privately insured in Tennessee versus other Southern states. The figure presents means by two-year cells. See text for details.

Appendix Figure A5. Share Publicly Insured, Triple Difference for Entire US



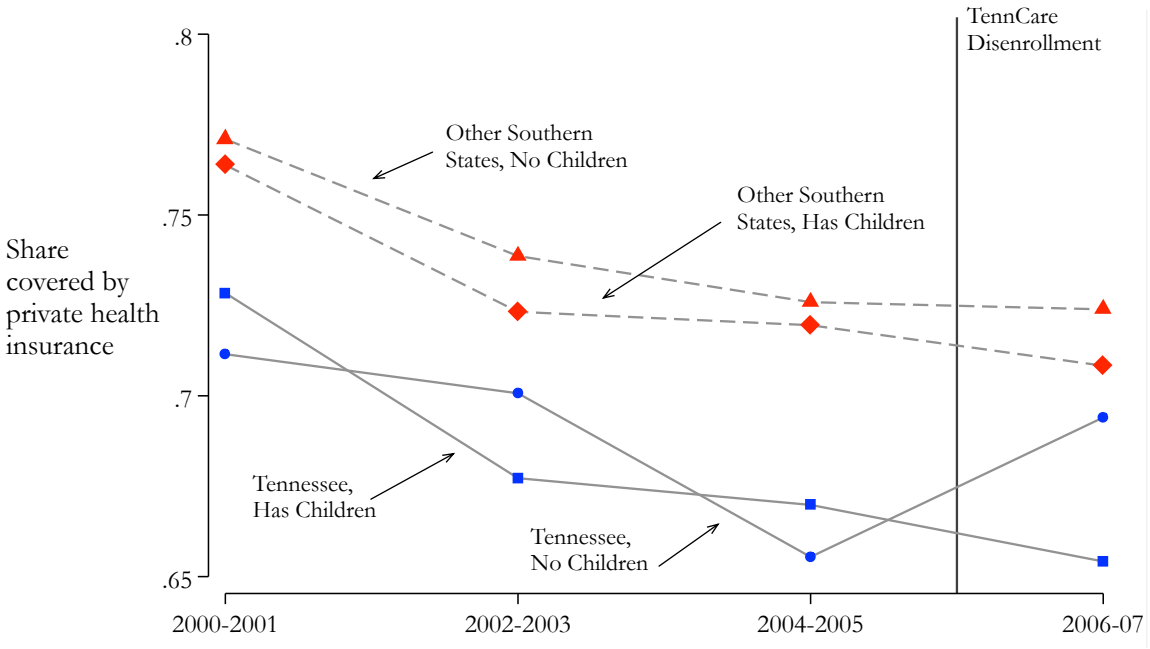
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being covered by public health insurance in Tennessee versus all other states. The figure presents means by two-year cells. See text for details.

Appendix Figure A6. Share Employed, Triple Difference for Entire US



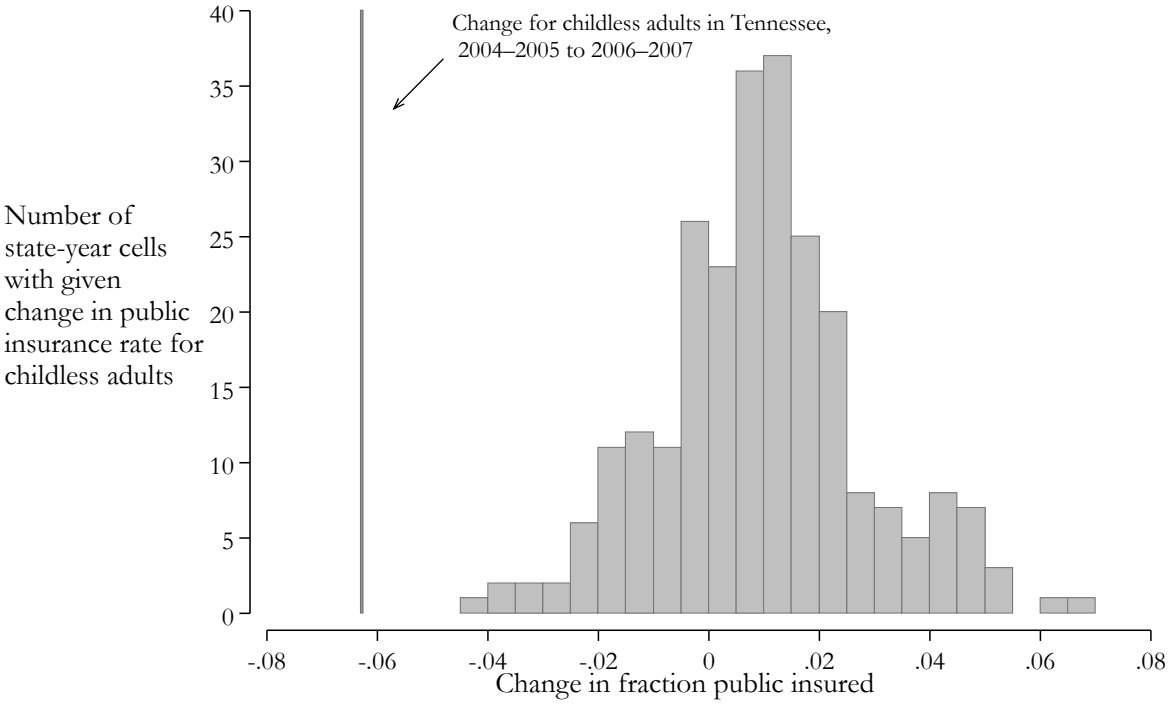
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being employed in Tennessee versus all other states. The figure presents means by two-year cells. See text for details.

Appendix Figure A7. Share Privately Insured, Triple Difference for Entire US



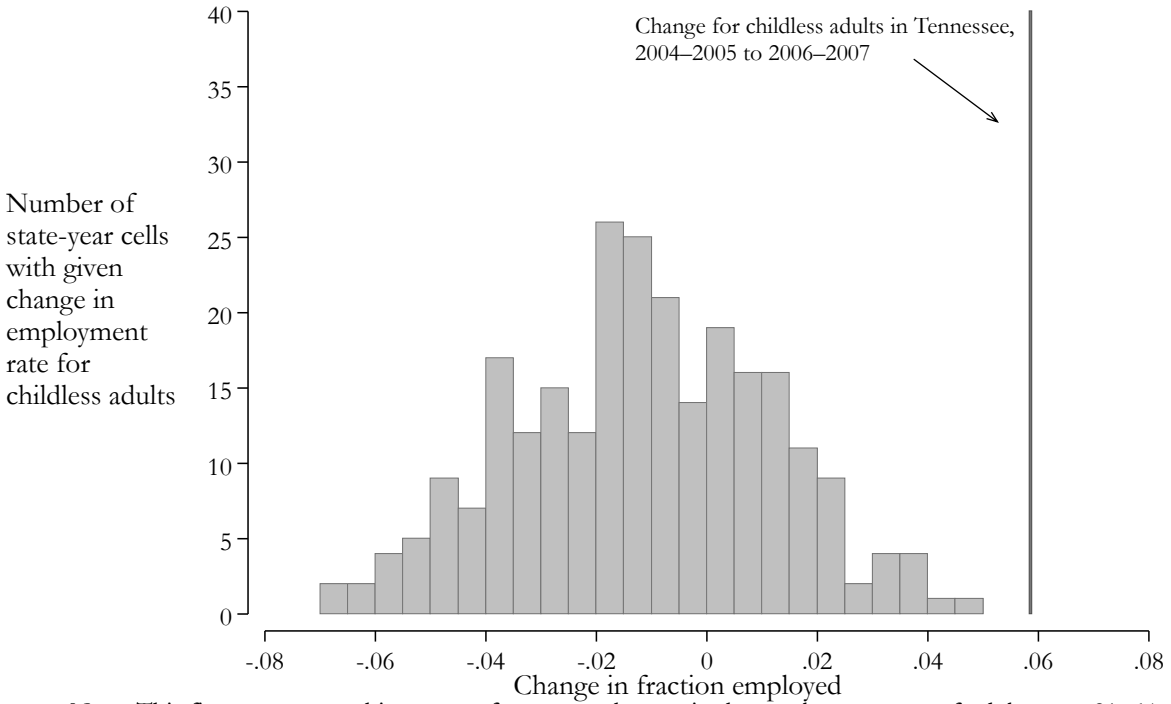
Note: This figure presents the share of CPS respondents ages 21–64 without an advanced degree who report being privately insured in Tennessee versus all other states. The figure presents means by two-year cells. See text for details.

Appendix Figure A8. The Distribution of Changes in the Public Insurance Rate, Entire US



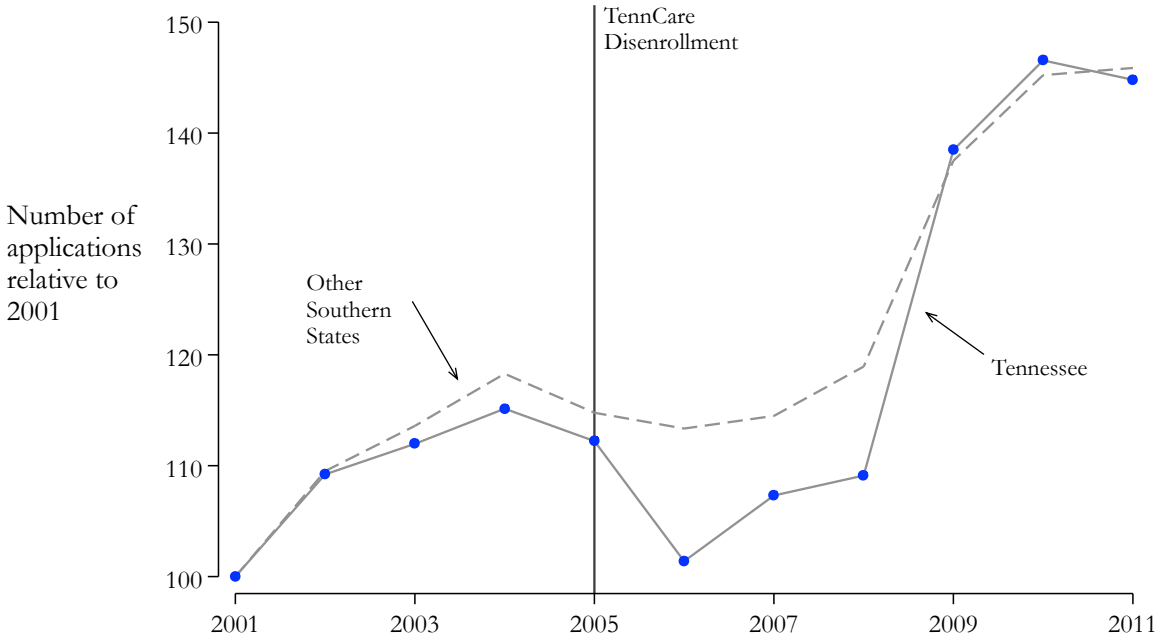
Note: This figure presents a histogram of two-year changes in the share of adults ages 21–64 without an advanced degree having public health insurance for each state. The changes are computed separately for each state-year for adults without children in the household. The two-year changes are computed across means of two-year cells. The vertical line indicates the change for childless adults in Tennessee before and after the TennCare disenrollment.

Appendix Figure A9. The Distribution of Changes in the Employment Rate, Entire US



Note: This figure presents a histogram of two-year changes in the employment rate of adults, ages 21–64, without an advanced degree. The changes are computed separately for each state-year for adults without children in the household. The two-year changes are computed across means of two-year cells. The vertical line indicates the change for childless adults in Tennessee before and after the TennCare disenrollment.

Appendix Figure A10. Applications to SSDI



Note: This figure presents the number of applications to the Social Security Disability Insurance Program for each year. The numbers are normalized so that applications in 2001 are equal to 100. See text for details.

Appendix Table A1. Estimated Premiums for TennCare and the ACA in 2004

	TennCare	Estimated ACA
Under 100%	No Premium	No Premium
138%	$24	No Premium
150%	$42	$47
200%	$120	$98
250%	$180	$157
300%	$240	$221
400%	$350	$295

Note: This table reports estimated premiums for TennCare and the ACA as a function of household income relative to the federal poverty line. To maximize comparability, the 2004 federal poverty line is used when computing premiums in both columns.

Appendix Table A2. Alternative Samples
Dependent Variable: The share of CPS respondents reporting the given outcome

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Public	Employed	Working <20 hours per week	Working 20-35 hours per week	Working ≥35 hours per week	Private	Crowdout Estimate
				A. 2000-2007, South Only			
Tennessee × Post	- 0.073	0.046	0.002	0.018	0.026	0.034	- 0.472
2005 × No Children	(0.006)	(0.010)	(0.006)	(0.005)	(0.010)	(0.010)	0.086
	[0.000]	[0.000]	[0.757]	[0.002]	[0.018]	[0.004]	0.000
R^2	0.952	0.941	0.665	0.824	0.918	0.948	
				B. 2000-2007, All States			
Tennessee × Post	- 0.066	0.043	0.002	0.014	0.027	0.036	- 0.555
2005 × No Children	(0.004)	(0.004)	(0.003)	(0.003)	(0.005)	(0.005)	0.051
	[0.000]	[0.000]	[0.526]	[0.000]	[0.000]	[0.000]	0.000
R^2	0.947	0.948	0.826	0.889	0.906	0.960	
				C. 2000-2011, South Only			
Tennessee × Post	- 0.053	0.044	- 0.004	0.014	0.034	0.027	- 0.517
2005 × No Children	(0.009)	(0.008)	(0.003)	(0.005)	(0.008)	(0.012)	0.100
	[0.000]	[0.000]	[0.156]	[0.008]	[0.001]	[0.033]	0.000
R^2	0.939	0.941	0.689	0.783	0.917	0.941	
				D. 2003-2007, South Only			
Tennessee × Post	- 0.093	0.052	- 0.005	0.008	0.049	0.040	- 0.425
2005 × No Children	(0.009)	(0.010)	(0.007)	(0.005)	(0.011)	(0.012)	0.076
	[0.000]	[0.000]	[0.475]	[0.114]	[0.001]	[0.004]	0.000
R^2	0.958	0.951	0.692	0.838	0.924	0.943	

Note: For Panel A, N = 272; for Panel B, N = 816; for Panel C, N = 408; for Panel D, N = 170. The sample consists of means for each state, year, and group. State fixed effects, year fixed effects, group fixed effects, and fixed effects for all possible pairwise interaction terms not shown. The standard errors in parenthesis are robust to autocorrelation between observations from the same state.

Appendix Table A3. The Effect of TennCare Disenrollment on Employment Using Individual-Level Data
Dependent Variable: An indicator equal to one for CPS respondents who report the given outcome

	(1)	(2)	(3)	(4)	(5)
	Has Public Health Insurance	Employed	Employed and Working <20 hours per week	Employed and Working 20-35 hours per week	Employed and Working ≥35 hours per week
			A. Triple-Difference Estimates		
Tennessee × Post	- 0.073	0.046	0.002	0.018	0.026
2005 × No Children	(0.004)	(0.006)	(0.004)	(0.003)	(0.006)
	[0.000]	[0.000]	[0.630]	[0.000]	[0.001]
R^2	0.016	0.010	0.002	0.002	0.007
N	233,549	247,980	247,980	247,980	247,980
			B. Triple-Difference Estimates with Controls for Demographic Characteristics		
Tennessee × Post	- 0.071	0.048	0.001	0.016	0.030
2005 × No Children	(0.004)	(0.006)	(0.004)	(0.003)	(0.006)
	[0.000]	[0.000]	[0.834]	[0.000]	[0.000]
R^2	0.077	0.111	0.012	0.013	0.121
N	233,549	247,980	247,980	247,980	247,980

Note: The sample consists of individual-level CPS data. State fixed effects, year fixed effects, childless fixed effects, and fixed effects for all possible pairwise interaction terms not shown. The standard errors in parenthesis are robust to autocorrelation between observations from the same state; associated p-values in brackets. We restrict the sample to southern states from 2000 through 2007. The controls added to regressions in Panel B are: a fourth-order polynomial in age; gender; an indicator function for whether the respondent reports being a high school graduate, attended some college, has an associate's degree, or has a college degree; and all two-way interactions between age, gender, and education variables.

Appendix Table A4. Other Triple-Difference Fixed Effects Estimates
Dependent Variable: The share of CPS respondents
reporting the given outcome

	(1)	(2)	(3)
	Has Public Health Insurance	Has Private Health Insurance	Employed
Tennessee × Post 2005 × No Children	- 0.073	0.034	0.046
	(0.004)	(0.007)	(0.006)
	[0.000]	[0.000]	[0.000]
Tennessee × Post 2005	- 0.004	- 0.003	- 0.002
	(0.004)	(0.005)	(0.005)
	[0.417]	[0.464]	[0.650]
Tennessee × No Children	- 0.014	- 0.013	- 0.007
	(0.012)	(0.010)	(0.008)
	[0.272]	[0.198]	[0.405]
Post 2005 × No Children	0.011	0.008	- 0.001
	(0.004)	(0.007)	(0.006)
	[0.018]	[0.266]	[0.898]
R^2	0.644	0.797	0.752

Note: N = 272; the sample consists of means for each state, year, and childless status; state fixed effects, year fixed effects, and childless-status fixed effects not shown. The standard errors in parenthesis are robust to autocorrelation between observations from the same state. Standard errors for crowdout calculated via the delta method.

Appendix Table A5. The Effect of TennCare Disenrollment on Source of Private Insurance
Dependent Variable: The share of CPS respondents reporting the given type of insurance

	(1)	(2)	(3)	(4)
	Has Employer-Provided Insurance	Employed but No Employer-Provided Insurance	Employed and Uninsured	Individual Insurance
Tennessee × Post 2005	0.049	- 0.013	0.007	- 0.008
× No Children	(0.009)	(0.005)	(0.005)	(0.007)
	[0.000]	[0.017]	[0.206]	[0.278]
R^2	0.950	0.924	0.938	0.812
Mean of dep. variable	0.641	0.186	0.127	0.063

Note: N = 272; the sample consists of means for each state, year, and childless status; state fixed effects, year fixed effects, childless fixed effects, and fixed effects for all possible pairwise interaction terms not shown. The standard errors in parenthesis are robust to autocorrelation between observations from the same state; associated p-values in brackets. We restrict the sample to southern states from 2000 through 2007.

Appendix Table A6. Heterogeneity in the Degree of Crowdout By Gender
Dependent Variable: The share of CPS respondents reporting the given outcome

	(1)	(2)		(3)	(4)
	Public Coverage	Employed	Employed with Private Insurance through Employer	Private Coverage	Crowdout Estimate
Triple-difference estimate for men	- 0.068	0.072	0.064	0.029	- 0.433
	(0.007)	(0.015)	(0.012)	(0.013)	(0.118)
	[0.000]	[0.000]	[0.000]	[0.034]	[0.000]
Mean for men	0.115	0.778	0.560	0.690	
Triple-difference estimate for women	- 0.078	0.025	0.018	0.040	- 0.508
	(0.007)	(0.009)	(0.012)	(0.009)	(0.075)
	[0.000]	[0.006]	[0.141]	[0.000]	[0.000]
Mean for women	0.157	0.643	0.481	0.703	
p-value of test for equality	[0.329]	[0.009]	[0.012]	[0.534]	[0.449]
R^2	0.948	0.970	0.954	0.942	

Note: N = 544. The sample consists of means for each state, year, childless status, and group. State fixed effects, year fixed effects, group fixed effects, and fixed effects for all possible pairwise interaction terms not shown. The standard errors in parenthesis are robust to autocorrelation between observations from the same state. We restrict the sample to southern states from 2000 through 2007.