MEDICAID EXPANSION PROGRAMS: EFFECTS ON MEDICAID ENROLLMENT AND HEALTHCARE EMPLOYMENT

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A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Health Policy and Management in the Gillings School of Global Public Health.

Chapel Hill
2015

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ABSTRACT

Marisa R. Morrison: Medicaid Expansion Programs: Effects on Medicaid Enrollment and Healthcare Employment
(Under the direction of Jonathan Oberlander)

This dissertation examines the effects of Section 1115 coverage expansions on health insurance coverage and healthcare employment. Although Section 1115 expansions had smaller enrollments than the Patient Protection and Affordable Care Act's (ACA) Medicaid expansion, they—like the ACA's Medicaid expansion—extended publicly financed health insurance to low-income adults who were previously ineligible for such coverage. Therefore, studying the effects of Section 1115 expansions can provide insights into the longer-term effects of the ACA's Medicaid expansion.

In the dissertation's first analysis, I construct multinomial probit models in Current Population Survey Annual Social and Economic Supplement data to evaluate Section 1115 expansions' effects on health insurance coverage for "pre-expansion eligible" parents and children. These pre-expansion eligible individuals were eligible for Medicaid or the Children's Health Insurance Program (CHIP) under rules in place prior to or in the absence of Section 1115 expansions. I find that the probability of public coverage enrollment increased for pre-expansion eligible children and parents and that the probability of private coverage declined for pre-expansion eligible parents after Section 1115 expansions. Because Section 1115 expansions were associated with an increased probability of Medicaid or CHIP enrollment among pre-expansion eligible individuals, the ACA's effect on pre-expansion eligible individuals' enrollment in public coverage is likely to be larger.

Second, I use ordinary least squares (OLS) models with county and year fixed effects to estimate Section 1115 expansions' effects on county-level health care and social assistance employment. This study's principal data set is County Business Patterns data. I find that Section 1115 expansions were associated with increases in county-level health care and social assistance employment across all states with changes in expansion status during the study period. This finding suggests that healthcare employment could grow in response to public coverage expansions.

Finally, I use OLS models with hospital and year fixed effects to examine Section 1115 expansions' effects on hospital employment. This study's key data source is the American Hospital Association annual survey. I find that these expansions were not associated with hospital employment growth. Applying these findings to the ACA's coverage expansion suggests that the ACA could have small effects on hospital employment.

ACKNOWLEDGMENTS

I could not have carried out my dissertation work without the support of many people. First, I would like to thank my advisor Jon Oberlander for his assistance in developing this dissertation. Throughout the dissertation process, he has helped me stay focused on the big picture. In general, Jon has been an excellent advisor throughout all stages of my graduate school experience—from talking with me about which classes to take to editing my cover letters for job applications.

I would also like to thank Mark Holmes for his invaluable advice on both quantitative methods and Stata coding. Mark always finds creative solutions to methods issues and is a great source for research ideas. I am grateful for Marisa Domino's, Krista Perreira's, and Pam Silberman's thorough feedback on my dissertation papers, which greatly improved the papers' quality.

I am indebted to Erin Fraher, who let me retain my research assistant position in the Program on Health Workforce Research and Policy at the Cecil G. Sheps Center for Health Services Research despite my move to Atlanta. Working with Erin and others at the Sheps Center for more than three years was an incredibly rewarding experience. My time at the Sheps Center helped me develop as a researcher and a writer and provided me with the inspiration for the two healthcare workforce–focused studies in this dissertation.

I feel lucky to have had strong support from family and friends throughout my time at the University of North Carolina. In particular, I would like to thank Sara Jacobs for being both a study buddy and a friend. My parents deserve acknowledgment for encouraging my

curiosity about the world and introducing me—through their careers—to the subjects of health care and public health. My mother requires a special mention for teaching me the value of clear writing. I would also like to thank my mother-in-law and father-in-law for their encouragement.

Finally, I would like to thank my husband Mike Simone, whose love and optimism were essential to my completion of the Health Policy and Management doctoral program.

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LIST OF ABBREVIATIONS

ACA	Patient Protection and Affordable Care Act
AHA	American Hospital Association
CBP	County Business Patterns
CHIP	Children's Health Insurance Program
CMS	Centers for Medicare and Medicaid Services
CPS ASEC	Current Population Survey Annual Social and Economic Supplement
FTE	Full-time equivalent
IPUMS	Integrated Public Use Microdata Series
KCMU	Kaiser Commission on Medicaid and the Uninsured
MERIC	Missouri Economic Research and Information Center
SAIPE	Small Area Income and Poverty Estimates

CHAPTER 1. INTRODUCTION

The 2010 Patient Protection and Affordable Care Act (ACA) authorized the most significant expansion of Medicaid coverage since the program's creation in 1965. As of April 2015, 29 states and Washington, DC, have adopted the ACA's Medicaid expansion, which has been in effect since January 2014 (Kaiser Family Foundation, 2015). As a result of this policy change, Medicaid and Children's Health Insurance Program (CHIP) enrollment grew by 26% in "expansion" states and 8% in "non-expansion" states between summer 2013 and January 2015 (Artiga et al., 2015). Because additional states may adopt the ACA's Medicaid expansion at a later date and because the Medicaid expansion has only been in effect for slightly more than a year, looking back at the effects of pre-2014 Medicaid expansions can provide insights into the longer-term effects of the ACA's Medicaid expansion.

This dissertation specifically draws lessons from pre-ACA Medicaid expansions in two areas: the effects of Medicaid expansion on health insurance for individuals already eligible for coverage under pre-expansion rules and the effects of Medicaid expansion on health care employment. The pre-ACA public coverage expansions on which this dissertation focuses are Section 1115 waiver-based expansions.

This dissertation concentrates on Section 1115 expansions because they share a target population of parents and non-elderly, low-income adults without dependent children with the ACA's Medicaid expansion. That being said, pre-ACA Section 1115 expansions do not present a perfect comparison for the ACA's Medicaid expansion because they had smaller enrollments and generally were not implemented at the same time as other major health

insurance market changes. Furthermore, federal spending on Section 1115 expansions was much more constrained than is federal spending on the ACA's Medicaid expansion.

Because the ACA's Medicaid expansion is an unprecedented event no prior expansion is exactly comparable to the ACA's Medicaid expansion. Massachusetts's 2006-2007 health care reforms, on which the ACA is modeled, provide the closest approximation to the ACA's coverage expansions. However, Massachusetts already had relatively high rates of health insurance coverage and a large healthcare workforce supply compared to other U.S. states prior to 2006 (Long, Stockley, & Dahlen, 2012; Staiger, Auerbach, & Buerhaus, 2011). Focusing on expansions carried out through Section 1115 waivers allows this dissertation to take into consideration public coverage expansion experiences in multiple states.

Overview of Medicaid

The Medicaid program is integral to the Section 1115 expansions discussed here. Prior to the ACA's Medicaid expansion, Medicaid provided publicly financed health insurance coverage to specific categories of individuals: low-income children, parents of dependent children, pregnant women, and elderly or disabled individuals. Each state's Medicaid program receives both federal and state funding, but each state has flexibility in administering its Medicaid program. Although the federal government has set minimum income eligibility limits, defined the types of individuals that are eligible for Medicaid coverage, and mandated certain Medicaid benefits, states can modify healthcare provider reimbursement, change Medicaid enrollment and renewal processes, enroll Medicaid beneficiaries into managed care, introduce premiums and cost sharing for some enrollees, offer additional benefits, increase income eligibility thresholds for mandatory populations, and apply for federal permission to cover optional populations (Kaiser Commission on Medicaid and the Uninsured, 2013).

Prior to the ACA's Medicaid expansion, more than three-fourths of children in poverty were enrolled in Medicaid coverage while 9.8% were uninsured (Majerol, Newkirk, & Garfield, 2015). In contrast, only 35.2% percent of non-elderly adults in poverty were enrolled in Medicaid coverage, and 37.2% of adults in poverty were uninsured (Majerol, Newkirk, & Garfield, 2015). One reason that so many low-income U.S. adults were uninsured is that many states had income eligibility limits for parents that were below the federal poverty level (limits that still exist in some states). In addition, non-elderly, non-disabled adults without dependent children ("childless adults") were ineligible for Medicaid in most states prior to the ACA's enactment (Kaiser Commission on Medicaid and the Uninsured, 2013).

States that have accepted the ACA's Medicaid expansion have extended Medicaid eligibility to all individuals with household incomes below 138% of the federal poverty level (FPL) (Heberlein et al., 2013). The ACA also includes provisions simplifying Medicaid enrollment and renewal processes and eliminating assets as a factor for determining Medicaid eligibility (Heberlein et al., 2013; Somashekhar & Tumulty, 2013).

Overview of Medicaid Waivers

Prior to the implementation of the ACA's Medicaid expansion in 2014, states had limited options for providing coverage to parents whose incomes were otherwise too high to qualify for Medicaid or to childless adults who were otherwise excluded from Medicaid coverage.

Some states used their own funds to extend health insurance to individuals otherwise ineligible for Medicaid. For example, Pennsylvania used National Tobacco Settlement Agreement money to provide health insurance coverage to low-income, uninsured adults who were ineligible for Medicaid (Dorn & Meyer, 2004). Washington state funded coverage for

individuals with incomes up to 200% FPL through a Basic Health Plan (Kaiser Commission on Medicaid and the Uninsured, 2010; Dorn & Alteras, 2004).

Another option for expanding Medicaid eligibility for parents—but not for childless adults—was a Section 1931 expansion. The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 removed the connection between welfare receipt and Medicaid eligibility, providing states with opportunities to expand coverage to parents not eligible for welfare (Guyer & Mann, 1998). Section 1931 of the Social Security Act allowed states to disregard a certain portion of a Medicaid applicant's income or assets when determining that applicant's Medicaid eligibility—a policy that effectively makes more parents eligible for Medicaid coverage (Birnbaum, 2000). Under Section 1931 rules, states could receive matching funds from the federal government to cover parents eligible for Medicaid under Section 1931 expansions (Guyer & Mann, 1998)

The third option for expanding publicly financed health insurance to adults was a Section 1115 waiver. In addition to being a tool for expanding coverage, the waivers provided states with opportunities to try new methods for administering Medicaid and CHIP programs (Centers for Medicare and Medicaid Services, n.d.). States submitted waiver applications outlining coverage expansion plans to the Centers for Medicaid and Medicaid Services (CMS). CMS and the states then negotiated waiver details (Artiga, 2009). CMS only approved waivers that were budget neutral—that is, CMS required each waiver to be projected to not increase federal spending above what the federal government would spend in the waiver's absence (Artiga, 2009). To maintain budget neutrality while expanding coverage, states implemented cost-saving strategies such as moving Medicaid enrollees into Medicaid managed care plans, redirecting disproportionate share hospital payment to health

insurance coverage or capping expansion program enrollment (Government Accountability Office, 2013). CMS approves waivers for five-year periods, after which a state must renew a waiver (Centers for Medicare and Medicaid Services, n.d.).

Overview of Dissertation

This dissertation examines the effects of Section 1115 expansions on health insurance coverage and on the healthcare workforce employment to provide lessons for the possible longer-term effects of the ACA's Medicaid expansion. It includes three separate studies. The first study evaluates how Section 1115 expansions affect health insurance coverage for "pre-expansion eligible" parents and children. This study defines pre-expansion eligible individuals as parents or children who are eligible for Medicaid or CHIP either under pre-expansion Medicaid and CHIP rules in expansion states or under public coverage rules in states without Section 1115 expansions.

The second study examines the effects of Section 1115 expansions on health care and social assistance employment at the county level between 2000 and 2010. The third study assesses the effect of Section 1115 expansions on full-time equivalent (FTE) hospital employment between 2000 and 2010.

Contribution to the Literature

These studies contribute to the literature on the effects of coverage expansions on health insurance coverage and the healthcare workforce. The first study adds to the literature because it examines the effects of expansions in several states not only on coverage for pre-expansion eligible children but also on coverage for pre-expansion eligible parents. In addition, it considers CHIP-eligible children—not just Medicaid-eligible children—as pre-expansion eligible children and it assesses whether public coverage expansions affect private health insurance coverage for pre-expansion eligible adults.

The second and third studies contribute to the limited research on the link between coverage expansion and healthcare employment (Buchmueller et al., 2014; Cozad, 2012; Shin & Rosenbaum 2012; Missouri Economic Research and Information Center, 2014; Staiger, Auerbach, & Buerhaus, 2011; Turner, 2014). Only two prior studies on this topic have used multivariate techniques to assess how coverage expansion affects specific types of healthcare workers (Buchmueller et al., 2014; Cozad, 2012). This dissertation's second study is the first to use multivariate techniques to assess coverage expansions' effects on employment within the entire healthcare sector in multiple states. The third study in this dissertation focuses on the effects of coverage expansions on hospital employment in multiple states rather than just in Massachusetts (Cozad, 2012).

Policy Implications

The studies in this dissertation also have implications for the ACA. First, by examining the effects of Section 1115 expansions on uninsurance, private health insurance coverage, and Medicaid or CHIP coverage for pre-expansion eligible populations, the first study in this dissertation can identify changes in health coverage patterns that could be repeated on a broader scale as a result of the ACA's Medicaid expansion. Prior to the ACA Medicaid expansion's implementation, there were approximately 9.1 million non-elderly individuals who were eligible for Medicaid but were uninsured (Sommers & Epstein, 2011). Due to the publicity surrounding the ACA, outreach efforts, changes to Medicaid enrollment procedures, and the ACA's requirement that most individuals have health insurance coverage, states expected many of these individuals to come out of the woodwork to enroll in public coverage (Sommers & Epstein, 2011).

Enrollment of this population into public coverage has potentially significant implications for state budgets because the federal government provides states with enhanced

funding only for covering individuals newly eligible for Medicaid under ACA rules (Sommers & Epstein, 2011; Sommers & Epstein, 2013). When individuals who are not newly eligible for Medicaid enroll in public coverage, the federal government provides states with pre-ACA levels of federal matching funds to cover these enrollees' costs (Sommers & Epstein, 2011). In fact, anecdotal evidence from California and Rhode Island suggests that "woodwork" enrollment has contributed to increased state Medicaid spending (Millman, 2014).

At present, there is limited information on woodwork enrollment under the ACA because CMS and other organizations are not publicly releasing data on health insurance coverage trends for "new eligibles" and woodwork individuals (Centers for Medicare and Medicaid Services, 2015; Levy, 2015; Urban Institute, 2014). Thus, it is only possible to identify the woodwork effect in states that have so far rejected the ACA's Medicaid expansion and not in states that have expanded Medicaid coverage (Artiga et al., 2015).

At the same time, it is important to evaluate whether pre-ACA coverage expansions influenced healthcare employment because the potential job-creating effects of the ACA's Medicaid expansion are cited as a benefit of expansion (Gruber, 2009; White House Council of Economic Advisors, 2014). Moreover, 10.6% of the employed U.S. population worked in health care in January 2015, and the healthcare sector represented 17.4% of the U.S. gross domestic product in 2013 (Bureau of Labor Statistics, 2015; Hartman et al., 2015). It is especially useful to examine the effects of pre-ACA coverage expansions on hospital employment because hospitals—as providers of emergency care—represent an important site of care for low-income and uninsured individuals, the ACA's target population for coverage.

Dissertation Organization

Chapters 2 through 4 present the first, second, and third studies included in this dissertation. Chapter 5 synthesizes the conclusions from the studies presented and describes opportunities for future research.

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CHAPTER 2. THE EFFECT OF MEDICAID EXPANSION ON HEALTH INSURANCE COVERAGE FOR PRE-EXPANSION ELIGIBLE PARENTS AND CHILDREN

The Patient Protection and Affordable Care Act (ACA) enables states to expand Medicaid coverage to all adults with household incomes below 138% of the federal poverty level (FPL). In addition to expanding coverage to adults newly eligible for Medicaid, the ACA's Medicaid expansion is likely to increase Medicaid participation—through publicity, outreach and administrative simplification—among the millions of individuals who were Medicaid-eligible under pre-ACA rules (Sommers & Epstein, 2010). This increase in Medicaid participation among pre-ACA Medicaid-eligible individuals is known as the "woodwork effect" (Sommers & Epstein, 2011).

States are concerned about the "woodwork" population because of its budgetary implications for Medicaid (Millman, 2014). Although the federal government will pay no less than 90% of the costs of Medicaid enrollees newly eligible through the ACA, it will not provide funds beyond the traditional match rate to cover spending on enrollees eligible for Medicaid under pre-ACA rules (Centers for Medicare and Medicaid Services, 2013). The traditional match rate varies by state, covering between 50% and 74% of Medicaid enrollee costs, so any increase in woodwork enrollment entails additional costs to states (U.S. Department of Health and Human Services, 2014).

At present, limited information is available on woodwork enrollment under the ACA. For example, the Centers for Medicare and Medicaid Services (CMS) does not publicly

separate total Medicaid and CHIP enrollment into "newly ACA eligible" enrollment and "eligible under pre-ACA rules" enrollment.

The ACA's Medicaid expansion is unprecedented in its magnitude. Yet examining the effects of prior Medicaid expansions on health insurance coverage for individuals eligible for Medicaid or CHIP prior to these expansions could provide insight into the ACA's potential woodwork effects. This study assesses the effects of Section 1115 waiver-based public coverage expansions on Medicaid coverage, uninsurance, and private coverage for parents and children eligible for Medicaid and CHIP coverage prior to these expansions or in states without coverage expansions. I refer to these individuals as the "pre-expansion eligible" population. In this study, individuals who are pre-expansion eligible can be enrolled in Medicaid or CHIP, covered by private coverage, or uninsured.[1]

Background

Overview of Section 1115 Waiver-Based Health Insurance Coverage Expansions

Before the ACA's Medicaid expansion, states had three options for expanding publicly financed health insurance to adults. First, states could create public insurance options that were entirely state-funded, such as Washington state's Basic Health Plan (Kaiser Commission on Medicaid and the Uninsured, 2010; Dorn & Alteras, 2004). A second option was a Section 1931 expansion, created by Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA). Section 1931 of the Social Security Act allowed states to expand Medicaid eligibility for parents and children by increasing the amount of a Medicaid applicant's income or assets that could be disregarded when determining that applicant's Medicaid eligibility (Birnbaum, 2000).

[1] As noted later in this chapter, I consider Medicaid or CHIP to be the primary coverage for individuals who have both Medicaid or CHIP and private coverage.

Finally, states could expand publicly financed health insurance through the Section 1115 waiver process. These waivers allowed states to waive key federally mandated features of the Medicaid program and still obtain Medicaid matching funds from the federal government. To obtain a Section 1115 waiver, a state submitted an application to CMS. The state and CMS then negotiated the waiver's terms (Artiga, 2009). CMS required waivers to be projected to not increase federal spending above what the federal government would spend in the waiver's absence—a condition known as "budget neutrality" (Artiga, 2009).

Prior Research on How Medicaid and CHIP Coverage Expansions Affect "Pre-Expansion" Eligible Parents and Children

Below, I summarize research on the effects of public insurance expansions on coverage for pre-expansion eligible children and parents. In particular, I review prior literature on how expansions affect parents' and children's substitution of public coverage for private coverage.

Effects of Coverage Expansion on Pre-Expansion Eligible Children's Coverage

Researchers have examined how three types of coverage expansions—parental Medicaid expansions, CHIP implementation, and Massachusetts's 2006–2007 healthcare reforms—have affected children's health insurance coverage.

I located three studies that examine how parental coverage expansions affected children's health insurance coverage. All three studies conclude that these expansions increased children's public coverage enrollment and decreased uninsurance. The earliest of these studies, by Ku and Broaddus (2001), finds that young children's Medicaid participation rates increased 16 percentage points between 1990 and 1998 in three states with parental Medicaid expansions, even though Medicaid eligibility rules for these children had not changed. On the other hand, in states without parental Medicaid expansions, children's

participation in Medicaid only increased 3 percentage points during the same period. However, this descriptive study, which uses Current Population Survey Annual Social and Economic Supplement (CPS ASEC), does not control for other factors that affect coverage.

Using multivariate techniques, CPS ASEC data, and a larger sample of states, Aizer and Grogger (2003) find that parental Medicaid expansions increased the probability of children's enrollment in Medicaid by 5.3 percentage points. Dubay and Kenney (2003) find that Massachusetts's expansion of Medicaid coverage for parents in 1997 was associated with a 14.2 percentage point increase in the percent of Medicaid-eligible children enrolled in Medicaid and an 11 percentage point increase in insurance coverage compared to other U.S. states (Dubay & Kenney, 2003).

Two studies indicate that CHIP was associated with increases in Medicaid coverage for low-income children. An uncontrolled analysis from Dubay and colleagues (2007) using the National Health Interview Survey finds that CHIP implementation corresponded with an 11.2 percentage point increase in public coverage among Medicaid-eligible children. Because the authors do not control for other factors, it is impossible to rule out other explanations besides CHIP implementation for increases in children's Medicaid participation. Using multivariate methods in Medical Expenditure Panel Survey data, Hudson, Selden, and Banthin (2005) find not only increases in Medicaid participation among Medicaid-eligible children but also decreases in uninsurance after CHIP implementation.

I identified one study that examines how Massachusetts's healthcare reforms in 2006–2007 affected Medicaid coverage for low-income children (Kenney, Long, & Luque, 2010). Using CPS ASEC data from 2005–2009, the authors find that children in Massachusetts in families with incomes below 200% FPL were 10.4 percentage points more

likely to be enrolled in Medicaid coverage and 5.1 percentage points less likely to be uninsured compared to children in other New England states (Kenney, Long, & Luque, 2010). Like Dubay and Kenney's study (2003), Kenney, Long, and Luque's study (2010) focuses only on changes in one state and therefore its results may be less generalizable to the rest of the United States.

Taken together, these studies suggest that Medicaid expansions increase public coverage and reduce uninsurance for pre-expansion eligible children.

Enrollment of Pre-Expansion Eligible Parents into Coverage after Coverage Expansions to Adults

Two studies use difference-in-difference models to estimate the enrollment of pre-expansion eligible parents into Medicaid after coverage expansions. Sommers, Kenney, and Epstein (2014) use American Community Survey data to examine changes in health insurance coverage for previously Medicaid-eligible parents after ACA-related Medicaid expansions in Washington, DC, and Connecticut in 2010. The authors observe an increase in coverage rates for previously Medicaid-eligible parents after Medicaid expansion in Connecticut but not in Washington, DC (Sommers, Kenney, & Epstein, 2014). Sonier, Boudreaux, and Blewett (2013) find that Massachusetts's 2006–2007 healthcare reforms increased Medicaid enrollment by 16.3 percentage points among previously Medicaid-eligible parents in Massachusetts compared to their peers in surrounding states (Sonier, Boudreaux, & Blewett, 2013).

Both Sommers and colleagues' (2014) and Sonier and colleagues' (2013) studies are limited by their focus on states with relatively high Medicaid income eligibility limits for parents and relatively high Medicaid participation rates among Medicaid-eligible individuals—even prior to the coverage expansions described in these two studies. In

particular, Sommers and colleagues' mixed findings may be due to the fact that both Connecticut and Washington, DC, had state-funded coverage expansions for adults prior to adopting the ACA's early expansion option. However, the studies by Sommers and colleagues (2014) and Sonier and colleagues (2013) together suggest that Medicaid expansions increase parental Medicaid coverage.

Substitution of Private Coverage for Public Coverage after Medicaid and CHIP Expansions

The substitution of private coverage for Medicaid or CHIP—usually described as "crowd-out"—has been studied extensively. Public coverage can crowd out private coverage in two ways. First, individuals can drop private insurance coverage—either employer-sponsored coverage or non-group coverage—in favor of Medicaid or CHIP after an expansion of public coverage (Gruber & Simon, 2008). Second, firms can respond to public insurance expansions by making changes to employer-sponsored insurance that result in employees' moving from employer-sponsored coverage to public coverage (Gruber & Simon, 2008).

I identified several studies that examined crowd-out for pre-expansion eligible children. Both Aizer and Grogger (2003) and Dubay and Kenney (2003) estimate that parental Medicaid expansions increased pre-expansion eligible children's Medicaid enrollment without a statistically significant effect on these children's private coverage. Hudson, Selden, and Banthin (2005) similarly find that CHIP implementation did not produce statistically significant estimates of crowd-out among already Medicaid-eligible children. Kenney, Long, and Luque (2010) extend prior research on crowd-out among children by separately examining substitution of public coverage for employer-sponsored insurance and non-group insurance. They conclude that although there is no evidence that

Massachusetts's state-level healthcare reforms caused substitution of employer-sponsored insurance for public coverage, the reforms did appear to decrease non-group coverage among children already eligible for public coverage in Massachusetts (Kenney, Long, & Luque, 2010).

Besides these studies, there is a substantial body of literature on the effect of expansions on crowd-out rates among low-income children and parents. The initial study of crowd-out, conducted by Cutler and Gruber (1996), finds that nearly half of the individuals newly insured as a result of Medicaid expansions in the late 1980s and early 1990s were previously privately insured.

Studies that followed Cutler and Gruber (1996) re-examine these 1980s–1990s Medicaid expansions, consider CHIP's effects on crowd-out, or assess how expansions affected private insurance coverage for non-elderly adults. The range of crowd-out estimates varies substantially across studies and estimates are sensitive to the expansion studied, the data set used, and the methods the authors employ (Gruber & Simon, 2008; Card & Shore-Sheppard, 2004; Hudson, Selden, & Banthin, 2005). One set of studies finds negligible rates of crowd-out (Aizer & Grogger, 2003; Card a&nd Shore-Sheppard, 2004; Ham & Shore-Sheppard, 2005; Shore-Sheppard, 2008; Hamersma & Kim, 2013). A second set of studies finds some evidence of crowd-out after expansions, but usually at rates lower than the 50% from Cutler and Gruber's 1996 study (Dubay & Kenney, 1996; Dubay & Kenney, 1997; Thorpe & Florence, 1998; Blumberg, Dubay, & Norton, 2000; Shore-Sheppard, 2000; Yazici & Kaestner, 2000; Shone et al., 2008; Kronick & Gilmer, 2002; Busch & Duchovny, 2005; Atherly, 2012; Lo, 2013; Sommers, Kenney, & Epstein, 2013).

Although the literature on crowd-out is extensive, there are no studies that focus on crowd-out among pre-expansion eligible parents. Furthermore, most crowd-out studies use linear probability models, which can result in nonsensical negative predicted probabilities (Hudson, Selden, & Banthin, 2005). This study avoids the problem of out-of-range predictions by using multinomial probit models. Finally, the lack of consensus on public coverage expansions' effects on crowd-out suggests that there are still opportunities to study this topic.

The Current Study's Contribution to the Literature

This study contributes to the literature on the effects of public insurance expansions on coverage for pre-expansion eligible individuals because it includes a broad group of states. In contrast, Dubay and Kenney (2003); Long, Kenney, and Luque (2010); Sommers and colleagues (2014); and Sonier and colleagues (2013) focus on a narrow set of states with higher family income eligibility limits for public coverage and higher-than-average Medicaid participation rates (Sonier, Boudreaux, & Blewett, 2013). Furthermore, this study is the first to examine the effects of Medicaid expansion on pre-expansion eligible parents' enrollment in private health insurance coverage.

Conceptual Framework

In this study, I assume that parents face two key decisions regarding health insurance: whether to obtain any insurance and whether to substitute public coverage for private coverage. All parents and children included in this study are assumed to be eligible for public coverage even if they are uninsured.

I assume that parents who are considering whether or not to obtain coverage weigh its benefits against its costs. Parents' perceptions of coverage's benefits and costs likely differ according to demographic characteristics and health status of parents and their families,

parental knowledge, family incomes, characteristics of state Medicaid and CHIP programs, and stigma surrounding public coverage (Davidoff & Garrett, 2001; Wolfe & Scrivner, 2005; Currie, 2004). A parent's or child's demographic and health-status characteristics can affect how much value a parent places on obtaining coverage for herself and her children. For example, parents with children in poor health are more likely to place a higher value on coverage than would parents with children who are in good health (Davidoff et al., 2000). In turn, parents who place more value on coverage are more likely to enroll themselves and their children in coverage.

Parents' perceptions of the value of coverage may reflect their knowledge of public insurance programs. For example, some low-income parents do not know that they or their children are eligible for public coverage and thus remain uninsured (Baicker, Congdon, & Mullanaithan, 2012). Other parents may believe that enrolling their children in public coverage will expose unauthorized-immigrant family members to deportation (Ojeda & Brown, 2005). In this study, such knowledge cannot be measured.

I propose that family income influences decisions about whether or not to obtain insurance. For the lower-income families considered in this study, private coverage—in particular, non-group coverage—could be too expensive (Davidoff et al., 2004). Public coverage entails relatively low out-of-pocket costs for families but premiums or cost-sharing can deter participation in public insurance programs (Kronebusch & Elbel, 2004; Wright et al., 2010).

Medicaid and CHIP program characteristics shape parental decisions about insurance by affecting the non-financial costs of applying for public coverage. Hassles such as a burdensome application process could deter Medicaid and CHIP enrollment, causing some

parents and children to remain uninsured (Baicker, Congdon, & Mullainathan, 2012). Simpler enrollment processes could raise the value of public coverage relative to uninsurance and therefore increase an individual's probability of public insurance enrollment (Baicker, Congdon, & Mullainathan, 2012). The stigma surrounding participation in public programs like Medicaid or CHIP could also influence the decision to enroll in coverage. Stigma can lower the value of enrolling in public insurance and thus reduce an individual's probability of public coverage enrollment—though prior research suggests that the magnitude of this effect could be small (Currie, 2004).

Pre-expansion eligible individuals with access to private health insurance coverage have the ability to decide whether or not to substitute their private health insurance coverage with public coverage. For low-income individuals, a primary factor in this choice is affordability. For many low-income individuals, Medicaid—with its low out-of-pocket costs—represents a more affordable choice than private health insurance coverage does (Gruber & Simon, 2008). Furthermore, parents, based on their and their children's demographic characteristics and health status, may favor the more comprehensive benefits of Medicaid to private coverage's less generous benefits (Gruber & Simon, 2008). Public coverage–eligible individuals could retain private coverage for a number of reasons. First, they may perceive that they have better access to care through private coverage than through Medicaid or CHIP (Gruber & Simon, 2008). Parents also could be unaware that they or their children qualify for public insurance or could be concerned about the potential stigma associated with such coverage (Currie, 2004).

I propose that public insurance expansions affect the relative values of uninsurance, private insurance, and public insurance. Outreach conducted as part of an expansion makes

individuals aware that they are eligible for Medicaid or CHIP and can include assistance with enrollment in insurance (Aizer, 2003). Such outreach activities, by increasing knowledge and reducing hassle, increase the perceived value of such coverage—which should lead to increased public insurance enrollment (Aizer, 2003). Furthermore, by increasing the pool of people eligible for public coverage, expansions could increase the value of Medicaid or CHIP by reducing the stigma associated with these programs. Finally, expansions could motivate employers to change the terms of the insurance they offer to employees, prompting employees to switch to public coverage (Gruber & Simon, 2008).

Hypotheses

Based on this conceptual framework, this study tests two hypotheses:

Hypothesis 1a. Pre-expansion eligible children are i) more likely to be enrolled in Medicaid, ii) less likely to be covered under private health insurance, and iii) less likely to be uninsured in states with active Section 1115 expansions than in states without such expansions.

Hypothesis 1b. Pre-expansion eligible parents are i) more likely to be enrolled in Medicaid, ii) less likely to be covered under private health insurance, and iii) less likely to be uninsured in states with active Section 1115 expansions than in states without such expansions.

Data and Samples

Data Sources

I use data from the Integrated Public Use Microdata (IPUMS) version of the Current Population Survey Annual Social and Economic Supplement, the Centers for Medicare and Medicaid Services Web site, and the Kaiser Commission on Medicaid and the Uninsured 50-state surveys.

Integrated Public Use Microdata Current Population Survey Annual Social and Economic Supplement (IPUMS CPS ASEC). This study's main data source is the IPUMS Current Population Survey Annual Social and Economic Supplement (CPS ASEC) data from the years 2001 to 2011 (King et al., 2010). This study uses IPUMS CPS ASEC data to describe coverage status, individual demographic characteristics, individual health status, and characteristics of the households in which each individual lives.

The Current Population Survey is a monthly survey of U.S. households. The U.S. Census Bureau and the Bureau of Labor Statistics field the Annual Social and Economic Supplement to the CPS every March. The CPS ASEC provides detailed employment, demographic, and socioeconomic information about members of approximately 100,000 surveyed households (U.S. Census Bureau, 2012; U.S. Census Bureau, 2013).

The IPUMS CPS data set, available from the University of Minnesota, is an edited version of the U.S. Census Bureau's CPS data (King et al., 2010). This study uses the IPUMS version of the CPS ASEC for several reasons. First, the IPUMS CPS ASEC corrects for biases resulting from the imputation of survey answers for approximately 10% of CPS ASEC survey respondents (Ziegenfuss & Davern, 2011). Second, the IPUMS CPS ASEC fixes coding errors in the original CPS ASEC related to health coverage status (Ziegenfuss & Davern, 2011). Third, the IPUMS CPS ASEC groups related individuals into health insurance coverage units. These health insurance units define the family relationships on which an individual's eligibility for either private or public health insurance coverage is based (State Health Access Data Assistance Center, 2012).

Using CPS ASEC data to evaluate patterns of health insurance coverage poses two challenges. First, the CPS ASEC under-represents the number of individuals enrolled in

Medicaid, due in large part to Medicaid enrollees mistakenly reporting that they did not have Medicaid coverage in the prior year (Davern et al., 2009). The CPS's Medicaid undercount therefore will depress this analysis's estimates of individuals' probability of Medicaid enrollment, but there is no evidence that this underreporting varies across states and years (Gilmer, Kronick, & Rice, 2005).

Centers for Medicare and Medicaid Services (CMS) Web site. The primary source of information on the years in which states implemented Section 1115 expansions is the CMS Section 1115 waivers Web site (Centers for Medicare and Medicaid Services, n.d. (a)). I use information from the CMS Web site to create this study's key independent variable.

Kaiser Commission on Medicaid and the Uninsured 50-state surveys. Since 2000, the Kaiser Commission on Medicaid and the Uninsured (KCMU) has commissioned surveys that provide information on Medicaid and CHIP income eligibility limits for children by age, parents by employment status, and pregnant women. These surveys also provide information on Medicaid and CHIP program features by state, such as whether states consider household assets when making determinations about a parent's or child's eligibility for Medicaid or CHIP ("asset tests"). In addition, these surveys provide information about non-Section 1115 expansions by state and year. Because the KCMU 50-state Medicaid and CHIP survey from 2000 only includes information about Medicaid and CHIP coverage for children and pregnant women, this study supplements the KCMU surveys with a 2000 survey of state Medicaid and CHIP eligibility and program characteristics from the Center on Budget and Policy Priorities (Broaddus et al., 2002).

Table 2.1. States Included in This Study that Implemented Section 1115 Expansions to Parents or Low-Income Adults Without Dependent Children between 2000 and 2010

Expansion state	Year expansion implemented	Expansion program enrollment as of June 2011	Expansion program enrollment as of June 2011
Arizona	2001	224,500 childless adults	16%
California	10 counties in 2007, 35 primarily rural counties in 2011[1]	184,200 childless adults and parents	2%
Delaware	1996	37,100 childless adults	19%
Hawaii	1994	Not reported	N/A
Illinois	2002. Expansion discontinued in 2007	129,994 parents on December 31, 2006[2]	7% of June 2006 enrollment
Indiana	2008	16,100 childless adults	2%
Iowa	2005	46,000 childless adults and parents	11%
Maine	2002	16,500 childless adults	6%
Maryland	2007[3]	56,800 childless adults	7%
Massachusetts	2007[4]	114,700 childless adults	10% (but accompanied by other coverage changes)
Michigan	2004	77,900 childless adults	4%
Minnesota	1995; amendment to expand parental coverage in 1999	90,455 parents and childless adults in MinnesotaCare[5]	11% of total Medicaid enrollment for December 2012
New Jersey	2001	156,598 adults ever enrolled in 2011 fiscal year[6] (monthly enrollment count not available)	N/A
New York	2001	949,300 childless adults	19%
Utah	2002	16,800 parents and childless adults	6%
Vermont	1996	34,400 childless adults in June 2012 (June 2011 data not available)	24% of total Medicaid enrollment in June 2012
Wisconsin	1999	34,200 childless adults	4%

Notes: Unless indicated otherwise, data on expansion enrollments and monthly Medicaid enrollments come from Kaiser Commission on Medicaid and the Uninsured, Medicaid enrollment: June 2013 data snapshot. Washington, DC: Kaiser Family Foundation; January 2014. http://kaiserfamilyfoundation.files.wordpress.com/2014/01/8050-07-medicaid-enrollment-june-2013-data-snapshot1.pdf.

1. California's Section 1115 expansions were not implemented on a statewide basis.
2. Illinois expansion program enrollment count from Artiga S, Mann C. Family coverage under SCHIP waivers. Washington, DC: Kaiser Commission on Medicaid and the Uninsured; May 2007. https://kaiserfamilyfoundation.files.wordpress.com/2013/01/7644.pdf. Accessed May 14, 2015.

3. Maryland's limited-benefit coverage expansion to low-income adults without dependent children was an addition to a Section 1115 waiver that implemented Medicaid managed care in Maryland in 1997.
4. Massachusetts' major expansion of coverage in 2006-2007 was carried out through Massachusetts' pre-existing Section 1115 waiver.
5. Minnesota expansion program enrollment count from Minnesota Department of Human Services. Managed care enrollment figures, July 2011. http://www.dhs.state.mn.us/main/idcplg?IdcService=GET_DYNAMIC_CONVERSION&RevisionSelectionMethod=LatestReleased&dDocName=dhs16_141529. Accessed June 25, 2015.
6. New Jersey expansion program enrollment count from the Centers for Medicare and Medicaid Services. New Jersey Family Coverage under SCHIP. Baltimore, MD: Centers for Medicare and Medicaid Services; April 2012.

Sample Creation

This study includes two distinct samples: one sample contains pre-expansion eligible parents and the other contains pre-expansion eligible children.

Imputing pre-expansion eligibility status for children. I use CPS ASEC data on income, age, employment, and state of residence to impute whether or not a U.S.-citizen parent or child could be eligible for Medicaid or CHIP prior to or in the absence of a Section 1115 expansion (Davidoff & Garrett, 2001; Sommers, 2007).

I impute a child's pre-expansion eligibility for Medicaid and CHIP by state and year based on the child's age, the annual income of the health insurance unit to which the child belongs, and income eligibility rules for the child's state of residence. The first step in this process is converting the total income of the health insurance unit to which the child belongs to a percentage of the federal poverty level. Calculations of income as a percent of poverty take into account family size, changes in federal poverty levels by year, and higher federal poverty levels in Alaska and Hawaii.

Then, I compare income as a percent of poverty in the child's health insurance unit to the appropriate state-specific income eligibility limits for public coverage. A child is considered pre-expansion eligible for Medicaid or CHIP if his or her family's income is at or

below Medicaid and CHIP upper income limits. Pre-expansion eligible income limits by state are available in Table 2.6 in this paper's Appendix.

Imputing pre-expansion eligibility status for parents. Imputing a parent's pre-expansion eligibility for Medicaid requires additional considerations. First, the pre-expansion eligible income limits for parents in this study differ by employment status in some states. Second, pre-expansion eligible income limits for parents attempt to account for the fact that some states do not adjust income eligibility limits for parents in Medicaid for inflation. For these states, I use the 2010 Medicaid income limit as a percent of poverty to determine pre-expansion eligibility.

Limitations of the imputation process. This imputation process has several limitations. First, the CPS ASEC does not provide information on family assets. Having assets above a certain dollar amount disqualified children and adults from public coverage in certain states included in this study. The lack of information on assets means that some individuals who are imputed to be eligible for Medicaid or CHIP were in fact not eligible for coverage under these programs. Second, the CPS ASEC does not provide detailed information on how many months individuals were uninsured during a given year. Because many state CHIP programs require children to be uninsured for a set number of months prior to obtaining CHIP coverage, this study's imputation process likely overestimates the number of children eligible for CHIP coverage under pre-existing non–Section 1115 rules. Third, this imputation process does not account for the closures of CHIP programs to new enrollment in certain states and years, also contributing to an overestimate of numbers of pre-expansion eligible children. Fourth, states can have different parental income eligibility limits based on family size. Because the KCMU 50-state surveys only provide information on income

eligibility limits for families of three people, the imputation process does not account for these differences in income limits by family size.

Years included in the study. The samples for parents and for children use IPUMS CPS ASEC for the survey years 2001 through 2011. The CPS ASEC reports health insurance coverage status from respondents for the prior year, so the CPS surveys years 2001–2011 provide information on survey respondent health insurance coverage status during 2000–2010.

The year 2000, corresponding to the 2001 CPS ASEC, is the start of the study period because by 2000 all but two states had implemented CHIP programs. Furthermore, by the 2001 CPS, the U.S. Census Bureau had changed how it determined whether or not CPS respondents were uninsured, resulting in reduced estimates of uninsurance rates (State Health Access Data Assistance Center, 2002). Therefore, I do not use CPS ASEC data from 2000 and before. The 2011 CPS ASEC, which provides health insurance coverage information from 2010, is the last year included in the study because of the ACA's passage in 2010.

Sample creation for pre-expansion eligible children. Developing the final study sample of children required subjecting the initial sample of individuals 18 years old or younger to several exclusion criteria. There were 733,226 total children (unweighted) in the 2001–2011 CPS ASEC files. First, I removed 31,327 children who were less than one year old from the sample, because a child can receive Medicaid coverage if his or her mother was enrolled in Medicaid on the child's birth date (Centers for Medicare and Medicaid Services, n.d. (b)).

The study sample also excludes 23,494 children who were not U.S. citizens. Non-citizen children are excluded from the study sample because the CPS ASEC does not provide

information on whether or not these children are authorized immigrants. Unauthorized immigrants are only eligible for emergency Medicaid services (Wasem, 2014). Next, I excluded 4,588 children on Medicare and 21,825 children with military coverage from the sample because neither Medicare coverage nor military coverage is a coverage option for most children (Hamersma & Kim, 2013).

In addition, I excluded 174,482 children because of public coverage changes unrelated to the Section 1115 expansions included in this study. Most of these exclusions are due to changes to Medicaid and CHIP program income eligibility limits that are not the result of Section 1115 expansions (in 24 states). For example, Hawaii increased CHIP income eligibility limits in 2006, so all children from Hawaii in the CPS ASEC from 2007 onward are excluded from the study sample. This exclusion ensures that I compare coverage for pre-expansion eligible individuals in Section 1115 expansion states only to coverage for pre-expansion eligible individuals in states with no Medicaid or CHIP income eligibility changes.

Other policy-based exclusions relate to changes to state-funded coverage programs for adults (in 4 states). For instance, Washington, DC, implemented a locally funded health insurance program in 2001, so all children from Washington, DC, from 2002 onwards are excluded from the sample. Children from 4 states are excluded from the study sample after those states implemented Section 1115–based premium assistance programs. Individuals from premium-assistance states are excluded from the sample because eligibility for premium assistance is related to an employer's offer of health insurance coverage or employment at a small firm—information not available in the IPUMS CPS ASEC.

I excluded all children from Tennessee because Tennessee's waiver program included repeated changes to income eligibility limits over the period of its operation and was

generally closed to adult enrollment soon after the expansion's implementation (Broaddus et al., 2002). All children from Oregon were excluded from the final sample because changes to the state's waiver program resulted in large declines in program enrollment (Oberlander, 2007). These policy-based exclusions make it easier to isolate the effects of Section 1115 expansions on the health insurance coverage status of pre-expansion eligible children. (Table 2.6 in the Appendix explains exclusions by state and year in greater detail.)[2]

Only children who are imputed to be pre-expansion eligible are included in the final study sample, resulting in the exclusion of 272,480 children. Finally, 24,969 children are excluded from the sample due to missing variable values. The variables with missing values describe the citizenship status of a child's parents (17,192 missing values), the number of siblings in a child's family (6,520 missing values), whether or not a child lives in a metropolitan area (1,214 missing values), and the educational attainment of the household head (43 missing values). Figure 2.1 shows the process for creating the study sample of pre-expansion eligible children.

[2] It is worth noting here that the policy-based exclusions differ between this paper and the two other dissertation papers, which focus on the effects of Section 1115 expansion on health care employment. These exclusions differ because individual enrollment in Medicaid or CHIP is assumed to be more responsive than health care employment to changes in Medicaid and CHIP income eligibility limits at the state level.

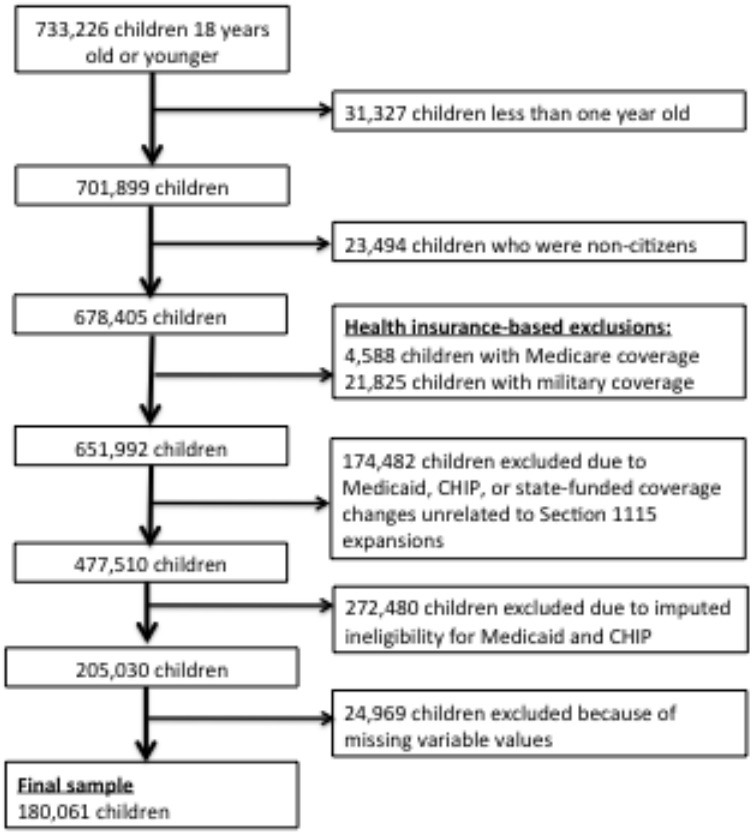

Figure 2.1. Creating a sample of pre-expansion eligible children.

Sample creation for pre-expansion eligible parents. The 2001–2011 IPUMS CPS ASEC data includes 629,441 non-elderly adult parents living with their minor children. This initial group of parents was subject to a number of exclusion criteria. First, I excluded 27,163 women whose youngest child was less than a year old were because these women were assumed to be pregnant in the prior year, and income eligibility limits for parents are different from those for pregnant women (Kenney et al., 2012).

Because the CPS ASEC does not distinguish between authorized immigrants and unauthorized immigrants, I dropped 63,225 parents who are not citizens from the parental sample. In addition, I excluded 7,011 parents with Medicare coverage and 18,935 parents with military coverage. (I also excluded four parents who reported being in the military but

lacked military coverage.) I removed 4,985 parents who reported receiving Supplemental Security Income (SSI) from the sample because, in most states, people who qualify for SSI automatically receive Medicaid (Social Security Administration, n.d.; Sonier, Boudreaux, & Blewett, 2013).

Public coverage policy changes, such as increases or decreases in CHIP income eligibility limits, resulted in the exclusion of 137,105 parents from the sample. These policy-based exclusions are identical to those discussed in the previous section. Next, I excluded 349,396 parents who were not pre-expansion eligible from the sample. Finally, I dropped 123 parents from the sample because their data included missing variable values. Figure 2.2 shows the process for creating this sample of parents.

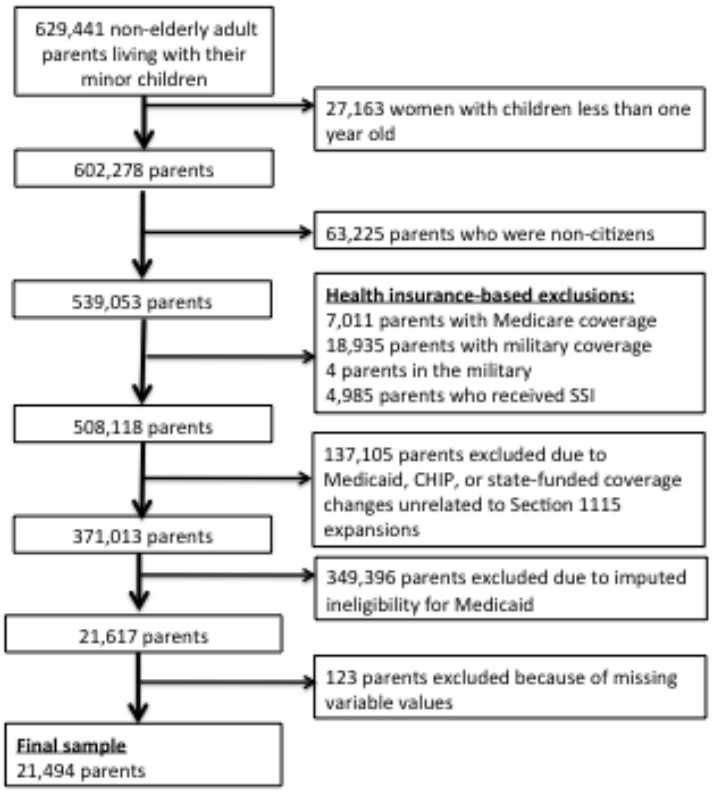

Figure 2.2. Creating a sample of pre-expansion eligible parents.

Sample sizes and characteristics. There are 180,061 children from 47 states and the District of Columbia in this study's sample of pre-expansion eligible children. The total number of children in states with active Section 1115 expansions during the study period is 90,156.

There are 21,494 parents from 47 states and the District of Columbia in the sample of pre-expansion eligible parents. Among all parents in all study years, 12,305 are from states that had active Section 1115 expansions during the study period, and 9,189 are from states without such expansions.

Variables

The analysis that focuses on pre-expansion eligible children and the analysis that focuses on pre-expansion eligible parents share the same dependent variable and key independent variable. The control variables differ between these two analyses because parental characteristics are associated with health insurance coverage outcomes for children (Davidoff and Garrett, 2001).

Dependent Variable

This study's dependent variable is a construct that describes whether or not an individual had Medicaid or CHIP coverage (or other non-military or non-Medicare public coverage),[3] had private health insurance, or had no health insurance in the year prior to the CPS survey year. Private health insurance includes both employer-sponsored coverage and non-group coverage.

I created this health insurance construct using summary health insurance indicators in the IPUMS CPS ASEC data. The summary health insurance variables for Medicaid and private health insurance in the IPUMS CPS ASEC are not mutually exclusive. In the study's

[3] For brevity's sake, I refer to this category as "Medicaid or CHIP coverage" throughout the rest of the paper.

final sample for children, 12,655 children (7.0% of the sample) had both public and private coverage. Similarly, 702 parents in the study's sample of parents (3.3% of the sample) reported having both public and private coverage. Because low-income individuals who move from private to public coverage are likely to face lower out-of-pocket costs and lower premiums, I consider individuals reporting both Medicaid coverage and private coverage to be covered under Medicaid (Shaefer, Grogan, & Pollack, 2011).

Expansion Indicator

Because the CPS ASEC records respondents' health coverage status for the prior year, this study's key independent variable describes Section 1115 expansion status at the state level in the previous year. The variable is set to 1 in a given year if a state had an active Section 1115 expansion in the previous year and is set to 0 otherwise. For example, because Arizona's Section 1115 expansion was first implemented in 2001, the expansion indicator for Arizona is set to 0 for "CPS year" 2001 and set to 1 for "CPS years" 2002 to 2011.

Control Variables for Children

The analysis for pre-expansion eligible children's coverage includes variables that describe a child's demographic and socioeconomic characteristics, the demographic and socioeconomic characteristics of the child's household, and state-level Medicaid and CHIP program characteristics. Individual child characteristics that affect a child's probability of public insurance enrollment, private insurance enrollment, or having no health insurance include age, gender, race and Hispanic origin, whether or not a child lives in a metropolitan area, and whether or not a child is reported by a parent to be in fair or poor health (Davidoff & Garrett, 2001; Kincheloe, Brown, & Frates, 2007).

A number of family-level factors affect health insurance coverage status. These include total family (health insurance unit) income as a percent of the federal poverty level,

the number of siblings in the child's health insurance unit, whether or not the child has a parent or minor sibling in fair or poor health, the age of the head of the household in which the child lives, the citizenship status of the child's parents, the household head's employment status, the household head's educational attainment, and the household head's marital status (Davidoff & Garrett, 2001; Kronebusch & Elbel, 2004).

Finally, state Medicaid and CHIP program characteristics can affect health insurance outcomes for children. State Medicaid and CHIP program characteristics that are controlled for in this analysis are whether or not a state has an asset test to determine Medicaid eligibility for children, whether or not a state has an asset test to determine CHIP eligibility for children, and whether or not a state's CHIP program is administered separately from its Medicaid program (Kronebusch & Elbel, 2004; Wolfe & Scrivner, 2005).

Control Variables for Parents

Individual characteristics that affect a parent's health insurance coverage status include age, gender, race and Hispanic origin, residence in a non-metropolitan location, whether or not the parent is in fair or poor health, educational attainment, the parent's employment status, and the parent's marital status (Kenney et al., 2012). This analysis does not control for whether a parent is a naturalized citizen or a U.S.-born citizen because naturalized citizens and U.S.-born citizens have similar rates of uninsurance (Derose, Escarce, & Lurie, 2007). Furthermore, U.S.-born citizens and naturalized citizens have similar probabilities of being covered by employer-sponsored insurance after controlling for other factors (Buchmueller et al., 2007). The analysis for parents accounts for Medicaid program characteristics in the form of asset tests for determining parental Medicaid eligibility (Sommers et al., 2012).

State and Year Indicators

The models for adults and children also include indicators to describe an individual's state of residence and the year in which that individual was included in the CPS ASEC.

Methods

Selecting between Maximum Likelihood Estimation Models

I considered several maximum likelihood estimation models for evaluating the effects of Section 1115 expansion on coverage for pre-expansion eligible parents and children. Multinomial logit models are useful for examining choices between multiple options, but these models require the restrictive Independence of Irrelevant Alternatives (IIA) assumption. The IIA assumption requires that the ratio of the predicted probabilities for any two alternatives in a multinomial logit model remain the same even when other available alternatives change. Tests using seemingly unrelated estimation rejected the null hypothesis that the IIA assumption holds in multinomial logit models for pre-expansion eligible parents and children.

Nested logit models are an alternative to multinomial logit models. In this case, nested logit models failed to converge and therefore could not be used. I therefore selected multinomial probit models, which also do not impose the IIA assumption on choice, to model health insurance coverage status in this study.

Multinomial Probit Models

This study uses multinomial probit models to evaluate the effect of Section 1115 expansions on health insurance status for pre-expansion eligible parents and children. As noted in the "Variables" section, health insurance status options are Medicaid or CHIP coverage, private coverage, or no insurance coverage. I also use survey weights from the IPUMS CPS to generate nationally representative estimates (Minnesota Population Center,

n.d.). It is worth noting that 15,991 children and 2,168 parents in the final samples of children and parents have survey weights of zero.

For both parents and children, I evaluate the association between Section 1115 expansion and health insurance status by computing the average differential effects of Section 1115 expansion on the predicted probabilities of having private health insurance coverage, having public coverage, and having no health insurance coverage. I calculate the average differential effects using the method of recycled predictions. I produce standard errors for the average differential effect estimates using bootstrapping with 500 replications. I also calculate predicted probabilities associated with Medicaid coverage, no health insurance coverage, and private coverage for individuals in expansion states and non-expansion states using the method of recycled predictions and bootstrapping with 500 replications to produce standard errors. In addition, I use bivariate tests to compare unadjusted differences in coverage, individual characteristics, family characteristics, and state Medicaid and CHIP program characteristics between individuals in expansion states and individuals in non-expansion states.

Results

Descriptive Statistics

Tables 2.2 and 2.3 provide descriptive statistics for the samples of pre-expansion eligible children and pre-expansion eligible parents.

Children. As Table 2.2 shows, the most common coverage choice for pre-expansion eligible children in the sample was Medicaid or CHIP. Approximately 50.6% of study-sample children in non-expansion states and 48.4% of children in expansion states were covered under Medicaid or CHIP. Nearly 39% of children from expansion states and one-third of children in non-expansion states had private coverage. Approximately 12.7% of

children in the sample from expansion states and nearly 17% of children in non-expansion states were uninsured. All of these differences are statistically significant ($p<0.001$).

Table 2.2. Summary Statistics for Pre-Expansion Eligible Children (Ages 1–18), Unweighted

Variables	All children (N=180,061)	Children in Section 1115 expansion states (N=90,156)	Children in non-Section 1115 expansion states (N=89,905)
Health insurance status			
Medicaid, CHIP, or state-funded public coverage	49.5%	48.4%	50.6%***
Private coverage	35.7%	38.9%	32.5%***
Uninsured	14.8%	12.7%	16.9%***
Individual child characteristics			
Age at last birthday (in years)	8.8 (5.0)	8.9 (5.0)	8.7*** (5.0)
Female	48.8%	48.7%	48.9%
Race/ethnicity (Referent category: non-Hispanic white)			
Black, non-Hispanic	16.9%	13.2%	20.5%***
Biracial, non-Hispanic	2.6%	2.5%	2.6%***
Asian/Pacific Islander, non-Hispanic	2.4%	3.6%	1.1%***
American Indian, non-Hispanic	1.7%	0.8%	2.7%***
Hispanic	29.6%	33.8%	25.4%***
Lives in metropolitan area	75.8%	82.6%	68.9%***
In fair or poor health	3.2%	3.0%	3.5%***
Family characteristics			
Family (health insurance unit) income as a percentage of poverty (Referent category: 100%-199% of the federal poverty level)			
Less than 100% FPL	42.3%	38.8%	45.7%
200% FPL and above	11.4%	17.3%	5.5%
Number of siblings in family	1.7 (1.3)	1.7 (1.4)	1.6*** (1.3)
Has parent or minor sibling in fair or poor health	17.1%	15.6%	18.6%***
Age of household head (Referent category: age 20 to 64)			
Age 19 or less	1.2%	1.1%	1.2%
Age 65 and above	2.3%	2.3%	2.3%

Citizenship status of child's parents (Referent category: all parents are citizens)			
Mixed parental citizenship status	6.2%	7.5%	4.9%***
No citizen parents	13.7%	17.4%	10.0%***
Employment status of household head (Referent category: Has full-time employment)			
Has part-time employment	13.4%	13.8%	13.0%***
Unemployed	7.4%	7.4%	7.4%***
Not in labor force or not applicable	27.1%	26.7%	27.5%***
Military	0.000056%	0.0011%	0.0%***
Educational attainment of household head (Referent category: High school graduate)			
Less than high school	9.8%	11.1%	8.5%***
Some high school	17.3%	16.6%	17.9%***
Some college	19.3%	18.6%	20.0%***
Associate's degree	8.2%	8.3%	8.0%***
Bachelor's degree	7.4%	8.3%	6.5%***
Advanced degree	2.2%	2.5%	1.8%*
Marital status (Referent category: Married)			
Separated, widowed, or divorced	26.7%	24.6%	28.7%***
Single	21.0%	20.8%	21.1%***
State Medicaid and CHIP program characteristics			
CHIP implemented as an expansion of Medicaid coverage (vs. as a separate state program)	24.7%	25.7%	23.8%***
State counts assets for determining Medicaid eligibility for children	14.2%	3.6%	24.8%***
State counts assets for determining CHIP eligibility for children	6.3%	0.0%	12.5%***

Note: *** indicates that means or proportions are statistically significant different at p<0.001.

Parents. Table 2.3 shows that approximately one-third of all pre-expansion eligible parents in this study's sample were Medicaid enrollees, another one-third were uninsured, and the remaining one-third had private coverage. Medicaid coverage rates were significantly higher for parents from expansion states. Approximately 38.4% of parents in expansion states

had Medicaid coverage, while 32.2% of parents in non-expansion states were enrolled in Medicaid ($p<0.001$). Approximately 38.3% of pre-expansion eligible parents in expansion states but only 23.8% of parents from non-expansion states had private coverage ($p<0.001$). Uninsurance also differed significantly between parents in expansion states and parents in non-expansion states: 44% of parents in non-expansion states were uninsured, compared to 23.2% of parents in expansion states ($p<0.001$).

Multinomial Probit Model Estimates

Coefficient estimates from the multinomial probit models for pre-expansion eligible children and parents are presented in Appendix Tables 2.7 and 2.8, respectively. Coefficient estimates for no health insurance are normalized to zero because having no health insurance is the base category in these models.

Table 2.3. Summary Statistics for Pre-Expansion Eligible Parents, Unweighted

Variables	All parents (N=21,494)	Parents in Section 1115 expansion states (N= 12,305)	Parents in non-Section 1115 expansion states (N=9,189)
Health insurance coverage status			
Medicaid	35.8%	38.4%	32.2%***
Private coverage	32.1%	38.3%	23.8%***
Uninsured	32.1%	23.2%	44.0%***
Individual parent characteristics			
Age at last birthday (in years)	35.4 (9.2)	36.1 (9.0)	34.4*** (9.4)
Female	69.8%	66.9%	73.7%***
Race/ethnicity (Referent category: non-Hispanic white)			
Black, non-Hispanic	17.9%	13.4%	23.8%***
Biracial, non-Hispanic	1.6%	1.7%	1.5%***
Asian/Pacific Islander, non-Hispanic	2.8%	3.7%	1.6%***
American Indian, non-Hispanic	2.8%	1.4%	4.7%***
Hispanic	12.2%	11.0%	13.9%***
Lives in metropolitan area	65.7%	64.2%	67.8%***
In fair or poor health	15.3%	13.1%	18.3%***
Educational attainment: (Referent category: High school graduate)			
Less than high school	3.7%	3.1%	4.4%***
Some high school	18.1%	14.5%	22.9%***
Some college	19.7%	20.3%	18.9%***
Associate's degree	8.6%	10.0%	6.7%***
Bachelor's degree	7.5%	9.2%	5.2%***
Advanced degree	2.1%	2.6%	1.6%***
Employment status (Referent category: Has full-time employment)			
Has part-time employment	18.6%	19.0%	18.1%***
Unemployed	10.7%	9.7%	11.9%***
Not in labor force or not applicable	33.5%	29.6%	38.6%***
Marital status of household head (Referent category: Married)			
Separated, widowed, or divorced	26.1%	23.6%	29.4%***
Single	31.2%	27.5%	36.1%***
Family characteristics			
Family (health insurance unit) income as a percentage of poverty (Referent category: less than 50% of the federal poverty level)			
50-100% FPL	20.8%	22.8%	18.1%***
100% FPL and above	26.5%	40.1%	8.2%***
State Medicaid and CHIP program characteristics			
State counts assets for determining Medicaid eligibility for parents	23.0%	25.9%	19.1%***

Note: *** indicates that means or proportions are statistically significant different at p<0.001.

Table 2.4 presents predicted probabilities of having private coverage, being uninsured, or having Medicaid or CHIP coverage for pre-expansion eligible parents and children in expansion and non-expansion states. Table 2.5 shows the average differential effects of Section 1115 expansions on the probabilities of private coverage, having no health insurance coverage, and Medicaid or CHIP coverage. The table indicates that Section 1115 expansions were associated with a 1.4 percentage point increase in the probability that a pre-expansion eligible child will have Medicaid or CHIP (95% bootstrapped confidence interval: 0.37 percentage points, 2.4 percentage points). Section 1115 expansions were associated with a corresponding 1.4 percentage point decline in the probability of a pre-expansion eligible child's having no health insurance coverage (95% bootstrapped confidence interval: -2.1 percentage points, -0.60 percentage points). The average differential effect of Section 1115 expansions on private coverage for pre-expansion eligible children is not statistically significant.

For pre-expansion eligible parents, Section 1115 expansions were associated with a 6.5 percentage point increase in the probability of Medicaid coverage (95% bootstrapped confidence interval: 2.8 percentage points, 10.3 percentage points) and 4.3 percentage point decline in the probability of private coverage (bootstrapped 95% confidence interval: -7.7 percentage points, -0.88 percentage points). The average differential effect of Section 1115 expansions on the probability of being uninsured is statistically insignificant for parents.

Table 2.4. Predicted Probabilities for Public, Private, or No Health Insurance Coverage for Pre-Expansion Eligible Children and Parents in Expansion States and Non-Expansion States

Coverage type	Section 1115 expansion states	Non-expansion states
Pre-expansion eligible children		
Medicaid or CHIP coverage	0.52 (0.0037)	0.51 (0.020)
Private coverage	0.35 (0.0035)	0.35 (0.019)
No health insurance coverage	0.13 (0.0029)	0.15 (0.0014)
Pre-expansion eligible parents		
Medicaid coverage	0.41 (0.011)	0.34 (0.0099)
Private coverage	0.29 (0.0082)	0.33 (0.010)
No health insurance coverage	0.30 (0.011)	0.32 (0.0090)

Note: Predicted probabilities are rounded.

Table 2.5. Average Differential Effects of Section 1115 Expansions on the Probabilities of Having Public, Private, or No Health Insurance Coverage for Pre-Expansion Eligible Children and Parents

Coverage type	Children	Parents
Medicaid or CHIP coverage	0.014** (0.0051)	0.065** (0.019)
Private coverage	-0.00012 (0.0049)	-0.043* (0 .018)
No health insurance coverage	-0.014*** (0.0039)	-0.022 (0.019)

Notes: * indicates p-value<0.05. ** indicates that p-value<0.01. ** indicates that p-value<0.001. Differential effects are rounded.

Discussion

This study finds mixed evidence in support of the hypotheses that Section 1115 expansions increased the probability of Medicaid or CHIP coverage, decreased the probability of private coverage among pre-expansion eligible parents and children, and decreased the probability of having no insurance. I find that Section 1115 expansions were

associated with increases in the probability of Medicaid or CHIP coverage for both pre-expansion eligible children and parents, which supports this study's hypotheses. However, I also find that Section 1115 expansions were associated with decreases in the probability of having private coverage for pre-expansion eligible parents but not for pre-expansion eligible children. Finally, there is evidence that Section 1115 expansions were associated with decreases in the probability of having no insurance coverage for pre-expansion eligible children but not for pre-expansion eligible parents.,

That Section 1115 expansions increased the probability of public coverage for pre-expansion eligible children and parents is consistent with prior literature on the effects of parental coverage expansions on children's coverage (Aizer & Grogger, 2003; Dubay & Kenney, 2003). The positive association between Section 1115 expansions and parental Medicaid coverage corresponds with Sonier and colleagues' (2013) finding that Massachusetts's healthcare reform increased Medicaid enrollment among pre-expansion-eligible parents in Massachusetts.

The finding that Section 1115 expansions had no effect on the probability that a pre-expansion eligible parent is uninsured contrasts with finding from Sommers and colleagues (2014) and Sonier and colleagues (2013). The difference between my findings and those from other studies could be explained by differences in the expansions that each of these studies considers. Sonier and colleagues (2013) and Sommers and colleagues (2014) focus on coverage expansions in Massachusetts and Connecticut and Washington, DC, respectively. Although this study includes the Massachusetts expansion, it does not include the expansions from Washington, DC, or Connecticut. Furthermore, this study also includes Medicaid expansions with modest enrollments and presumably less publicity. As a result, it is

reasonable to expect that the overall effect of the expansions in this study on parental uninsurance is smaller than the effects presented in the Sonier and colleagues (2013) and Sommers and colleagues (2014).

That Section 1115 expansions had no effect on the probability of private coverage for pre-expansion eligible children but a negative effect on the probability of private coverage for pre-expansion eligible parents is an unexpected finding. Previous research on the substitution of public coverage for private coverage suggests that such substitution is more likely for individuals in families with higher incomes because such individuals are more likely to have access to private insurance in the first place (Lo, 2013; Gilmer & Kronick, 200). In this study, pre-expansion income eligibility limits for children are generally higher than those for adults. However, the extent to which expansions cause substitution of private coverage for public coverage among children and parents has been a matter of long-running debate (Shore-Sheppard, 2008). The average differential effects of expansions on coverage in this study are comparable in magnitude to results from other studies (Aizer and Grogger, 2003; Atherly, 2012; Kenney, Long, and Luque, 2010).

Limitations

This analysis has several limitations. First, as in most studies of state-level policy change, Section 1115 expansions are not randomly assigned to states; states had to choose to pursue these expansions. This represents a potential source of bias for model estimates, particularly if the decision to pursue expansions is related to pre-expansion state-level health insurance coverage rates. However—as state decisions on implementing the ACA's Medicaid expansions illustrate—whether state policymakers perceive uninsurance as a pressing policy problem to resolve likely depends more on issues like state financial

resources and state administrative capacity rather than on health insurance coverage rates (Jacobs & Callaghan, 2013).

As previously noted, the process for imputing Medicaid and CHIP eligibility is imperfect. For example, the IPUMS CPS ASEC does not have data on assets, which also can determine whether or not an individual is eligible for Medicaid or CHIP. Nor does it contain information on monthly family income; individuals in families with volatile household incomes may be Medicaid- or CHIP-eligible in some months but not in others (Wolfe & Scrivner, 2005). Finally, the CPS ASEC data tend to understate Medicaid enrollment, though there is no evidence to suggest that this underreporting of Medicaid coverage varies systematically across states or years (Sonier, Boudreaux, & Blewett, 2013).

Implications for the ACA

The expansions presented here were much smaller in scope than the ACA's coverage expansion and—with the exception of Massachusetts's reforms—did not include a mandate to have health insurance coverage. Despite this, this study found statistically significant increases in the probabilities of Medicaid and CHIP enrollment among pre-expansion eligible parents and children after Section 1115 expansions. Therefore, the ACA could have an even larger effect on public insurance enrollment for individuals eligible for such coverage under pre-ACA rules. That the Section 1115 expansions were associated with an increased probability of Medicaid enrollment and a reduced probability of uninsurance for pre-expansion eligible children suggests that the ACA's coverage expansion—even though targeted toward adults—could improve coverage rates for children. Finally, this study's finding that Section 1115 expansions are associated with declines in the probability of pre-expansion eligible parents' enrollment in private coverage implies that at least some new parental enrollment in the ACA's Medicaid coverage will come from adults who are

substituting private coverage with public coverage. In sum, this study reinforces the notion that expansions are likely to motivate enrollment in public insurance programs among individuals already eligible for such coverage.

Table 2.6. Rules for Pre-Expansion Eligibility for Children and Parents, By State and Year

State name	Pre-expansion eligible income limits for children (as a percent of FPL)	Pre-expansion eligible income for unemployed parents (as a percent of FPL)	Pre-expansion eligible income limits for employed parents (as a percent of FPL)	CPS ASEC years excluded from the sample	Brief description of non-Section 1115 Medicaid or CHIP changes corresponding to data exclusions by year	Other notes
Alabama	200%	11%	19%	2010–2011	Non-Section 1115 increase in CHIP income eligibility limit in 2009	
Alaska	200%	75%	81%	2001–2005	Non-Section 1115 decrease in children's Medicaid income eligibility limits in 2004	
Arizona	200%	36%	36%	None		Pre-expansion eligible limits for unemployed and employed parents are the same because Broaddus and colleagues (2002) only provides information about parental income eligibility limits for working parents.
Arkansas	200%	15%	18%	2008–2011	Implementation of a Section 1115 premium assistance program in 2007	

California	250%	100%	106%	None		Only 10 counties were included in California's 2010 coverage expansion through a Section 1115 waiver. However, the IPUMS CPS ASEC does not provide information on county of residence for survey respondents.
Colorado	185%	31%	38%	2007–2011	Non-Section 1115 increase in parents' Medicaid income eligibility limits in 2006	
Connecticut	300%	100%	107%	2001–2002, 2006–2011	Non-Section 1115 changes to parents' Medicaid income eligibility limits in 2000, 2001, and 2005	
Delaware	200%	100%	106%	None		Individuals insured under coverage expansions from the 1990s—prior to the study period—are considered pre-expansion eligible.
District of Columbia	200%	200%	200%	2002–2011	Implementation of state-funded health coverage program for adults in 2001	
Florida	200%	20%	53%	None		

Georgia	235%	28%	50%			
Hawaii	200%	100%	100%	2007–2011	Non-Section 1115 increase in CHIP income eligibility limit in 2006	Individuals insured under coverage expansions from the 1990s—prior to the study period—are considered pre-expansion eligible.
Idaho	150%	25%	32%	2005–2011	Non-Section 1115 increase in CHIP income eligibility limit in 2004	
Illinois	185%	31%	56%	2007–2011	Non-Section 1115 increase in CHIP income eligibility limit in 2006	
Indiana	200% through 2008; 250% afterward	19%	25%	None		Increase in CHIP income eligibility limit in same year as implementation of Section 1115 waiver-based coverage expansion
Iowa	200%	31%	77%	2008–2011	Non-Section 1115 increase in parents' Medicaid income eligibility limits in 2007	
Kansas	200%	27%	34%	2010–2011	Non-Section 1115 increase in CHIP income eligibility limit in 2009	

Kentucky	200%	36%	62%	None		
Louisiana	200%	13%	20%	2001–2002, 2009–2011	Non-Section 1115 increase in children's Medicaid income eligibility limit in 2002, and increase CHIP income limit (including addition of separate CHIP program) in 2008	
Maine	200%	107%	107%	2007–2011	Non-Section 1115 increase in parents' Medicaid income eligibility limits in 2006	
Maryland	300%	30%	37%	2001–2002, 2009–2011	Non-Section 1115 increase in CHIP coverage limit in 2001; non-Section 1115 increase in parents' Medicaid income eligibility limits in 2008	
Massachusetts	400%	133%	133%	None		Massachusetts covered children with incomes between 300% FPL and 400% FPL with state funds.
Michigan	200%	34%	58%	None		
Minnesota	275%	275%	275%	None		Individuals insured under coverage expansions from the 1990s—prior to the study period—are considered pre-expansion eligible.

Mississippi	200%	24%	44%	None	
Missouri	300%	19%	25%	2001–2006	Non-Section 1115 reductions in parents' Medicaid income eligibility limits from 2000 to 2005
Montana	150%	35%	62%	2008–2011	Non-Section 1115 increases in CHIP income eligibility limit in 2007
Nebraska	185%	46%	56%	2010–2011	Non-Section 1115 increase in CHIP income eligibility limit in 2009
Nevada	200%	26%	84%	2007–2011	Section 1115 premium assistance program implemented in 2006
New Hampshire	300%	39%	49%	None	
New Jersey	350%	44%	44%		Pre-expansion eligible limits for unemployed and employed parents are the same because Broaddus and colleagues (2002) only provides information about parental income eligibility limits for working parents.
New Mexico	235%	30%	69%	2006–2011	Section 1115 premium assistance program implemented in 2005

New York	250%	80%	80%	2009–2011	Non-Section 1115 increase in CHIP income eligibility limit in 2008	Pre-expansion eligible limits for unemployed and employed parents are the same because Broaddus and colleagues (2002) only provides information about parental income eligibility limits for working parents.
North Carolina	200%	36%	49%	None		
North Dakota	140%	38%	65%	2001–2002; 2009–2011	Non-Section 1115 increases in parents' Medicaid income eligibility limits in 2001; non-Section 1115 increases in CHIP income eligibility limits between 2008 and 2010	
Ohio	200%	90%	90%	2001–2004	Non-Section 1115 decrease in parents' Medicaid income eligibility limits in 2004	
Oklahoma	185%	35%	44%	2007–2011	Section 1115 premium assistance program implemented in 2006	
Oregon	Dropped from sample because of expansion enrollment volatility during the study period					

Pennsylvania	250%	46%	46%	2002–2011	Non-Section 1115 decrease in children's income eligibility limits for Pennsylvania's state-based health insurance coverage in 2001; implementation of state-based health insurance coverage for adults in 2002	Pre-expansion eligible limits for unemployed and employed parents are the same because Broaddus and colleagues (2002) only provides information about parental income eligibility limits for working parents.
Rhode Island	250%	185%	192%	2010-2011	Non-Section 1115 decrease in parents' Medicaid income eligibility limits in fall 2008	
South Carolina	150%	48%	89%	None		
South Dakota	200%	52%	52%	2001-2003	Non-Section 1115-related increase in CHIP income eligibility limits in 2003	
Tennessee	Dropped from sample due to repeated changes to income eligibility limits. Also, most adult enrollment through the state's waiver-based coverage was closed before the beginning of the study period. The waiver program was closed altogether in 2005.					
Texas	200%	12%	26%	None		
Utah	200%	38%	44%	None		

Vermont	300%	185%	191%	None		Individuals insured under expansions from the 1990s—prior to the study period—are considered pre-expansion eligible.
Virginia	200%	23%	29%	2001-2002	Non-Section 1115-related increase in CHIP income eligibility limits in 2001	
Washington	Dropped from sample because of active state-funded health insurance coverage expansion for adults throughout the study period					
West Virginia	200%	19%	37%	2001-2002, 2007-2011	Non-Section 1115-related increases in CHIP income eligibility limits	
Wisconsin	185%	185%	185%	2009-2011	Non-Section 1115-related increase in CHIP income eligibility limit in 2008	Individuals insured under expansions from the 1990s—prior to the study period—are considered pre-expansion eligible.
Wyoming	200%	46%	60%	2001-2006	Non-Section 1115-related increase in CHIP income eligibility limit in 2005	

Table 2.7. Multinomial Probit Estimation of Coverage Outcomes for Pre-Expansion Eligible Children (N=180,061 children)[†]

Variables	Medicaid or CHIP coverage	Private coverage
Key independent variable		
Section 1115 expansion	0.097***	0.069*
	(0.027)	(0.029)
Individual child characteristics		
Age at last birthday (in years)	-0.045***	-0.010***
	(0.0013)	(0.0017)
Female	0.0092	0.022
	(0.013)	(0.014)
Race/ethnicity (Referent category: non-Hispanic white)		
Black, non-Hispanic	0.15***	-0.13***
	(0.021)	(0.022)
American Indian, non-Hispanic	-0.26***	-0.59***
	(0.055)	(0.062)
Asian/Pacific Islander, non-Hispanic	-0.12**	-0.28***
	(0.047)	(0.049)
Biracial, non-Hispanic	0.36***	-0.051
	(0.050)	(0.053)
Hispanic	0.098**	-0.25***
	(0.021)	(0.022)
Lives in metropolitan area	-0.11***	0.075***
	(0.018)	(0.019)
In fair or poor health	0.44***	-0.026
	(0.040)	(0.047)
Family characteristics		
Family (health insurance unit) income as a percentage of poverty (Referent category: 100%-199% of the federal poverty level)		
Less than 100% FPL	0.19***	-0.75***
	(0.015)	(0.016)
200% FPL and above	-0.27***	0.56***
	(0.028)	(0.027)
Number of siblings in family	0.10***	0.053***
	(0.0055)	(0.0057)
Has parent or sibling in fair or poor health	0.36***	-0.20***
	(0.018)	(0.021å)
Age of household head (Referent category: age 20 to 64)		
Age 19 or less	-0.58***	0.17**
	(0.057)	(0.061)
Age 65 and above	-0.64	-0.23***
	(0.041)	(0.044)

Citizenship status of child's parents (Referent category: all parents are citizens)		
Mixed parental citizenship status	-0.096**	-0.30***
	(0.028)	(0.030)
No citizen parents	-0.12***	-0.70***
	(0.022)	(0.025)
Employment status of household head (Referent category: Has full-time employment)		
Has part-time employment	0.24***	-0.19***
	(0.020)	(0.021)
Unemployed	0.37***	-0.30***
	(0.025)	(0.030)
Not in labor force or no response	0.27***	-0.19***
	(0.017)	(0.018)
Military	10.68***	-0.15
	(0.21)	(0.11)
Educational attainment of household head (Referent category: High school graduate)		
Less than high school	-0.17***	-0.46***
	(0.023)	(0.027)
Some high school	-0.0093	-0.36***
	(0.019)	(0.021)
Some college	0.053**	0.14***
	(0.019)	(0.020)
Associate's degree	0.037	0.26***
	(0.028)	(0.028)
Bachelor's degree	-0.19***	0.49***
	(0.030)	(0.029)
Advanced degree	-0.21***	0.69***
	(0.055)	(0.051)
Marital status of household head (Referent category: Married)		
Separated, widowed, or divorced	0.22***	-0.086***
	(0.017)	(0.018)
Single	0.35***	-0.22***
	(0.020)	(0.021)
State Medicaid and CHIP program characteristics		
CHIP implemented as an expansion of Medicaid coverage (vs. as a separate state program)	-0.21*	-0.069
	(0.080)	(0.085)
State counts assets for determining Medicaid eligibility for children	-0.41***	-0.27**
	(0.074)	(0.080)
State counts assets for determining CHIP eligibility for children	0.18***	0.046
	(0.040)	(0.044)

Notes: † Of the 180,061 children in the sample, 15,991 have a survey weight of zero. Coefficient estimates for state and year indicators as well as the constant term are omitted in the table above. * indicates p-value<0.05 for a particular coefficient; ** indicates p-value<0.01; and *** indicates p-value<0.001.

Table 2.8. Multinomial Probit Estimation of Coverage Outcomes for Pre-Expansion Eligible Parents (N=21,494 parents)[†]

Variables	Medicaid coverage	Private coverage
Key independent variable		
Section 1115 expansion	0.23* (0.089)	-0.090 (0.097)
Individual parent characteristics		
Age at last birthday (in years)	-0.020*** (0.0023)	0.0076** (0.0023)
Female	0.55*** (0.046)	0.32*** (0.048)
Race/ethnicity (Referent category: non-Hispanic white)		
Black, non-Hispanic	0.21*** (0.052)	-0.20** (0.058)
American Indian, non-Hispanic	-0.27* (0.12)	-0.59*** (0.15)
Asian/Pacific Islander, non-Hispanic	-0.28* (0.13)	-0.13 (0.13)
Biracial, non-Hispanic	0.13 (0.16)	0.034 (0.18)
Hispanic	-0.0017 (0.063)	-0.39*** (0.066)
Lives in metropolitan area	-0.14** (0.045)	0.15** (0.051)
In fair or poor health	0.46*** (0.049)	-0.35*** (0.046)
Educational attainment (Referent category: High school graduate)		
Less than high school	-0.058 (0.094)	-0.55*** (0.11)
Some high school	0.25*** (0.049)	-0.24*** (0.057)
Some college	0.11* (0.051)	0.37*** (0.052)
Associate's degree	0.020 (0.071)	0.37*** (0.068)
Bachelor's degree	0.044 (0.071)	0.93*** (0.077)
Advanced degree	-0.16 (0.19)	1.17*** (0.14)
Employment status (Referent category: Has full-time employment)		

Has part-time employment	0.15** (0.055)	-0.42*** (0.054)
Unemployed	0.35*** (0.062)	-0.58*** (0.071)
Not in labor force or no response	0.20*** (0.050)	-0.40*** (0.051)
Marital status (Referent category: Married)		
Separated, widowed, or divorced	-0.18*** (0.049)	-0.40*** (0.051)
Single	-0.11* (0.052)	-0.44*** (0.055)
Family (health insurance unit) income as a percentage of poverty (Referent category: <50% FPL of the federal poverty level)		
50-100% FPL	0.098 (0.057)	0.24*** (0.062)
> 100% FPL	-0.11 (0.077)	0.78*** (0.079)
State Medicaid program characteristics		
State counts assets for determining Medicaid eligibility for parents	-0.033 (0.075)	0.033 (0.079)

Notes: † Of the 21,494 parents in the sample, 2,168 have a survey weight of zero. Coefficient estimates for state and year indicators as well as the constant term are omitted in the table above. * indicates p-value<0.05 for a particular coefficient; ** indicates p-value<0.01; and *** indicates p-value<0.001.

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CHAPTER 3. THE EFFECT OF EXPANDING MEDICAID ON HEALTHCARE EMPLOYMENT

The Patient Protection and Affordable Care Act (ACA) initiated the largest expansion of Medicaid since the program's creation in 1965. As of October 2014, enrollment in Medicaid and the Children's Health Insurance Program had grown by nearly 9.7 million people compared to enrollment in those programs between July and September 2013 (Centers for Medicare and Medicaid Services, December 2014).

The ACA's Medicaid expansion has implications not only for uninsured rates but also for state economies. Available evidence suggests that the ACA's Medicaid expansion has increased revenues and lowered uncompensated care costs for hospitals and health systems in states that have expanded Medicaid (PwC Health Research Institute, 2014). Economic simulations indicate that the ACA's Medicaid expansion could help state economies by increasing state revenues and employment in both health care and in other industries (Kaiser Family Foundation, 2013; White House Council of Economic Advisors, 2014). In general, conventional wisdom suggests that the ACA's health insurance expansion will increase healthcare employment (Gruber, 2009).

It is important to explore the link between health insurance coverage expansion and healthcare employment because health care is integral to the U.S. economy. Nearly 15 million people, approximately 10.6% of the employed U.S. population, worked in health care in January 2015 (Bureau of Labor Statistics, 2015). Furthermore, the healthcare sector represented 17.4% of U.S. gross domestic product in 2013 (Hartman et al., 2015).

Because it will be years before the long-term effects of the ACA's Medicaid expansion are apparent—especially because some states may implement the expansion at a later date—focusing on pre-2014 state-level public coverage expansions can provide insight into how the ACA's Medicaid expansion could affect healthcare workforce employment. This study examines whether Section 1115 coverage expansions affected county-level health care employment in states that implemented these expansions. This study concentrates on Section 1115 expansions because these waivers share a target population of parents and non-elderly low-income adults without dependent children with the ACA's Medicaid expansion.

Background

Description of Section 1115 Medicaid Expansions

Prior to the ACA's health insurance coverage expansion, states had few options for providing coverage to individuals who were otherwise ineligible for Medicaid or the Children's Health Insurance Program (CHIP). One way for states to expand coverage to this group—which often included parents and low-income non-elderly, non-disabled adults without dependent children—was to seek a Section 1115 waiver. These waivers allow states to test different methods of financing and delivering Medicaid and CHIP to "promote the objectives" of these programs (Centers for Medicare and Medicaid Services, n.d. (a)). Although Section 1115 waivers have been in existence since the Medicaid program's founding, they were first used as a tool for expanding health coverage in the 1990s (Artiga, 2009).

To obtain a Section 1115 waiver, a state submits an application to the Centers for Medicare and Medicaid Services (CMS) within the U.S. Department of Health and Human Services. The state and CMS negotiate the waiver's terms, possibly leading to CMS approval and waiver implementation (Artiga, 2009). As a condition for waiver approval, the federal

government requires waivers to be budget-neutral. In other words, a state that applies for a Section 1115 waiver must show that federal Medicaid spending in that state under the waiver is projected to the be the same as federal Medicaid spending in that state in the absence of the waiver (Artiga, 2009). Because states must initiate the waiver-approval process, Section 1115 waiver-based coverage expansions from the pre-ACA era differed significantly across states in terms of expansion details and implementation. (Table A.1 in this dissertation's Appendix describes the characteristics of each Section 1115 waiver-based coverage expansion included in this study.)

In the pre-ACA era, the two other key policy options for expanding health insurance coverage to adults not otherwise eligible for publicly financed coverage were state-funded coverage expansions and Section 1931 expansions. First, states could expand coverage through fully state-financed public coverage. For example, Pennsylvania used National Tobacco Settlement Agreement money to provide health insurance coverage to low-income, uninsured adults who were ineligible for Medicaid (Dorn & Meyer, 2004). A second coverage-expansion option was a Section 1931 expansion, which allowed states to expand eligibility by increasing the amount of a Medicaid applicant's income or assets that can be ignored when determining that applicant's Medicaid eligibility (Birnbaum, 2000).

This study focuses only on Section 1115 expansions because, like the ACA, they extend coverage to higher-income parents and non-elderly, non-disabled low-income adults without dependent children who would otherwise be ineligible for Medicaid. (The Section 1115 waiver–based expansions in this study—implemented either via new Section 1115 waivers or through waiver amendments—are listed in this paper's "Sample" section.)

Prior Research On the Healthcare Workforce and Health Insurance Coverage Expansion

Prior research has focused on the effects of healthcare reforms in Massachusetts in 2007, variations in the generosity of Medicaid benefits and income eligibility limits, or the ACA's Medicaid expansion on healthcare employment. Staiger, Auerbach, and Buerhaus (2011) compare unadjusted trends in healthcare employment growth in Massachusetts to unadjusted trends in healthcare employment growth in all other states before and after Massachusetts's implementation of state-led healthcare reforms in 2007. The authors find that healthcare workforce employment in Massachusetts grew at approximately 8%—the same rate as that in the rest of the United States—from 2001 to 2005 but accelerated to 9.5% between December 2005 and 2010. A significant increase in healthcare administrative employment, which includes occupations like medical records technicians or healthcare executives, was mostly responsible for the post-2007 employment growth in Massachusetts (Staiger, Auerbach, & Buerhaus, 2011). The authors find that per-capita employment in healthcare administrative occupations grew 18.4% in Massachusetts between 2005–2006 and 2008–2009 but only grew 8% in the same time period in the rest of the United States.

Cozad (2012) uses difference-in-difference models to evaluate the effect of Massachusetts's healthcare reforms on hospital employment. Cozad's analysis (2012) compares numbers of employees in Massachusetts to hospitals in surrounding states before and after the implementation of Massachusetts's health insurance coverage mandate. She finds that the mandate for individuals to have health insurance coverage was not associated with changes in hospital employment (Cozad, 2012).

Shin and Rosenbaum (2012) and Buchmuller and colleagues (2014) examine the relationship between Medicaid program features and healthcare employment. In an

uncontrolled study, Shin and Rosenbaum (2012) use the Uniform Data System to examine changes in staffing levels between 2005 and 2009 at 519 community health centers (CHCs) in 25 states. Of these CHCs, 220 are located in states that provide Medicaid coverage to parents with incomes at or above the federal poverty level. The remaining 299 CHCs included in the study are located in states that provide Medicaid coverage only to parents with incomes well below the federal poverty level. Shin and Rosenbaum (2012) find that between 2005 and 2009 community health center (CHC) staff size grew 8 percentage points more at the 220 CHCs in states with higher parental Medicaid income eligibility limits than at the 299 CHCs in states with less generous income eligibility standards for parents.

Buchmueller and colleagues (2014) use fixed effects models to estimate the effects of comprehensive adult dental benefits in Medicaid on dentists' behavior. The authors find that comprehensive adult dental benefits in Medicaid increase dentists' probability of employing one or more dental hygienists by 3 percentage points (Buchmueller et al., 2010). Furthermore, the authors' analysis indicates that these dental benefits were associated with a 0.1 increase in the average number of hygienists working in a dental practice (Buchmueller et al., 2014). Taken together, the studies from Shin and Rosenbaum (2012) and Buchmueller and colleagues (2014) suggest that higher Medicaid income eligibility limits and more generous benefits are associated with higher levels of staffing within certain medical settings.

Two recent uncontrolled analyses assess the early effects of the Affordable Care Act's Medicaid expansion on health care and social assistance employment at the state level. A June 2014 analysis from the Missouri Economic Research and Information Center (MERIC) compares health care and social assistance employment growth pre- and post-ACA Medicaid expansion implementation in five states that accepted the ACA's Medicaid

expansion to healthcare employment growth in five states that have rejected the ACA's Medicaid expansion. The ten states included in this study had similar numbers of total employed individuals. The MERIC analysis finds that healthcare and social assistance employment counts increased 2.1% from the first five months of 2013 to the first five months of 2014 in five states that had accepted the ACA's Medicaid expansion but healthcare and social assistance employment only increased 0.7% between 2013 and 2014 in the study's five non-Medicaid expansion states (Missouri Economic Research and Information Center, 2014).

A December 2014 policy brief from the Altarum Institute finds that healthcare and social assistance job growth was higher in states that had not accepted the ACA's Medicaid expansion than in states that had implemented the expansion (Turner, 2014). This analysis compares healthcare and social assistance employment growth from April to October 2013—prior to the ACA Medicaid coverage expansion's implementation—to healthcare employment growth between April and October 2014—after the ACA's Medicaid expansion went into effect (Turner, 2014). The analysis finds that healthcare and social assistance job growth increased by 104% between 2013 and 2014 in non-Medicaid expansion states but only by 46% in Medicaid expansion states (Turner, 2014).

The current study is the first to comprehensively explore how public health insurance coverage expansions—through Section 1115 waivers—affect healthcare employment across multiple states and over a longer time period. Analyses that focus on Massachusetts are limited by Massachusetts's persistently large healthcare workforce supply relative to that of other states (Staiger, Auerbach, & Buerhaus, 2011; Cozad, 2012). This study also contributes to the literature by estimating health insurance coverage expansions' effects on employment in the entire healthcare and social assistance industry rather than on employment within a

single healthcare setting such as hospitals or CHCs (Cozad, 2012; Shin & Rosenbaum, 2012). The analysis improves on that from the Missouri Economic Research and Information Center (2014) and from the Altarum Institute (2014) because this analysis uses multivariate techniques.

Conceptual Framework

This study's conceptual framework proposes that health insurance coverage expansions—such as Section 1115 expansions—increase healthcare employment through increases in two related pathways. First, the framework proposes that healthcare organizations can hire workers in anticipation of increased demand for care due to a coverage expansion. In this situation, healthcare organizations make employment decisions in response to *predicted* changes in demand under a health insurance coverage expansion (Cozad, 2012). Because there is a time lag between the development and submission of a waiver and waiver implementation, healthcare organizations should, in theory, have time to prepare for policy changes under the waiver. This preparation could include hiring additional workers to meet possible increases in demand for care.

Second, healthcare organizations can react to changes in demand after a coverage expansion has begun accepting enrollees. In this study's conceptual framework, changes in demand for care are a consequence of post-expansion increases in community-level health insurance coverage rates. In fact, previous studies have indicated that Medicaid expansions to low-income, non-pregnant adults do increase health insurance coverage within this population (Atherly et al., 2012; Aizer & Grogger, 2003; Busch & Duchovny, 2005; Kronick & Gilmer, 2002). On gaining Medicaid coverage, newly insured adults tend to increase their use of inpatient, outpatient, and emergency department care (Finkelstein et al., 2012; Taubman, 2014). By increasing individual utilization rates, a coverage expansion could

increase community-level demand for healthcare services. Healthcare organizations could respond to increases in demand for health care by increasing the number of workers they employ (Gruber, 2009).

Local demographic and economic characteristics also are likely to affect healthcare employment within a community. A local population's demographic characteristics could affect local healthcare employment primarily by affecting rates of healthcare demand. For example, because women tend to use more medical care on average than men do and older people tend to use more care than younger people do, communities with relatively more women or a relatively older population could have higher rates of demand for health care (Bertakis et al., 2000; Meara, White, & Cutler, 2004). If healthcare employment responds to demand for healthcare services, communities with relatively more women or older populations will have relatively higher healthcare employment. Racial and ethnic minorities face barriers to accessing care unrelated to socioeconomic status (Fiscella et al., 2002; Padgett et al., 1994). Therefore, a community with a population that includes a relatively larger percent of racial and ethnic minorities may have lower healthcare use rates and, consequently, a correspondingly smaller healthcare workforce.

The literature on physician supply suggests that a community's economic wealth is positively associated with the size of a local healthcare workforce (Jiang & Begun, 2002; Freed, Nahra, & Wheeler, 2003; Ricketts & Randolph, 2008).

Economic trends such as economic expansions and recessions also affect healthcare employment (Wood, 2011). Finally, state and national policies—from malpractice regulations to loan repayment programs—influence the number of employees in the healthcare sector (Kessler, Sage, & Becker, 2005; Pathman et al., 2004).

Figure 3.1 describes the proposed effect of Section 1115 expansion implementation on healthcare employment.

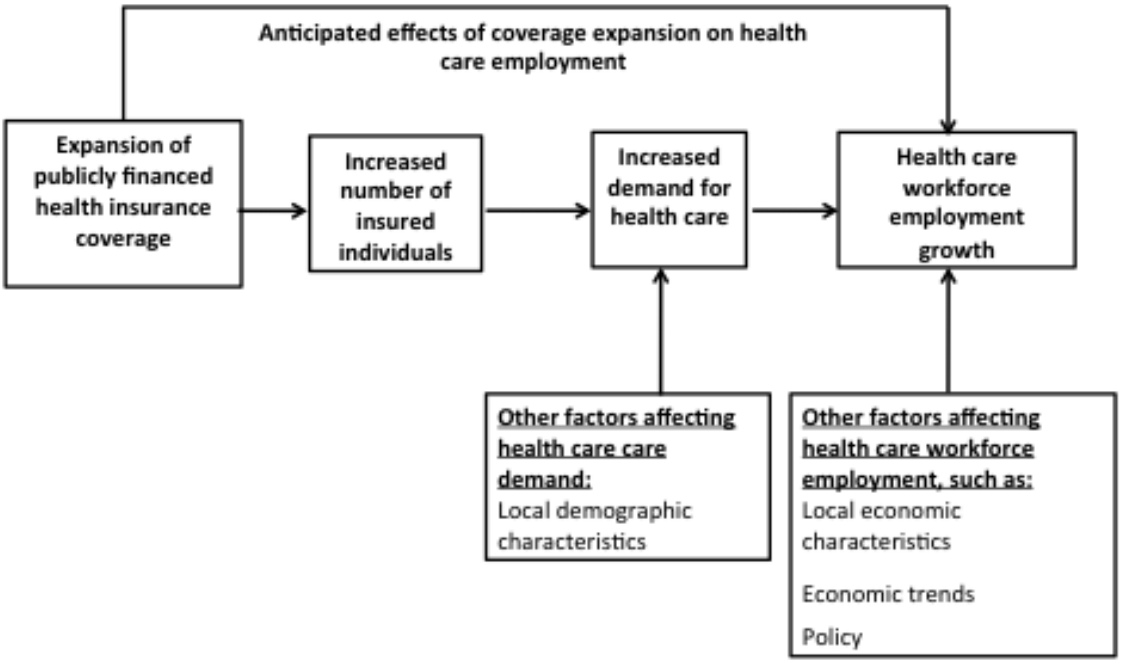

Figure 3.1. Section 1115 expansions' effect on healthcare and social assistance employment.

Hypotheses

Based on this conceptual framework, this study tests the hypothesis that Section 1115 coverage expansions increased *healthcare and social assistance employment* at the county level. Healthcare and social assistance employment encompasses healthcare employment in ambulatory settings, hospital employment, nursing and residential care employment, and employment in social services provision (Bureau of Labor Statistics, 2014).

Data and Sample

Data Sources

This analysis uses multiple data sources to describe county-level healthcare and social assistance employment counts, Section 1115 expansions, and county characteristics. The analysis is carried out at the county level because Section 1115 expansions' effects on health insurance coverage are likely to vary by county (Miller, 2012).

County Business Patterns data. The CBP data provide healthcare employment counts in mid-March of each year at non-government firms and some governmental organizations, such as hospitals, by industry (U.S. Census Bureau, 2013). Since 1998, the CBP has used the North American Industry Classification System (NAICS) to categorize employment by industry. Because CBP employment counts by industry from 1998 onward are not easily comparable to CBP employment data prior to 1998, this analysis does not use CBP data from before 1998. CBP employment counts are not available for all industries in all counties because the U.S. Census Bureau suppresses employment counts in the CBP when this information presents a disclosure risk for specific firms or individuals (Evans, Zayatz, & Slanta, 1998).

Data on Section 1115 expansions. Information on active Section 1115 waiver-based expansions by state and year was abstracted from the U.S. Centers for Medicare and Medicaid Services' Web site and from other sources such as the Robert Wood Johnson Foundation State Coverage Initiatives Web site (Centers for Medicare and Medicaid Services, n.d. (b); Robert Wood Johnson Foundation, n.d.) and the Kaiser Commission on Medicaid and the Uninsured's state-level surveys of Medicaid and CHIP program characteristics (Kaiser Commission on Medicaid and the Uninsured, 2015). This study focuses on Section 1115 waivers and waiver amendments that include a coverage expansion

component for parents or low-income adults without dependent children. This study considers states with Section 1115 health insurance premium assistance programs to be "non-expansion" states because there were often fewer than 1,000 individuals enrolled in these programs at the state level (Atherly et al., 2012).

Data on county characteristics. Several federal, publicly available data sources were used to characterize counties. County Intercensal Estimates provide annual estimates of county population demographics and population size. Data on county-level per capita income and poverty rates come from the U.S. Department of Commerce's Local Area Personal Income data and the U.S. Census Bureau's Small Area Income and Poverty Estimates (SAIPE), respectively.

Sample Creation

Sample timeframe. This study's analytic sample was created from a set of county-year observations from all U.S. counties and county-equivalents for all years between 2000 and 2010. The study sample's first year is 2000 for two reasons. First, by 2000, all but two states had implemented CHIP programs (Rosenbach et al., 2001). This allows the analysis to separate the potential effects of CHIP implementation on healthcare employment from the potential effects of Section 1115 expansions on healthcare employment. Second, County Business Patterns employment counts by industry from prior to 1998 are not comparable to CBP employment from 1998 onward. Setting the sample's initial year to 2000 avoids this issue. The year 2010 is the last year included in the study timeframe because the ACA was enacted in late March 2010, after 2010 CBP data were collected.

The Section 1115 expansions that were either implemented or discontinued during the 2000–2010 study period are listed in Table 3.1.

Table 3.1. States That Implemented Section 1115 Expansions to Parents or Low-Income Adults without Dependent Children between 2000 and 2010

Expansion state	Year expansion implemented	Expansion program enrollment as of June 2011	Expansion enrollment as percent of total Medicaid enrollment in June 2011
Arizona	2001	224,500 childless adults	16%
California	10 counties in 2007, 35 primarily rural counties in 2011[1]	184,200 childless adults and parents	2%
Illinois	2002. Expansion discontinued in 2007.	129,994 parents on December 31, 2006[2]	7% of June 2006 enrollment
Indiana	2008	16,100 childless adults	2%
Iowa	2005	46,000 childless adults and parents	11%
Maine	2002	16,500 childless adults	6%
Maryland	2007[3]	56,800 childless adults	7%
Massachusetts	2007[4]	114,700 childless adults	10% (but accompanied by other coverage changes)
Michigan	2004	77,900 childless adults	4%
New Jersey	2001	156,598 adults ever enrolled in 2011 fiscal year[5] (monthly enrollment count not available)	N/A
New York	2001	949,300 childless adults	19%
Tennessee	1994. Expansion discontinued in 2005.	Reduced uninsurance in Tennessee from 15.7% in 1992-1993 to 7.2% in 1994-1995. After the program's first year, it was closed to most new enrollment.[6]	N/A
Utah	2002	16,800 parents and childless adults	6%

Notes: Unless indicated otherwise, data on expansion enrollments and monthly Medicaid enrollments come from Kaiser Commission on Medicaid and the Uninsured, Medicaid enrollment: June 2013 data snapshot. Washington, DC: Kaiser Family Foundation; January 2014. http://kaiserfamilyfoundation.files.wordpress.com/2014/01/8050-07-medicaid-enrollment-june-2013-data-snapshot1.pdf.

1. California's Section 1115 expansions were not implemented on a statewide basis.
2. Illinois expansion program enrollment count from Artiga S, Mann C. Family coverage under SCHIP waivers. Washington, DC: Kaiser Commission on Medicaid and the Uninsured; May 2007. https://kaiserfamilyfoundation.files.wordpress.com/2013/01/7644.pdf. Accessed May 14, 2015.
3. Maryland's coverage expansion to low-income adults without dependent children was an addition to a Section 1115 waiver that implemented Medicaid managed care in Maryland in 1997.
4. Massachusetts' major expansion of coverage in 2006-2007 was carried out through Massachusetts' pre-existing Section 1115 waiver.

5. New Jersey expansion program enrollment count from the Centers for Medicare and Medicaid Services. New Jersey Family Coverage under SCHIP. Baltimore, MD: Centers for Medicare and Medicaid Services; April 2012.
7. Tennessee's expansion program's effects on state rates of health insurance coverage from Conover CJ, Davies HH. The role of TennCare in health policy for low-income people in Tennessee. Washington, DC: Urban Institute; February 2000. http://webarchive.urban.org/UploadedPDF/occa33.pdf. Accessed May 18, 2015.

Exclusion of county-year observations. The first step in producing this study's analytic sample was to exclude 638 county-year observations from counties and county-equivalents that were created or eliminated during the 2000–2010 timeframe, such as Alaska's boroughs. (Because the U.S. Census Bureau reorganized all of Alaska's boroughs, the entire state of Alaska is excluded from this sample.) Next, I excluded seven county-year observations with missing values for county economic and demographic characteristics from the sample. Third, I excluded from the sample 8,078 county-year observations from counties with any suppression of healthcare and social assistance employment counts during the study period.

Finally, I excluded 955 county-year observations collected from Connecticut, Pennsylvania, and Washington state after those states implemented state-funded health insurance coverage programs.[4] Observations from these states are excluded because these state-funded health insurance coverage programs did not require federal approval and budget neutrality, unlike Section 1115 waiver–based coverage expansions. These three states also had full discretion to define program benefits, change eligibility, and open or close program enrollment. Thus, state-funded coverage expansions are assumed to be different enough from Section 1115 expansion to be excluded from this study's sample.

[4] Washington, DC, also had a locally funded health insurance coverage program during the study period. However, healthcare and social assistance employment counts from Washington, DC, are suppressed from 2000 to 2003 in the CBP data, resulting in the exclusion of all observations from Washington, DC, from the final analytic sample.

Figure 3.2 describes how the sample was created.

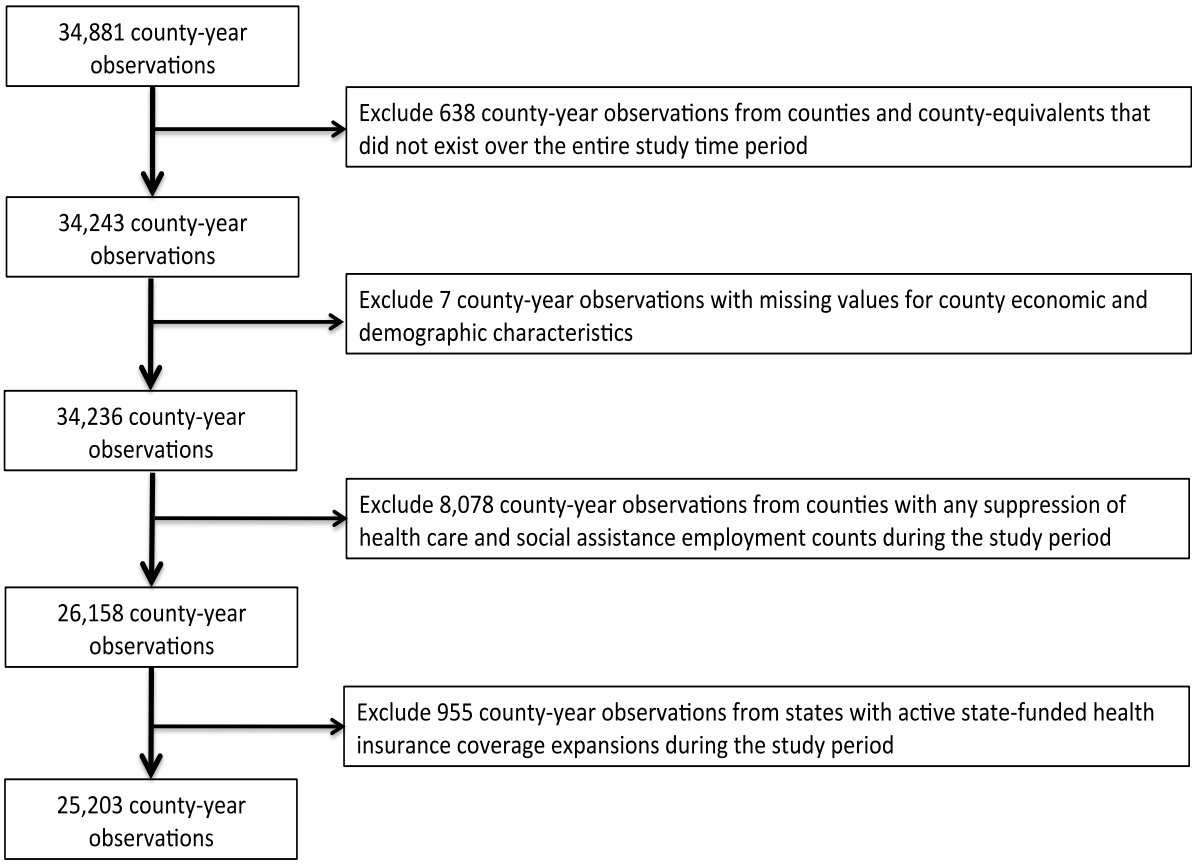

Figure 3.2. Creating a sample of county-year observations.

Sample size and characteristics. The final healthcare and social assistance sample includes 25,203 county-year observations from 2,344 counties in 48 states. (The states for which there are no county-year observations in the sample are Alaska; Washington, DC; and Washington state.) The sample includes 8,657 county-year observations from 787 counties in states with active Section 1115 expansions during the study period and 16,546 county-year observations from 1,557 counties in non-expansion states. In this sample, 6,721 county-year observations were from the 13 states that either implemented or discontinued Section 1115

expansion program during the 2000–2010 study period. The other 1,936 county-year observations in the expansion group are from Delaware, Hawaii, Minnesota, Oregon, Vermont, and Wisconsin—states that had active Section 1115 expansions during the entire study period.

Observations included in the final study analytic sample differ from those observations excluded from the sample in that excluded observations come from counties with much smaller population sizes. The average population size of a county excluded from the final analytic sample is 12,000 people, while the average population among counties included in the final analytic sample is approximately ten times larger.

Variables

Healthcare employment. This analysis's dependent variable is a county-level count of individuals employed in the healthcare and social assistance sector. This dependent variable comes from the U.S. Census Bureau's County Business Patterns data. Total healthcare and social assistance employment counts at the county level include not only employment in clinical occupations but also in non-clinical occupations (Bureau of Labor Statistics, 2015).

"Social assistance" employment is included in the healthcare and social assistance employment counts. Healthcare and social assistance are combined into a single industry category because, as the U.S. Bureau of Labor Statistics notes, "it is sometimes difficult to distinguish between the boundaries of these two activities" (Bureau of Labor Statistics, 2014). At the national level, social assistance represents approximately 15% of total healthcare and social assistance employment, as Table 3.2 shows.

Table 3.2: Healthcare and Social Assistance Employment by Subsector

Subsector within healthcare and social assistance	Sample categories within that subsector	Subsector employment as percent of total national healthcare and social assistance employment in 2000, 2005, and 2010
Ambulatory healthcare services	Offices of physicians, Offices of dentists, Diagnostic imaging centers	**2000:** 33.5% **2005:** 34.5% **2010:** 35.6%
Hospitals	General medical and surgical hospitals, Psychiatric and substance abuse hospitals, Specialty (except psychiatric and substance abuse) hospitals	**2000:** 30.8% **2005:** 29.5% **2010:** 28.0%
Nursing and residential care facilities	Residential mental health and substance abuse facilities, Residential intellectual and developmental disability facilities, Assisted living facilities for the elderly	**2000:** 20.1% **2005:** 19.4% **2010:** 18.7%
Social assistance	Child and youth services, Temporary shelters, Emergency and other relief services	**2000:** 15.6% **2005:** 16.6% **2010:** 17.7%

Source: Author's analysis of Current Employment Statistics

Section 1115 expansion indicator. This study's key independent variable is an indicator for an active Section 1115 expansion within a state. If an expansion is implemented prior to mid-March of a particular year in a particular state, then the expansion indicator for that state-year observation is set equal to 1. If an expansion is implemented after mid-March of a given year within a particular state, the expansion indicator for that state-year observation is set equal to zero and the state-year indicator for the following year is set to 1. This March cut-off date corresponds to the time of year during which the Census Bureau collects CBP employment data. This expansion indicator equals 1 for subsequent observations as long as an expansion is active. If an expansion program is closed and all

expansion enrollees are disenrolled from Section 1115 expansion–based coverage, then the indicator is reset to zero.

County demographic characteristics. This analysis uses control variables related to county demographic and economic characteristics. These control variables change over the study period and are correlated with both employment counts and the expansion indicator. Demographic variables include the percent of the county population that is female, the percent of the county population that is 19 years old or younger, the percent of the county population that is 65 years old or older, the percent of the county population that is a racial or ethnic minority, and the total county population (in tens of thousands of people). As described in this study's conceptual framework, these variables are likely to be associated with the size of the healthcare workforce. Furthermore, each of these variables is correlated with one another as well as with the Section 1115 expansion indicator. County demographic characteristics that are negatively correlated with the Section 1115 expansion indicator are the percent of the county population that is female (r=-0.035), the percent of the county population that is aged 19 or younger (r=-0.072), and the percent of the population that is a racial or ethnic minority (r=-0.20). County demographic variables that are positively correlated with the Section 1115 expansion indicator are total county population (r=0.060) and the percent of the county population that is 65 years old or older (r=0.049). Because these variables are correlated with the expansion indicator, omitting them from this study's regression model would bias model estimates.

County economic characteristics. County economic variables include the percent of the county population that is in poverty and county per capita income, which is inflation-

adjusted based on the Consumer Price Index to 2012 dollars.[5] These variables are included in the model because, as noted in this study's conceptual framework, clinician supply tends to be greater in areas with greater economic wealth (Jiang & Begun, 2002). Percent of the county population in poverty is negatively correlated with the expansion indicator (r=-0.22), and county per capita income is positively correlated with the expansion indicator (r=0.14).

Methods

This analysis uses ordinary least squares models with county and year fixed effects to test the effect of Section 1115 expansions on healthcare and social assistance employment. I use two model specifications: One specification estimates the average effect of these expansions across the 13 states that experienced changes in expansion status during the study period. The other specification estimates state-specific effects of the expansions on healthcare workforce employment. Allowing expansion effects to differ by state is useful because the expansions differ according to key features like income eligibility limits for expansion enrollees or the comprehensiveness of benefits provided to these enrollees.

Average Effect of Section 1115 Expansions on Healthcare Employment

The model for estimating the average effect of Section 1115 expansions on county-level healthcare and social assistance employment across the 13 states that experienced changes in Section 1115 expansion status between 2000 and 2010 is:

$$EMP_{ct} = \gamma_1 EXP_{st} + \gamma_2 X_{ct} + \tau_t + \mu_c + \varepsilon_{ct}$$

In this equation, the subscripts c and t indicate that variables vary by county and by time in years, respectively. The subscript s denotes variation at the state level. The dependent

[5] SAIPE data contains a county-level variable for median income. However, a change in the SAIPE estimation methodology between 2004 and 2005 makes comparing median incomes challenging across time. I therefore use the Local Area Personal Income data to describe county-level incomes. However, I still use SAIPE to describe the percent of each county's population in poverty.

variable *EMP* represents county-level counts of individuals employed in healthcare and social assistance. *EXP* is an indicator variable that describes whether or not a Section 1115 expansion is in effect in a particular year in a particular state. The vector X_{ct} describes each county's economic and demographic characteristics. Time fixed effects, τ_t, control for year-specific shocks to healthcare employment and county fixed effects, μ_c, control for unobservable, time-invariant county characteristics. The model's error term is ε_{ct}.

The coefficient (γ_1) on *EXP* describes the average effect of Section 1115 expansion implementation on county-level healthcare employment per capita across all Section 1115 expansion states that experienced a change in Section 1115 expansion status between 2000 and 2010.

State-Specific Effects of Section 1115 Expansions on Healthcare Workforce Employment

The state-specific effects model is:

$$EMP_{ct} = \beta_1 EXP_{st} + \beta_2 STATE_s + \beta_3 STATE_s \times EXP_{st} + \beta_4 X_{ct} + \tau_t + \mu_c + \varepsilon_{ct}$$

The state-specific model resembles the average-effect model. However, the state-specific model includes *STATE*, an indicator variable for each of the states in the model, and an interaction term that allows the effect of Section 1115 expansion implementation on county-level healthcare employment to vary by state. The coefficient on *STATE*, β_2, cannot be estimated because the state indicator variable becomes redundant in the presence of county fixed effects. The state-specific effect of Section 1115 expansion implementation on healthcare employment is $\beta_1 + \beta_3$, the sum of the coefficients on *EXP* and the *STATE*×*EXP* interaction term. The state-specific effect of Section 1115 expansions on county-level healthcare employment can only be identified for states with changes in expansion status during the 2000–2010 study period. Because Section 1115 waiver–based expansions were

continuously active in Delaware, Hawaii, Minnesota, Oregon, Vermont, and Wisconsin from prior to 2010 to the end of the study period in 2010, state-specific expansion effects cannot be estimated for these states.

This study uses block bootstrapping with 1,000 replications to generate standard errors for coefficient estimates for both the average-effect models and state-specific models (Bertrand, Duflo, & Mullainathan, 2004). Because this study uses a relatively long panel, focuses on the effects of state-level policy changes at the sub-state level, and features little change in the expansion implementation variable over time, conventional, non-bootstrapped standard errors likely would underestimate the standard errors from the average-effect and state-specific effect regression models (Bertrand, Duflo, & Mullainathan, 2004). The use of block bootstrapping avoids this problem.

Specification Testing

I examined the inclusion of a squared county population term in the regression models for this study's main analysis. Including a population-squared term in the model decreases the model's adjusted R^2 and thus does not improve model fit. As a result, I use the linear version of state population in this analysis.

Sensitivity Analysis

I conducted a sensitivity analysis that repeats the main analysis but with annual county-level ambulatory healthcare employment counts as the dependent variable. Ambulatory healthcare services employment includes employment in healthcare practitioner offices, outpatient care centers, medical and diagnostic laboratories, and home healthcare services.

Estimating the average-effect and state-specific effects of Section 1115 expansion implementation on county-level ambulatory healthcare services employment is useful

because, unlike healthcare and social assistance employment, ambulatory healthcare services employment does not include employment from the social assistance sector. Furthermore, ambulatory healthcare services employment is the largest subsector of healthcare and social assistance employment at the national level. Between 2000 and 2010—the years included in this study—ambulatory healthcare services employment represented approximately 35% of healthcare and social assistance employment nationally (see Table 3.2).

Supplemental Analyses

I also carried out two supplemental analyses. First, I assessed the association between Medicaid coverage expansion and total Medicaid enrollment at the state level. Second, I tested whether state-level healthcare and social assistance employment affected the probability of Medicaid expansion at the state level.

The first supplemental analysis evaluated whether the Section 1115 expansions that were either implemented or discontinued during the study period were associated with changes in total Medicaid enrollment. This analysis's hypothesis is that Section 1115 expansions were associated with increases in Medicaid enrollment at the state level. This analysis uses ordinary least squares models with state and year fixed effects:

$$ENROLL_{st} = \alpha_1 EXP_{st} + \alpha_s CHAR_{st} + \tau_t + \mu_s + \varepsilon_{ct}$$

The dependent variable in this model, *ENROLL*, measures total Medicaid enrollment in thousands at the state level in December of each year between 2000 and 2010. The model's key independent variable, *EXP*, is the state-level Section 1115 expansion indicator used in this study's main analysis.

This model includes control variables for demographic and economic characteristics, $CHAR_{st}$, that are measured annually by state. These variables include total state population,

the percent of the state population that is 19 years old or younger, the percent of the state population that is 65 years old or older, the percent of the state population that is female, the percent of the state population that is a racial or ethnic minority, the percent of the state population in poverty, and state (μ_s) and year fixed effects (τ_t). Standard errors in this model are clustered at the state level.

State-level Medicaid enrollment counts come from Kaiser State Health Facts (Kaiser State Health Facts, n.d.). Information about the Section 1115 expansion indicators comes from the CMS Web site and other sources. State-level control variables come from the U.S. Census Bureau's Population Intercensal Estimates and the Small Area Income Poverty Estimates.

The second supplemental analysis assesses the potential for reverse causality in this study: whether healthcare employment counts affects the probability of Section 1115 expansion. I hypothesized that state-level healthcare and social assistance employment counts in a given year were not associated with the probability of Section 1115 expansion in the following year. This state-level analysis uses a logit model with state and year fixed effects to predict the probability of Section 1115 expansion:

$$\text{Probability}(EXPANSION = 1|x) = 1/(1 + e^{-X\beta})$$

where $XB = \beta_1 EMPLOY_{s, t-1} + \beta_2 CHAR_{st} + t_t + \mu_s$

The subscripts in this model indicate that variables in the model vary by state, *s*, and by year, *t*. The dependent variable in this model is the indicator for an active Section 1115 expansion. The key independent variable, *EMPLOY*, in this model is an annual state-level count of healthcare and social assistance employees (in thousands). The subscript *t-1* on *EMPLOY* indicates that the healthcare and social assistance employment count is from the

year prior to year *t*. This model includes the same state-level demographic and economic characteristics, $CHAR_{st}$, as the first supplementary analysis. Year fixed effects are represented above as t_t and state fixed effects as μ_s.

Results

Descriptive Statistics

Table 3.3 summarizes the mean characteristics for all counties in the final sample, counties in states with active Section 1115 expansions during the study period, and counties in non-expansion states. During the study period, the average county had approximately 6,355 people employed in the healthcare and social assistance sector. Counties in non-expansion states had an average of 4,744 individuals employed in health care and social assistance while counties in expansion states had an average of approximately 9,433 individuals employed in health care and social assistance. The difference in healthcare employment between counties in expansion states and counties in non-expansion states is statistically significant in unadjusted comparisons ($p<0.001$).

Average economic and demographic characteristics differ significantly between counties in expansion states and counties in non-expansion states, as Table 3.3 indicates.

Multivariate Analyses

Table 3.4 shows coefficient estimates from the average-effect and state-specific effects models. Coefficients on state-specific interaction terms are omitted from Table 3.4. Instead, total estimated state-specific effects of Section 1115 expansion on county healthcare and social assistance employment are presented in Table 3.5. Figure 3.3 presents these same state-specific effects in a forest plot.

Table 3.3. Summary Statistics for County-Year Observations

Variables	All county-year observations (N=25,203)	County-year observations from non-expansion states (N=16,546)	County-year observations from expansion states* (N=8,657)
County health care employment			
Health care and social assistance employment	6,354.55 (18,846.26)	4,743.84 (12,128.24)	9,433.07*** (27,175.75)
County demographic characteristics			
Total population (in 10,000s)	11.75 (34.54)	8.98 (20.98)	17.04*** (50.90)
% of pop. female	50.43 (1.76)	50.47 (1.94)	50.35*** (1.35)
% of pop. 19 years old or younger	27.31 (3.09)	27.41 (3.15)	27.11*** (2.96)
% of pop. 65 years or older	14.74 (3.92)	14.64 (4.07)	14.94*** (3.61)
% of pop. racial or ethnic minority	20.05 (18.47)	23.47 (19.17)	13.50*** (15.03)
County economic characteristics			
% of population in poverty	14.44 (5.82)	15.80 (6.04)	11.85*** (4.30)
Inflation-adjusted per capita income (in $100s)	344.73 (83.23)	333.71 (78.14)	365.78*** (88.45)

Note: T-tests were used to compare differences in averages between counties in expansion states and counties in non-expansion states. *** indicates that the p-value for a t-test was 0.001.

Table 3.4 indicates that Section 1115 expansions were associated with a 372-person increase in the number of people employed in the healthcare and social assistance sector at the county level after controlling for other county and time effects. This effect is statistically significant at the 5% level of significance.

Table 3.5 and Figure 3.3 indicate that nine of the 13 state-specific estimates of Section 1115 expansion implementation on healthcare workforce employment are not

statistically significant. Three of the statistically significant state-specific estimates are positive. In New York, Section 1115 expansion was associated with an increase of approximately 1,482 healthcare and social assistance employees at the county level after controlling for other county and time factors. In New Jersey, Section 1115 expansion was associated with a 2,048-person increase in county-level healthcare and social assistance employment. Massachusetts's expansion of health insurance coverage in 2006–2007, supported by the state's Section 1115 waiver, was associated with a 4,224-person increase in county-level healthcare employment after controlling for other factors. Although these estimates seem large, it should be noted that the average county population in each of these states during the study period was much larger than the study sample's mean population size of 117,500. In New York, New Jersey, and Massachusetts, the average populations of the counties included in this study were 323,900 people, 428,400 people, and 494,400 people, respectively.

In Iowa, Section 1115 expansion was associated with a statistically significant 193-person decrease in county-level healthcare and social assistance employment, all else held constant.

An F-test on the state-specific coefficients in this model rejects the null hypothesis that these coefficients are jointly equal to zero.

Table 3.4. Regression Estimates of the Effect of Section 1115 Expansions on County-Level Counts of Healthcare and Social Assistance Employment (N=25,203 County-Year Observations)

Variables	Average-effect model	State-specific effects model
Section 1115 expansion indicator	371.99*	
	(153.73)	
State-specific expansion interactions		**Omitted: See table 3.5 below for total state-specific effects**
County characteristics		
Total population (in 10,000s)	636.00**	613.96**
	(93.74)	(90.85)
Percent of the population that is female	247.41**	220.48**
	(55.25)	(53.46)
Percent of the population that is 19 years old or younger	-130.83**	-108.61**
	(42.84)	(36.57)
Percent of the population that is 65 years old or older	-99.47*	-105.61**
	(42.08)	(40.49)
Percent of the population that is a racial or ethnic minority	94.78*	80.99*
	(39.30)	(38.96)
Percent of the population that is in poverty	13.52	21.01
	(11.89)	(10.92)
Inflation-adjusted per capita income (in $100s)	-0.58	-0.045
	(0.93)	(0.95)
Adjusted R-squared	0.9951	0.9954

Notes: * indicates p-value<0.05 , and ** indicates p-value<0.01. Models include county and year fixed effects.

Table 3.5. Estimates of State-Specific Effects of Section 1115 Expansions on County-Level Healthcare and Social Assistance Employment

State name	Estimate of state-specific effect	Lower bound of 95% confidence interval around estimate	Upper bound of 95% confidence interval around estimate
Utah	-262.59	-1027.49	502.31
Iowa	-192.64**	-325.96	-59.33
Tennessee	-89.82	-503.18	323.54
Illinois	-81.55	-197.10	33.99
Indiana	-35.80	-243.65	172.06
Michigan	281.31	-207.98	770.60
Maine	379.11	-397.51	1,155.73
Maryland	692.04	-433.83	1,817.91
Arizona	1,106.70	-2,168.61	4,382.01
New York	1,481.82*	4.35	2,959.29
New Jersey	2,047.60*	425.81	3,669.40
Massachusetts	4,223.80*	403.64	8,043.97
California	8,895.27	-4,389.12	22,179.65

Notes: * indicates p-value<0.05 for total effect; ** indicates p-value<0.01. Models include county and year fixed effects. For a given state, the total state-specific effect of Section 1115 expansion is calculated as the sum of the coefficient estimate on the expansion indicator and the coefficient estimate on the interaction between an indicator variable for that state and the expansion indicator.

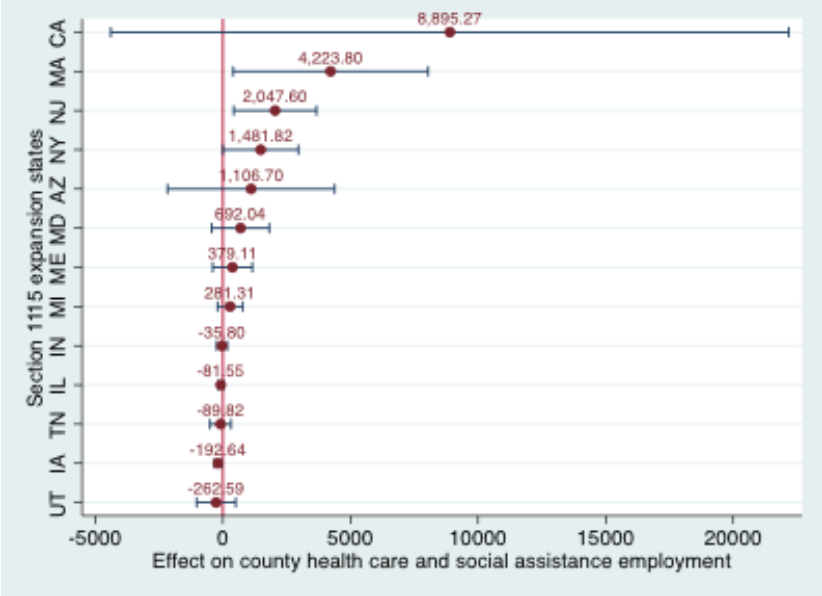

Figure 3.3. State-specific effects of Section 1115 expansions on county-level healthcare and social assistance employment.

Note: The diagram above shows point estimates of state-specific expansion effects and the 95% confidence intervals around these effects.

Sensitivity Analysis

As noted in "Methods," I replicated the analysis for county-level healthcare and social assistance employment counts with county-level ambulatory healthcare services employment counts. I created a sample of 18,700 county-year observations in a manner similar to that described in "Sample Creation."

Table 3.6. Regression Estimates of the Effect of Section 1115 Expansions on County-Level Ambulatory Healthcare Services Employment (N=18,700 County-Year Observations)

Variables	Average-effect model	State-specific effects model
Section 1115 expansion indicator	194.518**	
	(74.794)	
State-specific expansion interactions		**Omitted: See table 3.7 below for total state-specific effects**
County characteristics		
Total population (in 10,000s)	264.04**	297.85**
	(35.93)	(36.40)
Percent of the population that is female	189.53**	156.95**
	(48.95)	(47.10)
Percent of the population that is 19 years old or younger	-88.55**	-104.80**
	(30.39)	(31.25)
Percent of the population that is 65 years old or older	-82.54*	-105.01**
	(32.74)	(35.26)
Percent of the population that is a racial or ethnic minority	46.52*	26.61
	(20.32)	(20.97)
Percent of the population that is in poverty	0.69	0.50
	(7.07)	(6.17)
Inflation-adjusted per capita income (in $100s)	0.55	-0.26
	(0.85)	(0.70)
Adjusted R-squared	0.9915	0.9894

Notes: * indicates p-value<0.05, and ** indicates p-value<0.01; and *** indicates p-value<0.001. Models include county and year fixed effects.

The first column of Table 3.6 indicates that Section 1115 expansions were associated with an average 195-person increase in county-level ambulatory healthcare services employment across all states with changes in Section 1115 expansion status between 2000 and 2010. This result is statistically significant at the 1% level of significance. In the state-specific effects model for county-level ambulatory healthcare services employment, only two of 13 estimated state-specific effects are statistically significant, as Table 3.7 and Figure 3.4 show. Section 1115 expansion was associated with a statistically significant increase in county-level ambulatory healthcare services employment in New Jersey but a statistically significant decrease in county-level ambulatory healthcare services employment in Iowa.

Table 3.7. Estimates of State-Specific Effects of Section 1115 Expansions on County-Level Ambulatory Healthcare Services Employment

State name	Estimate of the state-specific effect	Lower bound of 95% confidence interval around estimate	Upper bound of 95% confidence interval around estimate
Utah	-229.54	-542.52	83.44
Iowa	-141.30*	-263.68	-18.93
Illinois	-69.05	-279.25	141.16
Maine	-16.15	-364.52	332.23
Tennessee	-3.40	-128.66	121.87
Indiana	52.31	-160.94	265.56
Arizona	83.89	-1,136.65	1,304.44
Maryland	84.27	-260.32	428.87
Michigan	192.80	-264.53	650.14
New York	629.55	-129.06	1,388.16
California	1,155.47	-1,024.08	3,335.02
New Jersey	1,234.23*	100.81	2,367.65
Massachusetts	1,510.30	-80.36	3,100.97

Notes: * indicates p-value<0.05 for a state-specific coefficient. For a given state, the total state-specific effect of Section 1115 expansion is calculated as the sum of the coefficient estimate on the expansion indicator and the coefficient estimate on the interaction between an indicator variable for that state and the expansion indicator.

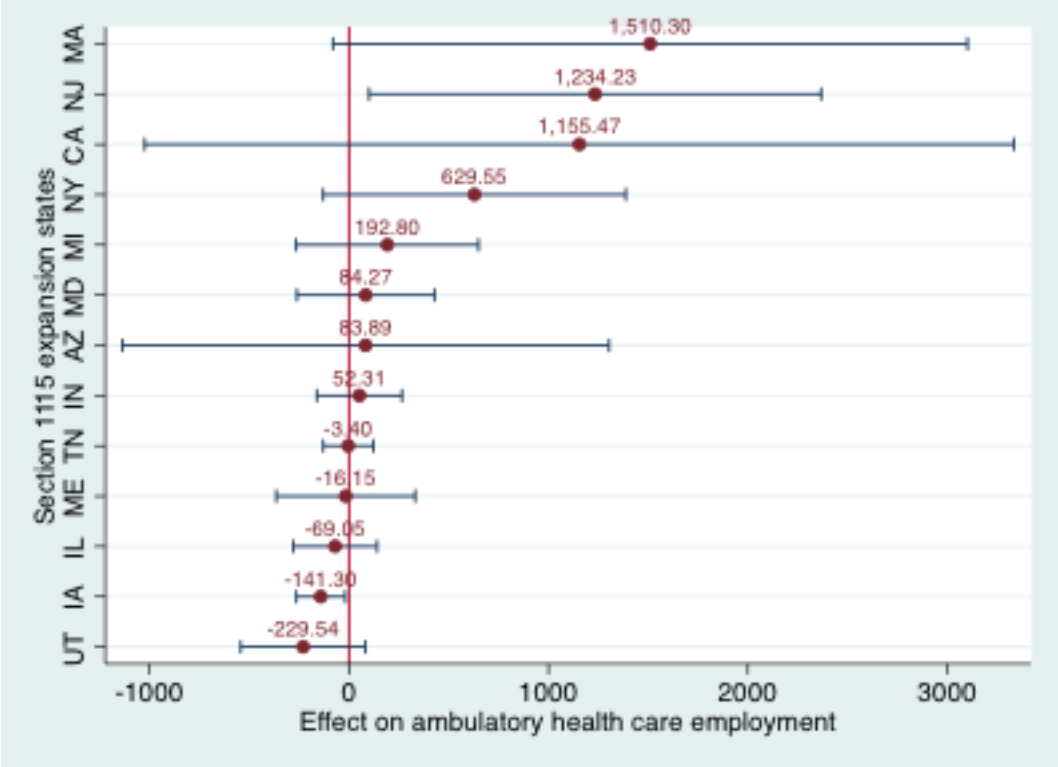

Figure 3.4. State-specific effects of Section 1115 expansions on county-level ambulatory healthcare services employment.

Supplemental Analyses

As described in the "Methods" section, I conducted two supplemental analyses. In the first analysis, I tested whether Section 1115 expansions that occurred during the study period were associated with changes in total Medicaid enrollment at the state level. Because this analysis includes data from every state except for Washington state—which had an active state-funded expansion throughout the entire study period—this analysis's regression could be seen as describing associations in a population rather than in a sample. As a result, in this case, standard errors around model coefficient estimates are not informative. As Table 3.8 shows, this analysis indicates that Section 1115 expansions were associated with an average 118,730-person increase in monthly (December) state-level enrollment in Medicaid for all

states with changes in Section 1115 expansion status between 2000 and 2010. This finding therefore provides evidence to suggest that Section 1115 expansions increased average Medicaid enrollment at the state level.

Table 3.8. Regression Estimates of the Effect of Section 1115 Expansions on State-Level Medicaid Enrollment (N=529 State-Year Observations)

Variables	Estimated effect on state-level enrollment (in thousands)
Section 1115 expansion indicator	118.73
	(68.68)
State characteristics	
Total state population	0.00032***
	(0.000050)
Percent of the state population that is female	282.85
	(199.42)
Percent of the state population that is 19 years old or younger	-108.75*
	(47.35)
Percent of the state population that is 65 years old or older	-136.17
	(94.81)
Percent of the state population that is in poverty	8.05
	(12.91)
Percent of the population that is a racial or ethnic minority	-17.23
	(19.54)
Adjusted R-squared	0.90

Notes: * indicates p-value<0.05 for total effect; *** indicates p-value<0.001. Models include state and year fixed effects.

The second supplemental analysis uses a fixed-effects logistic regression model to assess whether or not state healthcare employment counts are associated with the probability that a state will implement a Section 1115 expansion. This analysis also uses a population of states rather than a sample, so it is most informative to focus on average marginal effect

estimates rather than on standard errors around these estimates. The fixed-effects logistic regression model indicates that a thousand-person increase in the number of individuals employed in the healthcare and social assistance sector was associated with a 0.016 percentage point decrease in the probability of Section 1115 expansion. Because this effect is small in magnitude, it suggests that the possibility that states pursue Section 1115 waivers to bolster their healthcare employment is unlikely.

Discussion

Taking the results from the models together, there is some evidence to support the hypotheses that Section 1115 expansions increase healthcare and social assistance employment at the county level. The average-effect models for county-level healthcare and social assistance employment and for county-level ambulatory healthcare services indicate that Section 1115 expansions are positively associated with county-level health sector employment. However, the majority of the state-specific estimates of Section 1115 expansions on county-level healthcare and social assistance employment were not statistically significant.

The variation in expansion program enrollment counts across states could explain the finding that Section 1115 expansions were positively associated with county-level healthcare and social assistance employment counts in some states but not in others. First, Massachusetts, New Jersey, and New York—the states for which Section 1115 expansion was associated with increased healthcare and social assistance employment at the county level—had relatively larger expansion enrollments. In particular, Massachusetts's health insurance coverage expansion affected a broad group of lower-income individuals.

Many of the states for which there was no effect of coverage expansion on healthcare and social assistance employment had expansions with relatively smaller enrollments. For

example, Utah's Section 1115 waiver–based coverage expansion was capped at 25,000 enrollees (Centers for Medicare and Medicaid Services, February 2014). (See Table 3.1 for representative expansion enrollments.)

Iowa provides an exception to the proposed relationship between Section 1115 expansion enrollment and healthcare and social assistance employment growth. Although Iowa's Section 1115 expansion population represented nearly 11% of the state's total Medicaid population in 2011, Section 1115 expansion in Iowa was associated with declines in both healthcare and social assistance employment and ambulatory healthcare services employment.

Limitations

This analysis has four key limitations. First, states' implementation of Section 1115 expansions is not random because states have to have substantial political will and expertise to pursue and implement Section 1115 expansions. However, one of the study's supplemental analyses finds that state-level healthcare and social assistance employment is not strongly associated with the probability that a state will implement a Section 1115 expansion. In other words, changes to healthcare employment can be interpreted as a consequence of Section 1115 expansions rather than as a cause of such expansions.

Second, data suppression patterns in the CBP data limit the ability to generalize study results to counties with small populations. Third, healthcare and social assistance employment counts include some non-health employment—that is, employment in social services provision. As Table 3.2 shows, social assistance represents about 17% of all healthcare and social assistance employment at the national level. Social assistance employment is likely not related to Section 1115 expansion status, so the inclusion of social

assistance in the dependent variable should not necessarily bias the estimates of Section 1115 expansions' effects on healthcare employment.

Finally, the models in this analysis do not include variables that describe healthcare workforce policy at the national, state, and local levels. Due to the broad definition of "healthcare workforce" in this study, it would have been challenging to control for all policies that affect healthcare employment and are correlated with variables included in this study's regression models. However, year fixed effects can control for national healthcare workforce policy changes that affect all counties similarly, and county fixed effects control for healthcare workforce policies that do not change over the study period.

Implications for the Affordable Care Act

Section 1115 expansions' statistically significant effects on healthcare and social assistance employment in states with larger expansion enrollments indicates that healthcare employment could grow in response to the ACA's Medicaid expansion as well. Although Section 1115 expansions can provide information on the potential direction of the effects of the ACA's Medicaid expansion on healthcare employment, Section 1115 expansions differ from the ACA's Medicaid expansion in important ways. First, unlike Section 1115 expansions, the ACA's Medicaid expansion includes significant new federal spending. Furthermore, at the state level, the ACA's Medicaid expansion has enrolled more people than Section 1115 expansions did. Finally, the ACA's Medicaid expansion—unlike all Section 1115 expansions except for the one in Massachusetts—accompanies a significant expansion of private health insurance coverage. These ACA-specific factors—federal spending, larger enrollments, and private coverage expansion—indicate that the employment effects for the ACA could be larger than those associated with Section 1115 expansions. Therefore, there

will be a clear opportunity to monitor changes in health care employment in response to the ACA's coverage expansion.

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CHAPTER 4. THE EFFECT OF MEDICAID EXPANSION ON HOSPITAL EMPLOYMENT

Initial reports suggest that the Patient Protection and Affordable Care Act's (ACA) Medicaid expansion has provided financial benefits to some hospitals. A survey of 450 hospitals in 25 states revealed greater decreases in charity care provision and greater increases in Medicaid charges as a percent of total hospital charges for hospitals in Medicaid expansion states than for hospitals in non-expansion states six months after the ACA's Medicaid expansion began (Colorado Hospital Association, 2014). Declines in uncompensated care at hospitals in Medicaid expansion states have corresponded with increases in hospital revenues for non-profit safety net hospitals and for-profit hospitals alike (Galewitz, 2014; Herman, 2014; PwC Health Research Institute, 2014).

Policymakers assumed that the ACA's expansion of coverage would offset reductions in federal funding to hospitals for providing uncompensated care (Dorn et al., 2013). Some states' decisions to reject the ACA's Medicaid expansion has therefore left hospitals in those states subject to reductions in federal funding without large corresponding increases in insurance coverage among low-income adults—though Congress has delayed scheduled reductions in Medicaid Disproportionate Share Hospital program payments until the 2018 fiscal year (Medicaid and CHIP Payment and Access Commission, 2015).

Proponents of the ACA's Medicaid expansion have attempted to persuade policymakers in "non-expansion" states of Medicaid's economic benefits. Academic researchers, consulting firms, advocacy groups, and the White House Council of Economic

Advisors have produced simulations of the Medicaid expansion's economic effects in at least 24 states. All simulations that model employment show that the ACA's Medicaid expansion stimulates not just healthcare employment but also employment in all sectors (Kaiser Commission on Medicaid and the Uninsured, 2013; Mahan, 2013; White House Council of Economic Advisors, 2014). For example, a December 2014 analysis conducted by the Center for Health Policy Research at George Washington University estimated that if North Carolina implemented the ACA's Medicaid expansion in 2016, this policy change would create a total of 43,314 new jobs by 2020, including 4,954 jobs in hospitals and 18,339 jobs in ambulatory healthcare services (Ku et al., 2014).

These simulations of the ACA's effects on employment suggest that the ACA will continue to increase job growth over the longer term. However, the ACA's major coverage provisions have been in effect only since January 2014, and 21 states have yet to adopt the law's Medicaid expansion as of April 2015 (Kaiser Family Foundation, 2015). Therefore, it is useful to look back at the effects of pre-ACA health insurance coverage expansions on hospital employment to gain insight into the ACA's possible impacts. Examining the effects of health insurance coverage expansion on hospital employment is also important because hospitals employed approximately 3.4% of all non-farm workers in the United States and nearly one-third of all healthcare workers as of January 2015 (Bureau of Labor Statistics, 2015). Furthermore, because hospitals are legally required to provide emergency medical care regardless of a patient's health insurance coverage status, hospitals represent an important site of care for low-income and uninsured individuals—the target population for the ACA's Medicaid expansion.

Prior Research on the Effects of Health Insurance Coverage Expansion on Employment

Coverage Expansions' Effects on Healthcare Employment at the State Level

Three uncontrolled studies have examined the relationship between health insurance coverage expansion and healthcare employment at the state level. Staiger and colleagues' (2011) analysis of unadjusted trends in healthcare employment concludes that healthcare employment grew faster in Massachusetts compared to the rest of the nation after Massachusetts implemented its state-led healthcare reforms between 2006 and 2007. Using Quarterly Census of Employment and Wages data, the authors find that healthcare employment grew in Massachusetts by approximately 8% between 2001 and the end of 2005—the same rate as in the rest of the United States (Staiger, Auerbach, & Buerhaus, 2011). However, between late 2005 and 2010—the period that includes the implementation of Massachusetts's healthcare reforms—healthcare employment in Massachusetts grew by 9.5% (Staiger, Auerbach, & Buerhaus, 2011). During the same time period in the rest of the United States, healthcare employment grew by 5.5% (Staiger, Auerbach, & Buerhaus, 2011).

Staiger, Auerbach, and Buerhaus (2011) also used the American Community Survey to compare unadjusted growth in administrative healthcare occupations and non-administrative healthcare occupations in Massachusetts and in the rest of the United States. The authors find that per-capita employment in administrative healthcare occupations—which include finance, business, and administrative jobs—grew 18.4% in Massachusetts between 2005–2006 and 2008–2009 but only grew 8% in the same time period in the rest of the United States.

Two more recent unadjusted analyses examine trends in healthcare employment in states that have accepted the ACA's Medicaid expansion compared to those that have not. A

policy brief from the Missouri Economic Research and Information Center (MERIC) uses the Bureau of Labor Statistics' Current Employment Statistics data to compare healthcare and social assistance job growth in five states that accepted the ACA's Medicaid expansion to that in five states that have rejected the ACA's Medicaid expansion. These ten states were included in this study because they all had total numbers of employed workers similar to the number of employed workers in Missouri (Missouri Economic Research and Information Center, 2014). This analysis finds that in the states that accepted the ACA's Medicaid expansion healthcare and social assistance employment increased by an average of 2.1% between January to May 2013 and January to May 2014 (Missouri Economic Research and Information Center, 2014). Meanwhile, in the five states that rejected the ACA's Medicaid expansion healthcare and social assistance employment increased an average of 0.7% between the first five months of 2013 and the first five months of 2014 (Missouri Economic Research and Information Center, 2014).

A December 2014 analysis from the Altarum Institute also uses Current Employment Statistics to compare healthcare and social assistance job growth in states that have accepted the ACA's Medicaid expansion compared to states that have not (Turner, 2014). Unlike the MERIC analysis, the Altarum Institute analysis uses employment data from 47 states. In the states that accepted the ACA's Medicaid expansion, healthcare employment grew 46% between April through October 2013 and April to October 2014. However, healthcare and social assistance job growth increased 104% over the same period in the states rejecting the ACA's Medicaid expansion.

Two of these three uncontrolled studies find that coverage expansion increased healthcare employment at the state level. However, because these studies do not control for

state-level factors that affect healthcare employment, they may not identify coverage expansion's effects on healthcare employment. For example, differences in economic growth rates by state could affect healthcare and social assistance employment growth. In particular, economic conditions that vary by state—in addition to differing samples—could explain the differences in the findings from the MERIC and Altarum Institute analyses.

Coverage Expansions' Effects on Healthcare Employment at the Organizational Level

The literature on the relationship between pre-ACA health insurance coverage expansion and employment at healthcare organizations—including but not limited to hospitals—is sparse. Cozad (2012) tests whether state-led health insurance coverage expansions in Massachusetts in 2006–2007 increased hospital employment in that state compared to hospital employment in bordering states. After controlling for time-invariant hospital characteristics and state demographic and economic characteristics, she finds no statistically significant association between the implementation of near-universal health insurance coverage in Massachusetts and employment counts at Massachusetts hospitals.

Two other studies focus on health insurance coverage expansions' effects on staffing in community health centers (CHCs) and dental clinics, respectively. In an uncontrolled analysis of survey data from 519 CHCs, Shin and Rosenbaum (2012) find that CHCs in states that expanded Medicaid parental income eligibility limits above 100% of the federal poverty level (FPL) employed more clinicians on average than did CHCs in states with Medicaid parental income eligibility limits below 100% FPL. The authors also find that employment at CHCs in expansion states grew 8 percentage points more (41% vs. 33%) between 2005 and 2009 than at CHCs in states with lower parental Medicaid income eligibility limits (Shin & Rosenbaum, 2012). Buchmueller and colleagues (2014) use the Survey of Dental Practices to

assess the association between Medicaid coverage of adult dental benefits in Medicaid and staffing in dental offices. The authors find that the implementation of comprehensive adult dental Medicaid coverage was associated with a 3 percentage point increase in a dental practice's probability of employing one or more dental hygienists and a 0.1 increase in the number of dental hygienists in a dental practice (Buchmueller et al., 2014). In sum, these two studies suggest that Medicaid coverage expansion increases employment in ambulatory settings but Cozad's study finds no association between coverage expansion and hospital employment.

The analysis presented here augments the literature on the relationship between health insurance coverage expansion and hospital employment by examining the effects of Section 1115 waiver–based coverage expansions on full-time equivalent (FTE) hospital employment. Notably, this study focuses on coverage expansions' effects on hospital employment in multiple states and over an 11-year time period.

Furthermore, Massachusetts's experience with health insurance coverage expansion in the mid-2000s may not be representative of that in other states. Prior to Massachusetts's 2006–2007 coverage expansion, the percent of employed individuals working in hospitals grew in Massachusetts—from approximately 5.1% in 2000 to 5.6% in 2005—but declined from 5.1% to 4.6% of all employed individuals over the same time period in the entire United States (author's analysis of County Business Patterns data).

Background on Section 1115 Waivers

Section 1115 waivers provide states with flexibility to pursue "experimental, pilot, or demonstration projects" related to Medicaid and Children's Health Insurance Program (CHIP) eligibility, financing, and care delivery (Centers for Medicare and Medicaid Services, n.d. (a)). Through the Section 1115 program, a state can waive federally mandated features of

the Medicaid and CHIP programs, like the requirement to provide certain benefits to all Medicaid enrollees, and still obtain program funds from the federal government (Moody & Rosenstein, 2009). From the early 1990s through 2013, states had the option to use Section 1115 expansions to extend publicly financed coverage to individuals who were not otherwise already eligible for such coverage, such as non-disabled, non-elderly low-income adults without dependent children or parents with incomes otherwise too high to qualify for Medicaid.

To obtain a Section 1115 waiver, a state submitted an application to the Centers for Medicaid and Medicaid Services (CMS) within the U.S. Department of Health and Human Services. The state and CMS negotiated the waiver's terms, possibly leading to CMS approval and waiver implementation (Artiga, 2009). As a condition for waiver approval, CMS required the waiver to be budget-neutral—that is, Medicaid spending projections showed that the waiver would not increase federal spending above what the federal government would spend in the waiver's absence (Artiga, 2009).

Conceptual Framework

This study proposes that the expansion of health insurance coverage affects hospital employment through two related pathways.[6] First, hospitals could increase the size of their respective workforces in anticipation of an expansion of health insurance coverage (Cozad, 2012). Because the federal government's approval of a state's Section 1115 waiver entailed negotiation between state and federal officials, there was a delay between the development of a Section 1115 waiver–based coverage expansion and its implementation. That the Section

[6] A supplemental analysis presented in Chapter 3 of this dissertation suggests that state-level healthcare workforce employment counts likely do not affect the probability of Section 1115 coverage expansion implementation. It can therefore be assumed that health insurance coverage expansions affect healthcare employment—including hospital employment—rather than the reverse.

1115 waiver approval process was drawn out would presumably provide time for hospital management to become aware of the waiver and to decide whether or not to increase their labor supply in anticipation of expanded coverage and an accompanying increased demand for healthcare services. Furthermore, as part of the waiver application process, states projected the number of individuals expected to enroll in a waiver-based coverage expansion (see Atherly et al., 2012, for state estimates of expansion enrollment). These estimates of Section 1115 expansion enrollment also could have provided hospitals with information on whether to increase the number of workers they employ in anticipation of expanded coverage. In short, in this pathway, hospitals' *estimates* of increases in healthcare demand post-expansion are proposed to drive increases in hospital employment. This pathway does not require *actual* increases in demand for health care after a coverage expansion to produce an increase in hospital employment.

Second, hospitals could increase the number of workers they employ *after* the implementation of a Section 1115 expansion. The first step to increased hospital employment after an expansion of health insurance coverage is an improvement in health insurance coverage rates among the low-income populations that these expansions target.[7] Studies suggest that Medicaid expansions, through Section 1115 waivers or otherwise, reduce uninsurance among the low-income individuals that they target (Atherly et al., 2012; Aizer & Grogger, 2003; Busch & Duchovny, 2005; Kronick & Gilmer, 2002).

Changes in health insurance coverage rates affect hospital employment through increases in demand for healthcare services from the newly insured. Increases in the demand for healthcare services vary by the type of services provided. Evidence from the Oregon

[7] A supplemental analysis presented in Chapter 3 of this dissertation provides evidence that Section 1115 expansions increased total Medicaid enrollments.

Health Insurance Experiment suggests that newly Medicaid-enrolled adults actually use more emergency department care after becoming insured, even though theory suggests that these newly enrolled individuals should have improved access to outpatient care (Taubman et al., 2014). Adults who received Medicaid coverage in Oregon used 40% more emergency department visits than their uninsured peers over an 18-month period, though studies from Massachusetts's mid-2000s healthcare reform did not find substantial increases in emergency department use (Taubman et al., 2014; Chen, Scheffler, & Chandra, 2011; Miller, 2012; Lee et al., 2015). Oregon Health Insurance Experiment findings also indicate that receiving Medicaid coverage increases the probability of using hospital inpatient care by 30% and the probability of having at least one outpatient visit—to a hospital or elsewhere—by 35% (Finkelstein et al., 2012).

Therefore, when a sufficient number of individuals within a community gain Medicaid coverage, hospitals within that community face an increased demand for services such as emergency department care or inpatient care (Ku et al., 2011; Dorn et al., 2013). To address this demand, hospitals could hire additional employees. It should be noted that whether hospitals choose to hire additional employees after a coverage expansion could be based on calculations of whether post-expansion increases in healthcare demand are sustained over the longer term. If hospital executives judge increases in demand to be temporary—pent-up demand from formerly uninsured individuals—then hospitals may choose to not hire additional workers.

As Figure 4.1 shows, other factors proposed to affect hospital employment include hospital characteristics and characteristics of the county in which a hospital is located. County demographic and economic characteristics are proposed to indirectly affect hospital

employment through demand for hospital care. For instance, at the individual level, women and older people tend to have a higher demand for healthcare services compared to men and to younger people (Bertakis et al., 2000; Meara, White, & Cutler, 2004). Therefore, communities with relatively more women or relatively more older adults are likely to have higher levels of demand for healthcare services. In this conceptual model, this higher level of demand would produce a larger healthcare workforce. In contrast, due to the barriers to care for racial and ethnic minorities, a community that has a higher proportion of racial or ethnic minorities may have a smaller healthcare workforce (Fiscella et al., 2002; Padgett et al., 1994). Because higher-income individuals are more likely to be covered by private insurance and are less likely to report going without care due to affordability concerns, a community composed of relatively more higher-income individuals would likely have higher rates of demand for healthcare services (Kaiser Commission on Medicaid and the Uninsured, 2012). This increased demand for care could result in an increased supply of hospital workers.

The literature on hospital efficiency suggests that hospital characteristics affect how efficient hospitals are. For-profit hospitals and hospitals that are part of chains are more efficient than not-for-profit hospitals and non-chain hospitals (Rosko, 1999; Rosko, 2001). This study's conceptual framework posits that one source of these efficiency gains is a greater incentive to constrain labor costs and to hire fewer hospital employees. The hospital efficiency literature suggests that teaching hospitals are less efficient than their non-teaching counterparts are (Grosskopf, Margaritis, & Valdmanis, 2004). The conceptual framework for this present study suggests that increased employment at teaching hospitals may be required to sustain physician-training programs.

This conceptual framework also proposes that the types of services that hospitals provide affect hospital employment. It is reasonable to expect that the more types of services—such as emergency care or skilled nursing care—that a hospital offers, the more workers they are likely to have.

Hypothesis

This study assesses this proposed link between health insurance coverage expansion and hospital employment by testing the hypothesis that Section 1115 expansions increased the number of FTE employees at hospitals in expansion states.

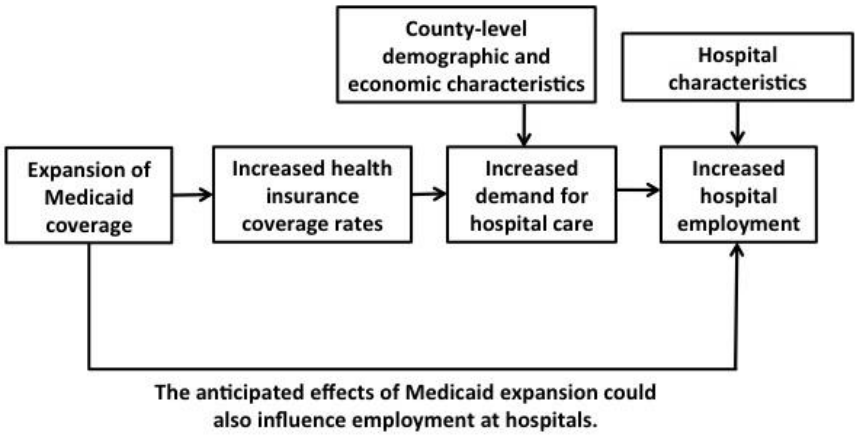

Figure 4.1. Section 1115 expansions' effects on FTE hospital employment.

Data and Sample

Data Sources

Information on FTE employees at hospitals comes from the American Hospital Association Annual (AHA) Survey of registered U.S. hospitals. I obtained data on the timing of Section 1115 expansion implementation or discontinuation from the Centers for Medicare and Medicaid Services Web site, from the Robert Wood Johnson Foundation State Coverage

Initiatives Web site (Centers for Medicare and Medicaid Services, n.d.; Robert Wood Johnson Foundation, n.d.) and the Kaiser Commission on Medicaid and the Uninsured's state-level surveys of Medicaid and CHIP program characteristics (Kaiser Commission on Medicaid and the Uninsured, 2015). Data on county demographic characteristics come from the U.S. Census Bureau's County Intercensal Estimates (U.S. Census Bureau, 2012). Annual estimates of the percent of each county's population in poverty are from the U.S. Census Bureau's Small Area Income and Poverty Estimates (U.S. Census Bureau, 2014). I use data on county-level per-capita income from the U.S. Department of Commerce's Local Area Personal Income estimates (Bureau of Economic Analysis, 2015).

Sample Creation

Sample timeframe. This study's sample includes annual observations from hospitals in 49 U.S. states and for the 11 years from 2000 to 2010. The beginning of the study period is 2000 because 48 states had implemented coverage expansions through the Children's Health Insurance Program by that year (Rosenbach et al., 2001). The year 2010 is the last year included in the study timeframe because the ACA was enacted in late March 2010. The Section 1115 waiver–based coverage expansions that were either implemented or ended during this period are listed in Table 4.1.

More information on each Section 1115 waiver–based expansion is available in the appendix to this dissertation.

Table 4.1. States that Implemented Section 1115 Waiver–Based Coverage Expansions to Parents or Low-Income Adults Without Dependent Children Between 2000 and 2010

Expansion state	Year expansion implemented	Expansion program enrollment as of June 2011	Expansion enrollment as percent of total Medicaid enrollment in June 2011
Arizona	2001	224,500 childless adults	16%
California	10 counties in 2007, 35 primarily rural counties in 2011[1]	184,200 childless adults and parents	2%
Illinois	2002. Expansion discontinued in 2007.	129,994 parents on December 31, 2006[2]	7% of June 2006 enrollment
Indiana	2008	16,100 childless adults	2%
Iowa	2005	46,000 childless adults and parents	11%
Maine	2002	16,500 childless adults	6%
Maryland	2007[3]	56,800 childless adults	7%
Massachusetts	2007[4]	114,700 childless adults	10% (but accompanied by other coverage changes)
Michigan	2004	77,900 childless adults	4%
New Jersey	2001	156,598 adults ever enrolled in 2011 fiscal year[5] (monthly enrollment count not available)	N/A
New York	2001	949,300 childless adults	19%
Tennessee	1994. Expansion discontinued in 2005.	Reduced uninsurance in Tennessee from 15.7% in 1992-1993 to 7.2% in 1994-1995. After the program's first year, it was closed to most new enrollment.[6]	N/A
Utah	2002	16,800 parents and childless adults	6%

Notes: *Unless indicated otherwise, data on expansion enrollments and monthly Medicaid enrollments come from Kaiser Commission on Medicaid and the Uninsured, Medicaid enrollment: June 2013 data snapshot. Washington, DC: Kaiser Family Foundation; January 2014. http://kaiserfamilyfoundation.files.wordpress.com/2014/01/8050-07-medicaid-enrollment-june-2013-data-snapshot1.pdf.

1. California's Section 1115 expansions were not implemented on a statewide basis.
2. Illinois expansion program enrollment count from Artiga S, Mann C. Family coverage under SCHIP waivers. Washington, DC: Kaiser Commission on Medicaid and the Uninsured; May 2007. https://kaiserfamilyfoundation.files.wordpress.com/2013/01/7644.pdf. Accessed May 14, 2015.
3. Maryland's coverage expansion to low-income adults without dependent children was an addition to a Section 1115 waiver that implemented Medicaid managed care in Maryland in 1997.
4. Massachusetts' major expansion of coverage in 2006-2007 was carried out through Massachusetts' pre-existing Section 1115 waiver.

5. New Jersey expansion program enrollment count from the Centers for Medicare and Medicaid Services. New Jersey Family Coverage under SCHIP. Baltimore, MD: Centers for Medicare and Medicaid Services; April 2012.
6. Tennessee's expansion program's effects on state rates of health insurance coverage from Conover CJ, Davies HH. The role of TennCare in health policy for low-income people in Tennessee. Washington, DC: Urban Institute; February 2000. http://webarchive.urban.org/UploadedPDF/occa33.pdf. Accessed May 18, 2015.

Exclusion of observations from the study sample. As Figure 4.2 shows, this study's sample was subject to a number of exclusions. First, I excluded from the sample 36,221 hospital-year observations from hospitals that were not classified as general medical and surgical hospitals. In the AHA data, hospitals that are not general medical and surgical hospitals are a diverse group that includes, for example, hospital units within prisons, psychiatric hospitals, rehabilitation hospitals, children's specialty hospitals, and acute long-term care hospitals. I removed these specialty hospitals from the study sample because they do not necessarily serve a broad adult population and therefore may be less likely to treat adults eligible for coverage under Section 1115 expansions. As a result, specialty hospitals may not experience the same post-expansion increase in healthcare demand that general medical and surgical hospitals are hypothesized to experience.

I also excluded observations from hospitals for which admissions were primarily restricted to children (N=12 hospital year-observations), observations from hospitals that were federally operated (N=2,280 hospital-year observations)—such as observations from military hospitals—and observations from general medical and surgical hospitals that did not report also being community hospitals (N=394 hospital-year observations). (An Internet search of the names of hospitals described as general medical and surgical hospitals but not community hospitals suggests that many of these hospitals are long-term care hospitals.)

Next, I excluded from the sample observations with missing or otherwise problematic data. These include the 525 hospital-year observations for which the year of the reported data

does not correspond with the survey year. For example, I dropped an observation from the sample if the end date for the observation is 2009, but the survey year was 2010. I also removed from the sample 59 hospital-year observations with either missing or negative FTE data because it is impossible for an organization to have a negative number of employees. I eliminated 17 hospital-year observations that indicated that a hospital was open during the entire survey year but reported having zero FTE employees during that year because it seems unlikely that a hospital would be able to operate without employees.

I removed 8,091 hospital-year observations with missing values of any control variables from the study sample. Most missing values were for variables describing whether or not a hospital was a member of a network or whether a hospital had an emergency department. I dropped 904 hospital-year observations from the sample because they indicated a change in the counties in which hospitals were located. I excluded these observations from the sample because the changing county location makes it impossible to match hospital location to county characteristics.

In addition, I excluded 2,007 hospital-year observations from hospitals in states with state-funded coverage expansions to adults. Applying this criterion results in the exclusion from the study sample of observations from Connecticut from 2008 to 2010; Washington, DC, from 2001 to 2010; Pennsylvania from 2002 to 2010; and Washington state during the entire study period. I removed observations from states with active primarily state-funded programs from the sample because state-funded programs—unlike Section 1115 waiver–based programs—were not subject to federal approval. States had complete leeway to define and change eligibility and benefits for these programs. Furthermore, because these state-funded programs did not receive federal approval to operate, they do not have to be budget

neutral. As a result, I consider these state-funded programs different enough from Medicaid or CHIP expansions to be excluded from the study sample.

Observations in states that implemented Section 1115 premium assistance programs and no other types of Section 1115 coverage expansions are included in the control group. Premium assistance programs tended to have low enrollment—numbering anywhere between a few hundred to a few thousand—and so seem unlikely to affect rates of health insurance coverage at the community level (Atherly et al., 2012).

Finally, 269 hospitals that were only included in the sample in one year were excluded from the sample. Figure 4.2 summarizes the sample exclusions.

Sample size and characteristics. There are a total of 38,530 hospital-year observations from 4,494 total hospitals in the study sample. The sample includes 11,594 hospital-year observations from 1,289 hospitals in states with active Section 1115 coverage expansions during the study period, and 26,936 hospital-year observations from 3,205 hospitals in non-expansion states.

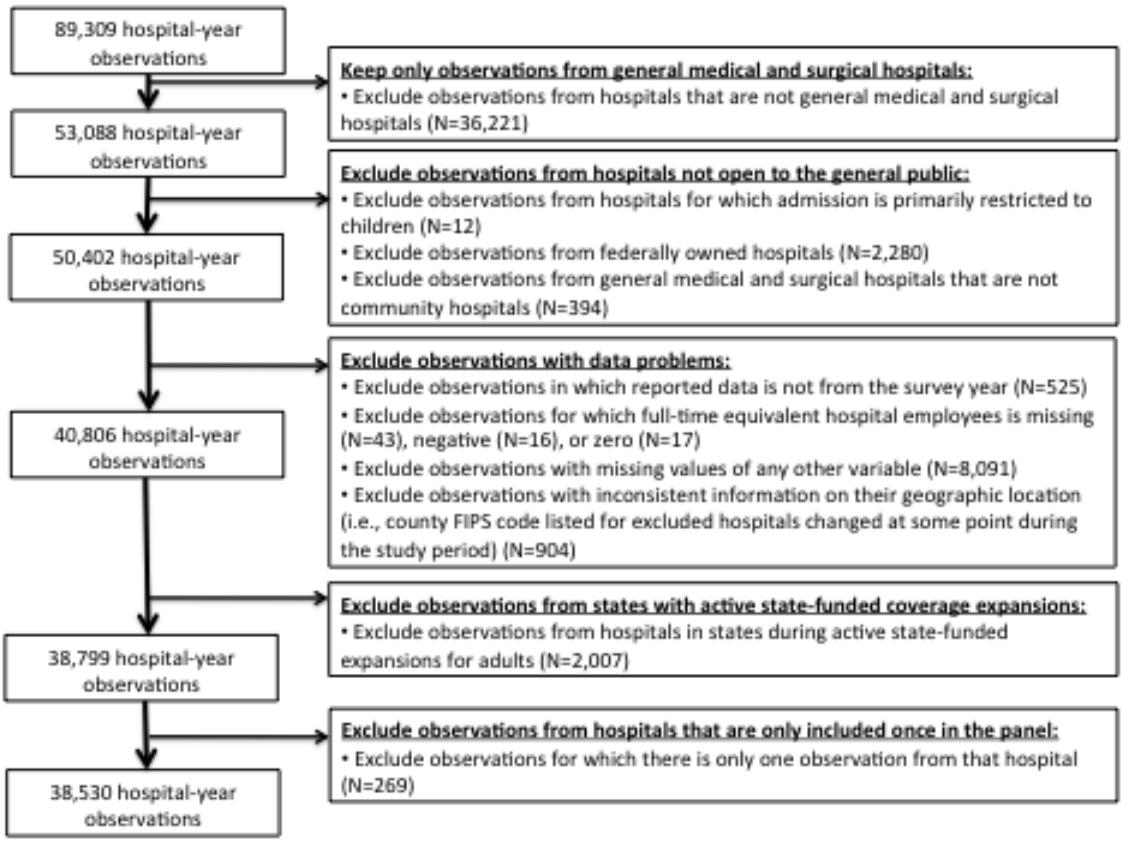

Figure 4.2. Creating a sample of hospital-year observations.

Variables

Variables included in the regression models for this study describe full-time equivalent hospital employment, a state's Section 1115 expansion status, the economic and demographic characteristics of the county in which a hospital is located, and a hospital's characteristics and services.

Full-Time Equivalent Hospital Employment

This analysis's dependent variable is the FTE number of people employed at a particular hospital in a specific year. FTE hospital employment counts include all hospital employees, not just clinicians. FTE hospital employment is calculated as the number of full-time hospital employees plus one-half of the number of part-time hospital employees.

Section 1115 Expansion Indicator

This study's key independent variable is an indicator for an active Section 1115 expansion within a state for a particular year. In a Section 1115 expansion state, this indicator is equal to 1 as long as the expansion in this state is active. If an expansion program is discontinued in an expansion state, the indicator is reset to zero. The indicator is set to zero in states without active Section 1115 expansions.

County Demographic and Economic Characteristics

This analysis controls for time-varying county demographic and economic characteristics that that are correlated with both hospital FTEs and the Section 1115 expansion indicator. County demographic variables included in this analysis are the percent of the county population that is female, the percent of the county population that is 19 years old or younger, the percent of the county population that is 65 years old or older, the percent of the county population that is a racial or ethnic minority, and the total county population (in tens of thousands of people). This study's conceptual framework explains how each of these demographic characteristics could be associated with either increases or decreases in FTE employment at the hospital level. Because these variables are correlated with the Section 1115 expansion indicator and are likely to be associated with changes in FTE hospital employment, including them in this study's regression models reduces the potential for bias in model estimates.

Total county population (r = 0.0796), county per capita income (r = 0.173), and the percent of the county population that is 65 years old or older (r = 0.015) are positively correlated with the expansion indicator. The percent of a county's population that is a racial or ethnic minority (r = -0.106), the percent of a county's population that is female (r = -

0.0045), and the percent of a county's population that is aged 19 years old or younger (r = -0.1125) are negatively correlated with the Section 1115 expansion indicator.

This analysis controls for time-varying county economic characteristics that affect hospital employment and are correlated with the expansion indicator. The county-level economic control variables are the percent of the county population that is in poverty and county per capita income, which is inflation-adjusted based on the Consumer Price Index to 2012 dollars. These variables are included in the model because, as noted in this study's conceptual framework, wealthier people experience fewer barriers to care, so higher-income communities are likely to demand relatively more health care. The percent of the county population in poverty is negatively correlated with the expansion indicator (r = -0.2025), and county per capita income is positively correlated with the expansion indicator (r = 0.173).

Hospital Characteristics

This analysis controls for hospital ownership, teaching status, and services provided. As noted in the conceptual framework, hospitals that are for-profit and are part of a hospital network tend to manage their costs more efficiently than non-profit and non-chain hospitals, respectively. One element of managing costs more efficiently could be maintaining lower levels of hospital staffing. As a result, this analysis includes a categorical variable that describes hospital ownership and an indicator for whether a hospital is part of a network. Teaching hospitals have to have residents and additional staff to support teaching, so this analysis includes two indicator variables related to teaching status. One indicator describes whether a hospital is a teaching hospital, and the other indicator describes whether a hospital is a member of the Council of Teaching Hospitals and Health Systems—that is, whether it is a more prominent teaching hospital.

Non-federal government hospital ownership (r = -0.1184) and for-profit ownership (r = -0.1407) are negatively correlated with the Section 1115 expansion indicator. Membership in a hospital network (r = 0.0111) is positively, though weakly, correlated with Section 1115 expansion as well. Medical school affiliation (r = 0.0592) and membership in the Council on Teaching Hospitals and Health Systems (r = 0.0678) are also positively correlated with the expansion indicator.

Another set of hospital control variables describe the types of services that a hospital offers. As the conceptual framework notes, the more services a hospital provides, the more employees a hospital will have to provide those services. This analysis includes indicators for whether or not a hospital has an emergency department, provides home health services, offers outpatient surgery, has a skilled nursing care unit, has social work services, has a separate long-term care unit, or is a certified trauma center. Although individual hospitals do not typically frequently change the mix of services they provide, there is change over time in the sample in the percent of hospitals offering each of these services.

Emergency department care (r = 0.0204), outpatient surgery (r = 0.1005), social work services (r = 0.1031), and certification as a trauma center (r = 0.0559) are positively correlated with Section 1115 expansion implementation. Home health services (r = -0.0106), skilled nursing care (r = -0.0244), and having a separate long-term care unit (r = -0.0036) are weakly negatively correlated with the expansion indicator.

Methods

This analysis evaluates the effects of Section 1115 expansions on FTE hospital employment using ordinary least squares models with hospital and year fixed effects. It should be noted that the models presented in this analysis identify the effects of these expansions on hospital employment only for expansions that had changes in status during the

study period. The models cannot identify effects of expansions that were active throughout the entire 11 years of the study period.

The first model specification assesses the average effect of Section 1115 expansions on FTE hospital employment across hospitals in all of the study's expansion states:

$$FTE_{ht} = \gamma_1 EXP_{st} + \gamma_2 X_{ct} + \gamma_3 HOSP_{ht} + \tau_t + \mu_h + \varepsilon_{ht}$$

In the equation above, the subscripts *h*, *c*, and *s* indicate that observations vary by the hospital, county, and state levels, respectively. The subscript *t* denotes variation by year. This dependent variable, *FTE*, describes the number of FTE employees in a hospital in a particular year. The variable *EXP* is the indicator for an active Section 1115 expansion. The vector X_{ct} includes time-varying county demographic and economic characteristics. $HOSP_{ht}$ represents the control variables for hospital ownership, teaching status, and service provision. The terms τ_t and μ_h represent year and hospital fixed effects, respectively. The term is ε_{ht} is the model's error term.

The second specification allows the effect of Section 1115 expansion implementation on FTE hospital employees to differ by state:

$$FTE_{ht} = \beta_1 EXP_{st} + \beta_2 STATE_s + \beta_3 STATE_s \times EXP_{st} + \beta_4 X_{ct} + \beta_5 HOSP_{ht}\ \tau_t + \mu_c + \varepsilon_{ct}$$

This model is similar to the average-effect model described previously. However, the state-specific effects model includes *STATE*, a vector of indicator variables for each U.S. state. In this model, the effects of *STATE* are not separately estimated because they are subsumed by the hospital fixed effects in this model. The state-specific effects model also includes an interaction term, $EXP \times STATE$, that allows the effect of Section 1115 expansions on FTE hospital employment to vary at the state level. This model allows potential expansion

effects to differ at the state level because Section 1115 expansion characteristics—eligibility rules, enrollment numbers, and benefits—vary widely across states.

I employ block bootstrapping to estimate the standard errors for each coefficient estimate in both the average-effect and state-specific effects model specifications. Block bootstrapping helps mitigate the possibility that the model's standard errors indicate the existence of statistically significant effects when no such effects exist (Bertrand, Duflo, & Mullanaithan, 2004).

I use an F-test to evaluate the hypothesis that the state-specific coefficient estimates from the state-specific effects model are statistically different from zero.

Model Specification

I tested whether or not to use logged FTE hospital employment in place of FTE hospital employment as this analysis's dependent variable. An advantage of the logged dependent variable is that it presents the effect of coverage expansion on FTE hospital employment as a percentage change that is constant across hospitals of different sizes (Finkelstein, 2007). Because a Boxcox test did not produce definitive guidance on whether to use logged FTE hospital employment, I implemented a Wooldridge test (Wooldridge, 2009). The Wooldridge test prefers both the average-effect and state-specific effect models with unlogged variables to the same models with logged dependent variables.

Table 4.2. Summary Statistics for Hospital-Year Observations

Variables	All hospital-year observations (N=38,530)	Hospital-year observations in non-expansion states (N=26,936)	Hospital-year observations in expansion states (N=11,594)*
Dependent variable			
Number of FTE hospital employees	895.93 (1,281.91)	809.45 (1,169.50)	1,096.85*** (1,491.95)
Hospital characteristics			
Hospital ownership type (Referent category: Non-governmental, not-for-profit)			
Non-federal government ownership	25.3%	28.6%	17.7%***
For-profit ownership	13.5%	18.0%	3.2%***
Membership in a network			
Hospital is a member of a network	55.7%	56.0%	55.3%
Hospital teaching status			
Medical school affiliation	22.0%	19.8%	27.1%***
Member of the Council of Teaching Hospitals and Health Systems	6.2%	4.7%	9.6%***
Services hospital offers			
Hospital has an emergency department	97.3%	96.9%	98.3%***
Hospital offers home health services	40.7%	40.3%	41.7%**
Hospital offers outpatient surgery	94.1%	92.2%	98.6%***
Hospital offers skilled nursing care	35.2%	35.3%	35.0%
Hospital offers social work services	86.2%	83.3%	93.1%***
Hospital maintains a separate nursing-home type of long-term care unit	27.2%	26.5%	28.8%***
Hospital is a certified trauma center	35.9%	34.1%	40.1%***
Characteristics of the county in which each hospital is located			
Total county population (in 10,000s)	59.09 (150.09)	59.56 (164.09)	57.99 (110.94)
Percent of the county population that is female	50.62 (1.59)	50.58 (1.72)	50.69*** (1.22)
Percent of the county population that is 19 years old or less	27.53 (3.10)	27.66 (3.20)	27.22*** (2.81)
Percent of the county population that is 65 years old or older	14.06 (3.99)	13.99 (4.22)	14.22*** (3.38)
Percent of the county population that is a racial or ethnic minority	26.59 (21.49)	29.43 (21.68)	19.98*** (19.51)
Percent of the county population in poverty	14.12 (5.40)	15.23 (5.47)	11.54*** (4.24)
Per capita income in county (in $100s)	377.76 (103.29)	365.58 (92.47)	406.08*** (120.17)

Note: T-tests and chi-squared tests were used to compare differences in averages or proportions between hospitals in expansion states and hospitals in non-expansion states. **indicates p-value<0.01, and *** indicates p-value<0.001.

Results

Summary Statistics

As Table 4.2 shows, the average number of FTE employees across all hospitals and years in the sample was 895.93, though the median number of FTE hospital employees was 439 FTE employees. The distribution of FTE hospital employees is skewed rightward by a small number of observations from large hospitals; the average number of FTE employees for the top 1% of all hospital-year observations was 8,538.75 (data not shown).

Hospitals in expansion states had an average of 1,096.85 FTE employees while hospitals in non-expansion states had an average of 809.45 FTE employees. Hospitals in expansion and non-expansion states also differed by hospital characteristics and by the characteristics of the counties in which each hospital is located. These differences may reflect unobserved differences between hospitals in expansion states and non-expansion states or between expansion states and non-expansion states. The hospital fixed effects included in this study's models control for time-invariant differences between hospitals as well for time-invariant differences between expansion and non-expansion counties and states.

Multivariate Analyses

Table 4.3 displays coefficient estimates for the average-effect and state-specific effects model specifications, respectively. Coefficient estimates on the state-specific interactions terms in the state-specific model are omitted from Table 4.3.

Column 1 in Table 4.3 indicates that after accounting for hospital characteristics and the characteristics of a hospital's geographic location Section 1115 expansions were not associated with changes in FTE hospital employment across all expansion states.

Table 4.4 and Figure 4.3 show that Iowa is the only state for which there was a statistically significant effect of Section 1115 expansion on FTE hospital employment.

Controlling for other factors, Section 1115 expansion in Iowa was associated with a decrease in FTE hospital employment. An F-test rejects the null hypothesis that the state-specific estimates of the effects of Section 1115 expansion on hospital employment are all equal to zero.

Table 4.3. Estimates of the Effects of Section 1115 Expansions on FTE Hospital Employment (N=38,530 Hospital-Year Observations)

Variables	Average-effect model	State-specific effects model
Section 1115 expansion indicator	29.06	
	(16.23)	
State-specific interaction terms for Section 1115 expansion implementation		**Omitted: See table 4.4 below for total state-specific effects**
Hospital characteristics		
Hospital ownership type (Referent category: nongovernment, not-for-profit ownership)		
Non-federal government ownership	-1.13	-2.62
	(12.39)	(12.45)
For-profit ownership	-46.25**	-48.56**
	(1.13)	(14.13)
Hospital teaching status		
Medical school affiliation	31.72*	34.85**
	(13.20)	(13.23)
Member of the Council of Teaching Hospitals and Health Systems	147.52*	148.70*
	(65.81)	(65.36)
Membership in a network		
Hospital is a member of a network	-43.84**	-41.23**
	(9.15)	(9.13)
Hospital has an emergency department	-25.84*	-29.74**
	(11.36)	(11.47)
Hospital offers home health services	59.51**	58.08**
	(15.75)	(15.68)
Hospital offers outpatient surgery	30.08**	28.18*

	(11.17)	(11.12)
Hospital offers skilled nursing care	19.83*	21.39**
	(7.71)	(7.67)
Hospital offers social work services	6.35	6.38
	(7.35)	(7.47)
Hospital maintains a separate nursing-home type of long-term care unit	-6.89	-6.79
	(11.96)	(11.95)
Hospital is a certified trauma center	6.65	8.09
	(8.06)	(8.08)
Characteristics of the county in which each hospital is located		
Total county population (in 10,000s)	5.17**	4.98**
	(1.16)	(1.17)
Percent of the county population that is female	49.58**	45.58**
	(6.22)	(6.18)
Percent of the county population that is 19 years old or less	-4.03	-1.87
	(5.05)	(5.12)
Percent of the county population that is 65 years old or older	-14.19*	-15.64*
	(6.17)	(6.28)
Percent of the county population that is a racial or ethnic minority	12.50**	11.83**
	(2.89)	(2.90)
Percent of the county population in poverty	2.04	2.71
	(1.62)	(1.55)
Per capita income in county (in $100s)	-0.23	-0.18
	(0.13)	(0.13)
Adjusted R-squared	0.9666	0.9706

Notes: * indicates p-value<0.05 for a particular coefficient; ** indicates p-value<0.01. Hospital fixed effects, year fixed effects, and state-five year fixed effects are included in both the average-effect and state-specific-effects model specifications but excluded from the tables presented above. Coefficient estimates are rounded.

Table 4.4. Estimates of State-Specific Effects of Section 1115 Expansions on FTE Hospital Employment

State name	Estimate of the total state-specific effect of Section 1115 expansion on FTE hospital employment	Lower bound of 95% confidence interval around estimate	Upper bound of 95% confidence interval around estimate
Tennessee	-66.90	-212.63	78.83
Iowa	-48.78*	-83.91	-13.65
New Jersey	-43.74	-240.82	153.34
Indiana	-20.71	-89.71	48.29
Illinois	4.63	-21.95	31.22
Michigan	52.86	-56.14	161.85
Utah	55.58	-145.24	256.39
Maine	85.86	-5.76	177.48
New York	101.08	-10.61	212.78
California	101.81	-0.93	204.56
Maryland	118.45	-23.89	260.80
Arizona	121.7	-44.94	288.35
Massachusetts	175.25	-30.94	381.43

Note: For a given state, the total state-specific effect of Section 1115 expansion is calculated as the sum of the coefficient estimate on the expansion indicator and the coefficient estimate on the interaction between an indicator variable for that state and the expansion indicator.

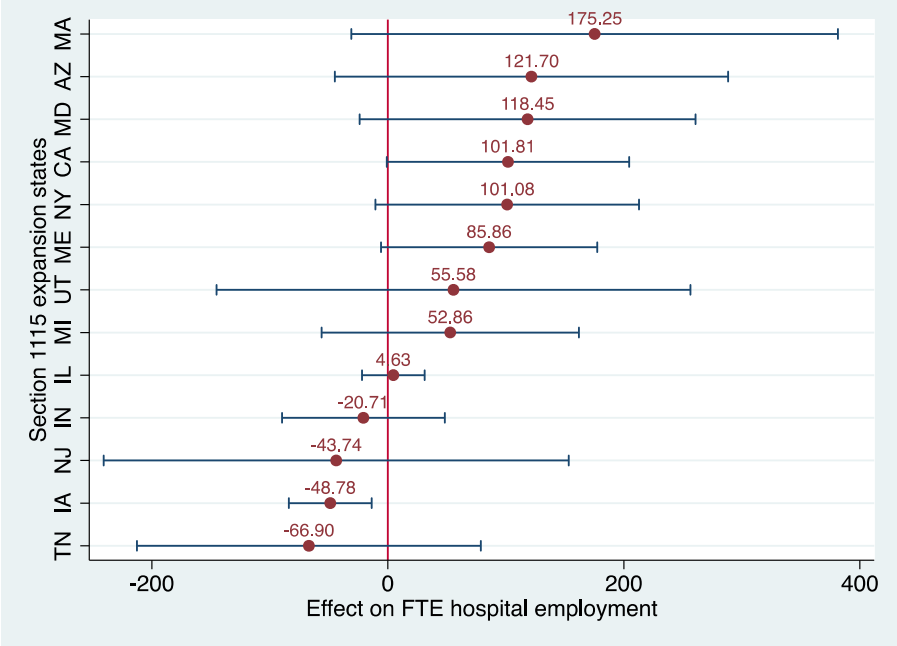

Figure 4.3. State-specific effects of Section 1115 expansions on FTE hospital employment.

Note: An F-test on the state-specific expansion coefficients rejects the null hypothesis that these coefficients are jointly equal to zero.

Discussion

The estimates from the average-effect and state-specific effect model specifications provide no support for the hypothesis that Section 1115 expansions increase FTE employment at the hospital level. This result is consistent with Cozad's (2012) finding of no effect of Massachusetts's 2007 reforms on hospital employment in that state.

Section 1115 expansions could have had no positive effect on FTE hospital employment in all states for two reasons. First, as Table 4.1 shows, several state expansion programs such as those in Maine, Maryland, and Michigan had enrollments representing less than 10% of total state Medicaid enrollment. These expansion enrollments could have been too small to produce increases in hospital care use or decreases in uncompensated care provision and, therefore, too small to produce effects on hospital employment. That being said, there was no effect of Section 1115 expansion on hospital employment in Arizona, New York, and Massachusetts, states with larger coverage expansions.

Second, because Section 1115 expansions must be budget neutral to be approved by the federal government, the Section 1115 waiver–based expansions in this study generally included cost-containment mechanisms such as enrolling Medicaid beneficiaries into managed care, benefit reductions and cost-sharing for expansion populations, and enrollment caps on expansion programs (Government Accountability Office, 2013). By constraining Medicaid spending, Section 1115 demonstrations could have also constrained FTE hospital employment growth.

Limitations

This analysis has several limitations. Section 1115 coverage expansions, like other state-based policy changes, are subject to selection bias. At the state level, developing and

implementing Section 1115 waiver–based health insurance coverage expansions require both expertise in Medicaid policy development and implementation and political will.

Second, enrollments in the Section 1115 expansions included in this study were much smaller than enrollments in the ACA's Medicaid expansion. For example, Michigan's Adult Benefits Waiver expansion program had nearly 78,000 enrollees in June 2011 while Michigan's ACA Medicaid expansion program enrolled approximately 322,000 individuals in the first 100 days of that program's launch (Kaiser Commission on Medicaid and the Uninsured, 2014; Michigan.gov, 2014). The ACA's Medicaid expansion also differs from Section 1115 expansions because the former expansion is not budget neutral and is part of a larger set of comprehensive reforms to health insurance coverage and healthcare delivery. Therefore, some caution should be exercised in extrapolating this study's results to the ACA's Medicaid expansion.

Implications for the Affordable Care Act

Although the Section 1115 expansions are smaller in magnitude than the ACA's Medicaid expansion, this study's findings suggest that there could be few gains in hospital employment from the ACA's Medicaid expansion. The statistically insignificant effects of Section 1115 expansions on FTE hospital employment indicate that health insurance expansion does not necessarily translate into hospital employment growth. As described previously, one possible explanation for this study's findings was that Section 1115 expansions' potential employment-increasing effects were offset by cost-containment measures implemented in tandem with these expansions. As in Section 1115 expansions, there are various healthcare delivery and payment changes included in the ACA that could limit new spending on hospital care over the long term, such as accountable care organizations, bundled payments, value-based purchasing in Medicare, and Medicare

payment reductions and bonuses to hospitals based on rates of hospital readmissions and hospital-acquired infections (Kaiser Family Foundation, 2013). Hospitals also face the prospect of ACA's cuts to Medicaid Disproportionate Share Hospital funding, though Congress has delayed these reductions (Burak, 2013). (Medicare Disproportionate Share Hospital funding cuts have already been implemented.)

This study's failure to find an association between pre-ACA coverage expansions and hospital employment growth does not, of course, negate other non-employment economic arguments in favor of Medicaid expansion. Medicaid shields low-income individuals from financial risks associated with unaffordable medical expenditures and enables low-income persons to access crucial medical services. It can also stimulate consumer spending among previously uninsured individuals and benefit state budgets by reducing state and local spending on care for the uninsured (Gruber & Yelowitz, 1999; Baicker et al., 2013; Angeles, 2012). In short, even if Medicaid expansion does not produce a substantial boost in employment, there are other compelling rationales to extend coverage to low-income Americans.

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CHAPTER 5: CONCLUSION

Summary of Findings

This dissertation examines the effects of Section 1115 expansions on health insurance coverage and healthcare employment to gain insights into the longer-term effects of the ACA's Medicaid expansion. This dissertation's first study tests whether Section 1115 expansions affected health insurance coverage for pre-expansion eligible children and parents. I use IPUMS CPS ASEC data from 2001 to 2011 to describe an individual's health insurance status, individual characteristics, and family characteristics; information from the CMS Web site and other sources to determine the timing of Section 1115 expansions; and information from the Kaiser Commission on Medicaid and the Uninsured's 50-state Medicaid and CHIP survey to describe Medicaid and CHIP program characteristics. I employ multinomial probit models to assess how Section 1115 expansions change the probabilities of Medicaid or CHIP coverage, private coverage, or uninsurance.

For pre-expansion eligible children, Section 1115 expansions were associated with a 1.4 percentage point increase in the probability of enrollment in Medicaid or CHIP coverage. For pre-expansion eligible parents, Section 1115 expansions were associated with a 6.5 percentage point increase in the probability of Medicaid coverage. For pre-expansion eligible children, Section 1115 expansions were associated with 1.4 percentage point decline in uninsurance, but for pre-expansion eligible parents, there was no statistically significant association between Section 1115 expansions and the probability of having no coverage. For pre-expansion eligible children, Section 1115 expansions were not associated with the

probability of enrollment in private insurance and Section 1115 expansions were associated with a 4.3 percentage point decline in the probability of private coverage enrollment for pre-expansion eligible parents.

My second analysis evaluates the effects of Section 1115 expansions on healthcare and social assistance employment between 2000 and 2010 at the county level. This analysis uses County Business Patterns to describe county-level healthcare and social assistance employment; information from CMS and other data sources to describe Section 1115 expansion timing; and data from the County Intercensal Estimates, Small Area Income and Poverty Estimates, and the Local Area Personal Income estimates to describe county characteristics. The analysis, which uses ordinary least squares models with county and year fixed effects, finds that Section 1115 expansions were associated with a 372-person increase, on average, in the number of people employed in health care and social assistance at the county level. Estimates from a regression model in which Section 1115 expansion effects vary by state indicate Section 1115 expansions were associated with increases in county-level healthcare and social assistance employment in Massachusetts, New York, and New Jersey. I also examine the effects of Section 1115 expansions on county-level ambulatory healthcare services employment. This sensitivity analysis finds that, on average, Section 1115 expansions were associated with a 195-person increase in the number of people employed in ambulatory healthcare services in a county. However, at the state level, Section 1115 expansions were positively and statistically significantly associated with county-level ambulatory healthcare services employment only for New Jersey.

My third study assesses the effect of Section 1115 expansions on FTE hospital employment. I use American Hospital Association annual survey data from 2000 to 2010 to

describe FTE hospital employment and hospital characteristics, information from CMS on Section 1115 expansion timing, and data from several federal data sources to describe the characteristics of the county in which each hospital is located. This analysis uses ordinary least squares models with hospital and year effects. Study findings indicate that there were no statistically significant positive associations between Section 1115 expansions and FTE hospital employment.

Limitations

These studies have four main limitations. First, Section 1115 expansions were not randomly assigned to states. Because obtaining a Section 1115 waiver requires sustained negotiation with the federal government, states must have both the administrative expertise and political will to pursue these waivers. Because state decisions to implement Section 1115 expansions are non-random, study results potentially could be biased in two ways. First, high rates of uninsurance at the state level could spur policymakers to expand health insurance coverage. However, research on states' decision-making about the ACA's Medicaid expansion suggests that expansion decisions depend on other factors such as party control of government, state administrative capacity, and past state policy on coverage for low-income people (Jacobs & Callaghan, 2013). Second, if state policymakers view coverage expansion as an opportunity for economic growth, it is possible that state-level healthcare employment counts could influence the probability that a state pursues coverage expansion. However, an analysis presented in the second study finds little evidence that state-level healthcare and social assistance employment counts were associated with the probability of Section 1115 expansion after controlling for state and year factors.

Two of the three studies included in this dissertation also had notable data limitations. The CPS ASEC, used in the first study, does not provide information on family assets or

monthly incomes, introducing imprecision into this study's imputation of pre-expansion eligibility for parents and children. Furthermore, the CPS ASEC understates Medicaid coverage rates, though there is no evidence that this tendency varies systematically across states and years (Sonier, Boudreaux, & Blewett, 2013).

Moreover, the County Business Patterns data set, the second study's key data set, does not contain county-level employment data for all U.S. counties in all study years. Rather, the U.S. Census Bureau suppresses employment counts that could potentially identify specific individuals or firms (Evans, Zayatz, & Slanta, 1998). This data suppression appears to be related to county population size; Census Bureau decisions to suppress county-level employment data should not be related to Section 1115 expansion status. Nonetheless, because observations from counties with an average population size of 12,000 people, study findings might not be generalizable to counties with small populations.

Third, omitted variables are a limitation in each of the three dissertation studies. For example, local, state, and national healthcare workforce policies are omitted from regression models for the second and third studies. These policies likely affect healthcare workforce employment and could be correlated with Section 1115 expansion status. Fixed effects in the models for these studies control for policies that do not change during the study period and for policies that affect all counties or hospitals similarly. However, fixed effects cannot control for policies that vary over time or affect different counties or hospitals differently.

Finally, it should be emphasized that Section 1115 expansions—which I study to gain insights into the effects of the ACA's Medicaid expansion—generally had smaller enrollments than the ACA's Medicaid expansion and usually (except in the case of Massachusetts) were not accompanied by extensive changes to health insurance markets.

Furthermore, Section 1115 expansions were budget-neutral while the ACA's Medicaid expansion is not. As a result, effects of Section 1115 expansions are likely to be smaller in magnitude than the ACA's effects.

Policy Implications

Although Section 1115 expansions were smaller than the ACA's Medicaid expansion, Section 1115 expansions can indicate the direction of the potential effects of ACA's Medicaid expansion. The first dissertation study indicates that Section 1115 expansions were associated with statistically significant increases in the probability of public coverage for both pre-expansion eligible parents and children and with decreases in the probability of uninsurance for children. This suggests that even though the ACA's Medicaid expansion is targeted toward low-income adults, it could increase children's enrollment into public coverage. In addition, the finding of a negative association between Section 1115 expansions and the probability of private coverage for pre-expansion eligible parents indicates that some pre-expansion eligible parents likely will switch from private coverage to Medicaid coverage as a result of the ACA. Although an individual who substitutes private coverage for public coverage represents an additional cost to the Medicaid program, switching from private coverage to public coverage could financially benefit that individual.

Discussions of "woodwork enrollment" due to the ACA's coverage expansion tend to focus on individuals who are uninsured but public coverage eligible under pre-ACA rules (see, for example, Sommers & Epstein, 2011). Because coverage expansion is associated with changes in private coverage for pre-expansion eligible parents, future studies of the ACA should explore not only enrollment in public coverage among pre-expansion eligible individuals but also the crowd-out of private coverage in this population.

The second and third studies in this dissertation assess the effect of Section 1115 expansions on healthcare workforce employment—at the county level and in hospitals, respectively—but have different results. The second study finds that Section 1115 expansions were associated with increases in county-level healthcare and social assistance employment—notably, in states with relatively larger expansions. The third dissertation study finds that Section 1115 expansions were not associated with changes in full-time equivalent (FTE) hospital employment. Applying study findings to the ACA's Medicaid expansion suggests that although overall employment in the healthcare industry could grow in response to the ACA's Medicaid expansion, any changes to employment at the hospital level could be much more modest.

A possible explanation for the discrepancies in the findings of these two studies is that hospital employment represents only one part of healthcare and social assistance employment. Although hospital employment may not respond to Medicaid expansions, healthcare employment in non-hospital settings could still be affected by such expansions. In fact, the sensitivity analysis from this dissertation's second study suggests that across all states with changes in Section 1115 expansion status during the study period, Section 1115 expansions were associated with increases in county-level ambulatory healthcare services employment.

Hospital employment and non-hospital employment could change at different rates after a coverage expansion if post-expansion increases in usage rates differ for hospital care and non-hospital care. In fact, findings from the Oregon Health Insurance Experiment indicated that compared to having no insurance coverage, Medicaid coverage was associated

with a 1.08 increase in the number of outpatient physician visits and 0.021 increase in the number of hospital admissions (Finkelstein et al., 2012).

Future Research

The findings from this dissertation suggest opportunities to further explore the ACA's effects on health insurance coverage among pre-expansion eligible individuals and on healthcare workforce issues.

First, it eventually will be possible to evaluate the effects of the ACA's Medicaid expansion on coverage for individuals who were eligible for either Medicaid or CHIP under pre-ACA rules. Although the ACA's creation of private health insurance marketplaces should affect coverage for pre-expansion eligible populations in both states that have accepted the ACA's Medicaid and in states that have not, such effects could be larger in states accepting the ACA's Medicaid expansion.

In addition, there are opportunities for examining the effects of the ACA's Medicaid expansion on the U.S. healthcare workforce. When County Business Patterns data from 2014 become available, it will be possible to assess the early effects of the ACA's Medicaid expansion on county-level healthcare and social assistance employment counts. Because CMS has released state-level Medicaid and CHIP enrollment counts, it may be possible to directly examine how changes in Medicaid and CHIP enrollment through the ACA affect healthcare employment (Centers for Medicare and Medicaid Services, n.d.).

This dissertation's analysis of the effects of Section 1115 expansions on FTE hospital employment could be adapted to compare FTE hospital employment changes at hospitals in ACA Medicaid expansion states to FTE employment changes at hospitals in non-expansion states.

This dissertation does not address the effects of Medicaid expansions on healthcare employment by occupation. Understanding how Medicaid expansions affect different healthcare occupations is useful for guiding federal and state policies related to healthcare workforce training. Therefore, a future study could examine how the ACA's Medicaid expansion has affected employment growth for both clinicians and non-clinicians working in the healthcare sector.

In sum, the analyses conducted in this dissertation provide a path forward for examining the effects of the ACA's Medicaid expansion on health insurance and on the U.S. healthcare workforce.

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APPENDIX. SECTION 1115 EXPANSIONS

Table A: Description of Section 1115 Expansions

State name	Year expansion began	Name of expansion program	Population covered and relevant income eligibility limits	Additional description	Full or limited Medicaid benefits for expansion groups?	Enrollment or spending cap?
Arizona	Phase I: 2001 Phase II: 2002	AHCCCS Care (Childless Adults)/ Proposition 204	**Parents:** 200% FPL **Childless adults:** 100% FPL	In Phase I, the waiver program expanded coverage to childless adults in households with incomes below 100% FPL. In Phase II, the program expanded coverage to parents below 200% FPL with Medicaid- or CHIP-enrolled children. For childless adults enrolling in coverage, there was no asset test, and eligibility could be renewed on an annual basis. Arizona closed enrollment in coverage for childless adults under this program in July 2011.	Full	Yes, in 2011
California	2007	Health Care Coverage Initiative/ California Bridge to Reform	**Parents:** 200% FPL **Childless adults:** 200% FPL (though counties could set own thresholds)	The Health Care Coverage Initiative provided coverage to low-income, non-pregnant, non-elderly uninsured adults in 10 California counties. Participating counties had the authority to set benefits, income thresholds, and cap enrollment in county-administered health insurance coverage. In 2010, California's Section 1115 waiver was renewed as the Bridge to Reform, which provided additional California counties with the opportunity to expand coverage to up a total of 500,000 individuals.	Limited	Yes

Delaware	1996	Diamond State Health Plan	**Parents:** 100% FPL **Childless adults**: 100% FPL	This program moved almost all Medicaid enrollees into managed care in order to expand coverage to adults at or below 100% FPL.	Full	No
Hawaii	1994	QUEST Expanded	**Parents:** 133% FPL **Childless adults:** 133% FPL	This program moved Medicaid enrollees into managed care in order to expand coverage to low-income parents and childless adults. Childless adults and parents at or below 100% FPL were eligible for QUEST, Hawaii's Medicaid managed care program. Adults with incomes below 133% FPL who were not eligible for Medicaid could receive limited benefits.	Full for individuals at or below 100% FPL; limited otherwise	Yes, in 2003
Illinois	2002; expansion expired in 2007	Illinois KidCare Parent	**Parents:** 185% FPL	Parents who enrolled in this expansion could either receive public coverage or premium assistance. The program also included the possibility of premium assistance for children in families with incomes between 133% FPL and 200% FPL.	Full	No
Indiana	2008	Healthy Indiana Plan	**Parents:** 200% FPL **Childless adults:** 200% FPL	The Healthy Indiana Plan provided a high-deductible health insurance with a health savings account to non-elderly adults with incomes below 200% FPL who were not eligible for employer-sponsored coverage or other public coverage. Adults had to have been uninsured for more than 6 months to qualify.	Limited	Yes, for childless adults

Iowa	2005	IowaCare	**Parents:** 200% FPL **Childless adults:** 200% FPL	IowaCare provided limited coverage to non-elderly adults below 200% FPL who were not eligible for employer-sponsored coverage or other public coverage. The IowaCare network was limited to a small set of providers.	Limited	Yes, in 2013
Maine	2002	Maine Childless Adults	**Childless adults:** 100% FPL	Maine provided coverage to childless adults up to 100% FPL. Maine reduced benefits in 2004 and 2005 due to state budget issues.	Limited	Yes, capped at 20,000 enrollees
Maryland	2007	Maryland HealthChoice - Primary Adult Care (PAC) program	**Childless adults:** 116% FPL	The PAC program provided a limited set of Medicaid managed care benefits to low-income childless adults who were not otherwise Medicare- or Medicaid-eligible. The program was an addition to the Maryland HealthChoice waiver, which allowed Maryland to implement managed care in Medicaid in 1997.	Limited	No
Mass-achusetts	Waiver amendment approved in 2006; health reform provisions were fully implement-ed by 2007	MassHealth	**Parents:** Up to 300% FPL for subsidized coverage (for parents who do not qualify for Medicaid) **Childless adults:** Up to 300% FPL for subsidized coverage **Children:** Up to 300% FPL	Massachusetts amended and expanded its Section 1115 waiver, first implemented in 1997, multiple times. In 1997, Massachusetts moved Medicaid enrollees into managed care and used the savings to expand Medicaid coverage to additional populations. In summer 2006, CMS approved a waiver amendment to redirect funds from the state's Uncompensated Care Pool to help fund subsidized health insurance coverage to individuals with incomes below 300% FPL.	Limited	No

Michigan	2004	Michigan Medicaid Nonpregnant Childless Adults (Adult Benefits Waiver)	**Childless adults:** 35% FPL	This program provided limited coverage to non-elderly, non-pregnant childless adults through county-administered health insurance.	Limited; initially more generous but later reduced	Yes
Minnesota	Amendment to expand parental/ caretaker relative coverage approved in 1999	Prepaid Medical Assistance Project Plus (PMAP+)	**Parents:** Up to 275% FPL **Childless adults:** Coverage not extended to childless adults until 2011.	The PMAP+ program, initially implemented in 1995, enrolled the state's Medicaid population in managed care and initially expanded Medicaid coverage to children and pregnant women who were previously covered under a state-funded expansion program. A waiver amendment expanded coverage for parents and caretaker relatives.	Full for parents below 215% FPL; limited for parents above 215% FPL and childless adults	No
New Jersey	2001	New Jersey Family Coverage through SCHIP	**Parents**: 200% FPL **Childless adults:** Waiver-based coverage not extended to childless adults until 2011.	This program allowed New Jersey to cover parents of children enrolled in Medicaid or SCHIP. The waiver population also included children with family incomes up to 185% FPL and otherwise-uninsured pregnant women with family incomes between 185% FPL and 200% FPL.	Full	Yes
New York	2001	Partnership Plan - Family Health Plus	**Parents:** 150% FPL **Childless adults:** 100% FPL	The Partnership Plan demonstration allowed New York to move Medicaid enrollees into managed care in order expand coverage.	Limited, but comparable to full benefit	No

Oregon	1994	Oregon Health Plan/ Oregon Health Plan 2	**Parents: 100% Childless adults:** 100% FPL	The Oregon Health Plan (OHP) provided limited benefits to eligible low-income adults based on a ranked set of medical services. Changes to the Oregon Health Plan in 2003 resulted in mass disenrollment in that year. From January 2003 to December 2003, enrollment in OHP dropped from 104,000 to 49,000.	Limited	Yes, enrollment was capped in June 2004 but was briefly reopened in 2008.
Tennessee	1994; discontinued in 2005	TennCare/ TennCare II	Originally no income eligibility limit for uninsured individuals; income eligibility limits were imposed later	The TennCare waiver moved Tennessee's Medicaid population into managed care and expanded coverage to uninsured and medically uninsurable Tennesseans.	Full	Yes.
Utah	2002	Utah Primary Care Network	**Parents:** 150% FPL **Childless adults:** 150% FPL	The Primary Care Network Program provided adults with coverage for primary care services. Demonstration enrollees also had the option of receiving premium assistance to pay for employer-sponsored health insurance coverage.	Limited	Yes, capped at 25,000 enrollees
Vermont	1996	Vermont Health Access Plan (VHAP)	**Parents:** 185% FPL **Childless adults:** 150% FPL	VHAP eligibility was initially restricted to parents up to 150% FPL; eligibility was increased up to 185% FPL in 1999.	Limited for childless adults; full for parents	Yes
Wisconsin	1999	BadgerCare	**Parents:** 185% FPL **Childless adults:** Not until 2009	The waiver allowed Wisconsin to enroll higher-income parents in Medicaid. BadgerCare also covered low-income children.	Full for parents; limited for childless adults	Yes

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