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The Impact of the Affordable Care Act's Medicaid Expansion on Medicaid Spending by Health Care Service Category

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Abstract

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Keywords: Affordable Care Act; Medicaid expansion; non-elderly adults; expenditures
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1 Introduction

The 2010 Patient Protection and Affordable Care Act (“ObamaCare”; hereafter, ACA) fundamentally reformed Medicaid, a health care program for individuals with limited income. The ACA is a complex piece of legislation with multiple provisions; this paper focuses on the 2014 Medicaid expansion¹. This provision established a uniform minimum income eligibility threshold up to 138 percent of the federal poverty level (FPL)² for nearly all individuals under age 65 in states participating in the expansion. If all states implement the Medicaid expansion, an estimated additional 21.3 million people could enroll into Medicaid by 2022. However, not all states have elected to participate and the effects of expanding Medicaid coverage to low-income, non-elderly (ages 19-64) adults are unclear. Intense political debate is ongoing on the future of the ACA.

In this paper I seek to identify the short-term (i.e., the first three years post-expansion) effect the 2014 Medicaid expansion had on Medicaid spending³. To my knowledge, I am the first to use comprehensive data provided by the Centers for Medicare and Medicaid Services (CMS) on all Medicaid expenditures over time to study the 2014 Medicaid expansion. These data provide a complete census of government expenditures reported for every health care service utilized by all Medicaid beneficiaries in every state. The robust data allow me to assess which services experienced the greatest change in government spending associated with the health reform.

A series of recent papers most relevant to my research focus on the impact of the 2014 Medicaid expansion on *health care utilization* for individual service categories⁴. The ex-

¹Key components of the ACA that impact individuals include the dependent-coverage provision, the individual mandate, health insurance exchanges, and the 2014 Medicaid expansion – the focus of this paper. Published research by Courtemanche et al. (2017b), Frean et al. (2016), and several other recent studies showed that the ACA led to gains in insurance coverage. For the dependent-coverage provision, see Anderson et al. (2012), Antwi et al. (2013), Cantor et al. (2012), Kowalski (2014), and Sommers & Kronick (2012).

²The ACA states Medicaid eligibility to be <133% FPL, however, eligibility is effectively up to 138% FPL after applying the Modified Adjusted Gross Income (MAGI) 5% income disregard.

³Medicaid spending refers to total state and federal government expenditures.

⁴Antonisse et al. (2017) provide a summary of 153 studies on the impact of the 2014 Medicaid expansion on the following outcomes: insurance coverage; access to care, utilization, affordability, and health outcomes; and economic outcomes (i.e., state budgets and economies, payor mix, employment and the labor market).

pansion was found to be associated with increased inpatient hospitalizations (Wherry & Miller 2016) and prescriptions (Ghosh et al. 2017, Wen et al. 2016). Previous studies found no significant overall impact on dental visits (Nasseh & Vujicic 2016, Simon et al. 2017)⁵, emergency room visits (Pines et al. 2016, Wherry & Miller 2016), and the number of health center patients (Cole et al. 2017). The results were mixed for the impact of the expansion on physician visits. Courtemanche et al. (2017a) found no statistically significant effect of the expansion on the probability of having a primary care visit; however, Wherry & Miller (2016) found an increase in general practice physician visits.

Also applicable to my research is the impact of the expansion on the *payor-mix*. Although previous studies found no effect on the number of emergency room visits or health center patients, a significant increase in Medicaid-paid visits (i.e., as opposed to private insurance or uninsured patients) was reported (Cole et al. 2017, Pines et al. 2016, Shin et al. 2015). Additional studies found decreases in uncompensated inpatient hospitalizations suggesting a post-expansion change in the payor-mix (Dranove et al. 2016, Nikpay et al. 2016, Freedman et al. 2017).

This paper makes three contributions that go beyond the previous literature on the 2014 Medicaid expansion. First, I assess a *new outcome*, *Medicaid spending by the government*, which is used to understand the fiscal impact of the expansion. I accomplish this by analyzing data on the universe of all Medicaid expenditures, including the first three years after the expansion became effective. Including data from 2014-2016 is important for analyzing the fiscal impact of the expansion because the federal government will finance 100 percent of expenditures incurred by the newly eligible adults during the first three years post-expansion. Therefore, states will have no financial responsibility for Medicaid expenditures during this period; states' share of the expenditures will increase to 10 percent by 2020.

Second, using data on expenditures for *all health care services*, I make a complete as-

Refer to Appendix Table A1 for the most relevant previous studies, which focus on the impact on health care utilization and the payor mix.

⁵Singhal et al. (2017) found significant heterogeneous effects for dental visits between childless adults and parents.

assessment on the cost of health care utilization. I am able to identify which services had a significant increase in Medicaid spending and those that did not. I provide explanations to support my results based on the ACA and State Medicaid Plan amendments which can be used to complement previous studies on utilization.

Third, I provide an *independent evaluation* from policy groups or the federal government using data from CMS on the short-term costs of the 2014 Medicaid expansion. In comparison to many of the previous studies on the expansion, the CMS data source does not rely on self-reported data that are subject to selection and recall bias.

I apply a difference-in-differences (DD) design to compare average Medicaid spending by health care service category for states participating in the expansion to states not participating. The DD method addresses the concerns that prior to the expansion, Medicaid spending was increasing over time for most services and there was variation across the states and years in the pre-expansion eligibility criteria for Medicaid and services covered for Medicaid enrollees. To obtain evidence on the sensitivity of my findings, I examine the effect for different sets of treatment groups based on the policy implementation effective date and prior expansion status.

The main result is that the expansion increased total Medicaid spending by 14 percent in participating states, but this masks the substantive heterogeneity in Medicaid spending across the 21 service categories. Most notably, dental and rural health clinic services increased by 201 and 99 percent, respectively. My results show that the expansion is having a disproportionately significant increase in Medicaid spending for clinic services in rural areas compared to urban areas. To clarify, no statistically significant increase was observed for Medicaid spending at health clinics (exclusive of rural clinics) or federally-qualified health centers. In addition, Medicaid spending on case management services increased by 139 percent; this result is expected due to the surge in enrollment of newly eligibles. States should consider new modes of communication, text messages or email as opposed to in-person or telephone calls, to assist the newly eligible in gaining access to needed medical and related

services.

Overall, the new adult group has increased expenditures associated with services for routine or preventive care. These findings suggest that low-income, non-elderly adults made eligible for Medicaid may be healthier than groups covered previously by Medicaid (e.g., pregnant women, children, the disabled, and the elderly). The fiscal impact of the expansion by service category provides helpful indicators for states still deciding if they will elect or continue to participate in the expansion and provide expectations for which services will have the greatest impact on government budgets.

2 Background and Theoretical Framework

Medicaid was created in 1965 to help states provide medical services to individuals with limited incomes and resources. Under the program, the federal government provides matching funds to states to enable them to provide medical services to individuals who meet the eligibility criteria. Eligibility for Medicaid benefits varies widely among the states; all states must meet federal minimum requirements. States have the option to modify their State Medicaid Plan by expanding eligibility to individuals who are not otherwise Medicaid eligible; providing services not typically covered by Medicaid; or using innovative service delivery systems that improve care, increase efficiency, and reduce costs⁶.

2.1 Pre-ACA National-Level Medicaid Reforms

Appendix Table A2 summarizes the Medicaid reforms that occurred during the study period. The pre-ACA reforms primarily focused on offering Medicaid to disabled persons, uninsured women, immigrant children, and pregnant women. Early research on Medicaid expansions studied the impact on select target groups such as pregnant women (Currie & Gruber 1996b, Dubay et al. 2001, Kutinova & Conway 2008) and children (Currie &

⁶<https://www.medicaid.gov/medicaid-chip-program-information/by-topics/waivers/1115/section-1115-demonstrations.html>. Accessed on June 21, 2016.

Gruber 1996a, Dafny & Gruber 2005). Other reforms modified the amount of state and federal cost-sharing for select services. No Medicaid reforms were enacted after the ACA⁷. In addition, some states used Section 1115 demonstrations of the Social Security Act to offer Medicaid coverage to low-income, non-elderly adults without children, although very few to the extent of ACA (see Table 1). In conclusion, prior research on pre-ACA, national-level Medicaid reforms focused on different target groups and cannot be used to assess the potential impact of the 2014 Medicaid expansion for low-income, non-elderly adults.

2.2 Pre-ACA State-Specific Health Reforms

Limited inferences on the impact of Medicaid expansions for low-income, non-elderly adults on Medicaid spending by service category can be drawn from the 2006 Massachusetts health care reform law⁸ and the 2008 Oregon Health Insurance Experiment⁹. The Medicaid expansion component of these health care reforms had similar income thresholds for eligibility for non-elderly adults to that of the ACA.

Due to data constraints, prior publications on the Massachusetts and Oregon health reforms could not provide a comprehensive assessment of *government expenditures* associated with Medicaid expansions¹⁰. Studies on the economic impact of prior health reforms typically relied upon the enrollee’s *self-reported affordability* of health care services.

In addition, there is no consensus from the literature on the short-term impact health reform had on *health care utilization* for low-income, non-elderly adults. The impact on *hospitalizations* is unclear; no significant impact was found in Massachusetts (Long et al.

⁷For the post-expansion period included in this analysis.

⁸In 2006, Massachusetts passed a comprehensive health reform titled, “An Act Providing Access to Affordable, Quality, Accountable Health Care” that included both an expansion of its Medicaid program to adults up to 100% FPL. It also introduced a new program which provided free (for individuals up to 150% FPL) and three tiers of subsidized coverage up to 300% FPL (McDonough et al. 2006).

⁹In 2008, using a lottery, the state of Oregon expanded Medicaid under the name “Oregon Health Plan Standard” to a limited number of adults aged 19-64. Eligibility criteria included having an income below 100% FPL and assets of \$2,000 or less, and having been uninsured for the previous 6 months or longer (Oregon Health Policy Research 2009).

¹⁰Baicker et al. (2013) and Finkelstein et al. (2012) estimate annual health care spending for select services; Kolstad & Kowalski (2012) estimated hospital costs.

2012, Kolstad & Kowalski 2012) or Oregon (Baicker et al. 2013), yet Finkelstein et al. (2012) found that insurance coverage through Medicaid is associated with an increase in the probability of any hospital admission of approximately 30% in Oregon¹¹. Long & Masi (2008) found a non-significant impact on *prescription drug use* in Massachusetts, but an increase was reported in Oregon (Baicker et al. 2013, Finkelstein et al. 2012). In Massachusetts, Kolstad & Kowalski (2012) found minimal impact on *preventive care* visits, however, Finkelstein et al. (2012) showed an increase and Baicker et al. (2013) found mixed results in Oregon.

2.3 ACA 2014 Medicaid Expansion

The ACA 2014 Medicaid expansion fundamentally reformed Medicaid by establishing eligibility for non-elderly adults, and also by putting in place a uniform, national minimum income eligibility threshold of 138% FPL, which was \$16,105 for a single person and \$32,913 for a family of four in 2014¹², for nearly all individuals under age 65. The goal of these changes was to establish Medicaid as the coverage pathway for low-income people in the ACA's broader system for covering the uninsured. This provision allows for childless adults who meet the low-income criteria to be eligible for Medicaid for the first time under the traditional Medicaid program¹³. Enrollment for the newly eligible adults into Medicaid is not automatic; although the process has been simplified (e.g., national income threshold, no asset tests) and streamlined compared to the past.

Total net expenditures for Medicaid exceeded \$1.5 trillion during the first three years after the expansion. Beginning in 2014, coverage for the newly eligible adults was fully funded by the federal government for three years. It phases down to 90% by 2020. Refer to Appendix Table A2 for additional information on federal and state cost sharing.

¹¹Using hospital discharge administrative data (Finkelstein et al. 2012) found that, insurance [through OHP Standard (i.e., Medicaid)] is associated with an increase in the probability of any hospital admission of 2.1 percentage points (std. err. = 0.7), or about 30%. The increase in hospital admissions appears to be disproportionately concentrated in the approximately 35% of admissions that do not originate in the ER.

¹²<http://khn.org/news/hhs-releases-poverty-guidelines-for-2014/>. Accessed on December 3, 2016.

¹³The Section 1115 demonstration authority allowed states to make similar provisions to their state Medicaid plans in the past.

Although the Medicaid reform was intended to be a national mandate, the US Supreme Court ruling on the ACA on June 28, 2012 made state participation in the expansion optional. There is no deadline for a state to make a decision to participate. By August 2016, 31 states adopted the Medicaid expansion (see Figure 1 and Table 1). Eighteen of the participating states made coverage effective under the Medicaid expansion on January 1, 2014.

Multiple states participating in the expansion have realized budget savings, revenue gains, and overall economic growth during the first few years after the expansion became effective (Bachrach et al. 2016). Proponents of the Medicaid expansion hope that an increase in the utilization of health services will lead to more appropriate care, better health outcomes, and a reduction in medical emergencies, ultimately lowering costs over time (Miller 2012).

Even though the federal government will pay for 100% of the costs associated with the Medicaid expansion for the first three years, 20 states elected not to participate during the first three years after the expansion. The small financial percentage representing the state share of costs during 2017-2020 may represent a large actual dollar amount, enough for states not to adopt the expansion. In addition, Roy (2012) suggests that states have a financial incentive to opt out of the Medicaid expansion because there is uncertainty with the federal match rate for expenditures associated with the expansion after year 2020. Cantor et al. (2013) and Al-Ississ & Miller (2013) suggest state politics and ongoing fiscal stress related to funding needed for education, pensions, and other key programs as being a concern.

A final concern relates to economies of scale due. There may not be a sufficient number of providers in traditionally low-income, medically underserved areas. Some providers may not be willing to accept new patients that have Medicaid because there are lower provider reimbursement rates compared to patients with private insurance. In addition, the previously enrolled into Medicaid may experience longer wait times to schedule an appointment if their existing providers accept new Medicaid patients after the expansion. Last, some providers may reduce the time they spend with patients to accommodate an increased demand for services from the newly enrolled.

2.4 Theoretical Framework

In today’s context, moral hazard refers to the price sensitivity of demand for health care, conditional on the underlying health status (Cutler & Zeckhauser 2000). Abraham (2014) and Kolstad & Kowalski (2012) explain that insurance coverage through recent health reforms could increase or decrease the intensity and cost of health care, depending on provider capacity and the impact increased demand has on health care delivery.

The seminal and gold standard research on the impact of cost-sharing on health care utilization and spending comes from the RAND Health Insurance Experiment (RAND HIE)¹⁴. Newhouse (1993) presents key results from the RAND HIE: more generous health insurance coverage increases health care utilization; families that received free care made more doctors’ visits annually and had approximately 20% more hospitalizations than those with coinsurance. Aron-Dine et al. (2013) re-examined the RAND HIE and found important results relative to my research. Elasticities for various types of health care services differ; demand for dental and mental health services were more responsive to changes in co-payments than demand for other outpatient care or inpatient care. In addition, inpatient expenditures were generally not responsive to cost-sharing, suggesting that more serious medical episodes may be less price sensitive.

3 Data and Summary Statistics

State level information about the Medicaid program is difficult to find for this time period and is spread across a variety of sources. Data for the outcome, treatment assignment, and covariates come from multiple sources.

¹⁴Conducted between 1974 and 1981, the RAND HIE randomly placed more than 5,800 individuals from 2,750 families in health insurance plans with different levels of cost-sharing ranging from free care to 95 percent coinsurance (Manning et al. 1987).

3.1 Outcomes

The outcome variable, Medicaid spending, is constructed from comprehensive, federal government data that are publicly available in the CMS-64 Financial Management Report for each federal fiscal year (FY) October 1 - September 30, for FYs 1999-2016 (CMS 2016a). A total of 918 state-year observations are included in the analysis, representing all states and the District of Columbia.

3.1.1 Source

The annual CMS-64 Financial Management Reports constitute a census of Medicaid expenditures aggregated at the state by year level for each health care service category (e.g., case management, clinic, dental, etc.). The data originate from each state's accounting of actual recorded expenditures and are not based on estimates. The data are first reported by each Medicaid state agency to CMS on the Quarterly Medicaid Statement of Expenditures, which summarizes Medicaid expenditures that serve as the basis for the amount of Federal Financial Participation (FFP) paid to states to fund the Medicaid program. The amount claimed on the Form CMS-64 is a summary of expenditures derived from source documents such as invoices, cost reports and eligibility records. As part of their submission, states certify that their reported expenditures are actual expenditures allowable under federal requirements. CMS applies data validation checks and resolves data anomalies before finalizing the data in the publicly available, annual CMS-64 Financial Management Reports used for this analysis.

3.1.2 Definitions

The outcomes studied include Medicaid spending on total net expenditures and Medicaid spending by health care service category (N=21) for all Medicaid beneficiaries (i.e., aged, disabled, adults, and children) excluding Children's Health Insurance Program expenditures. Total net expenditures is the sum of expenditures for the current quarter and adjustments

increasing claims for prior quarters; less collections from third party liability, probate, and other; recoveries from fraud, waste, and abuse efforts; recoveries from the OIG compliant False Claims Act; and adjustments decreasing claims for prior quarters due to federal audit, overpayment, permanent changes, and other adjustments. Appendix Table B1 defines the approximately 100 original health care service categories reported on the CMS-64, which I collapsed into 21 health care service category groups used for the analysis. Appendix Table B2 lists the service categories reported on the CMS-64 that were excluded from all analyses.

For all outcomes, I analyzed the “total computable costs” for the “Medical Assistance Program,” which combines the federal and state share of expenditures reported on the annual CMS-64 Financial Management Report. I did not analyze the federal and state share separately because during the first three years of the expansion, the federal match rate is 100% for expenditures incurred by the expansion group. I restricted my analysis to expenditures reported under the “Medical Assistance Program;” to clarify, I excluded all administrative expenditures because they are often not directly related to the Medicaid expansion; they include expenditures reported for peer review organizations, resident review, drug use review, enrollment brokers, school-based administration, etc.

There are a few state-year observations where a health care service category has a zero or negative expenditure reported. A zero can mean multiple things: 1) The state did not report any expenditures for that service category for that year, 2) The state did not have the authority to report expenditures to that service category for that year, or 3) The state had the category available, but actually had zero dollars. A negative expenditure occurs in response to an adjustment in claims from a previous period. Refer to Appendix Table B3 for a summary of positive, zero, and negative expenditures by service category. Appendix Table B4 is used to assess if there is an association with negative or zero expenditures and state participation in the Medicaid expansion. The dependent variable in these regressions was changed from the log of Medicaid spending to an indicator variable equal to one if Medicaid

spending was less than or equal to zero. The indicator variable is equal to zero otherwise. Appendix Table B4 shows that there was no association between states participating in the Medicaid expansion and having a negative or zero expenditure. Therefore, my decision to exclude all expenditures that are less than or equal to zero in all analyses is justified.

3.1.3 Limitations

The CMS-64 Financial Management Reports do not include data on the type of enrollees (i.e., aged, disabled, adults, and children), enrollee categories specific to the expansion (i.e., newly eligible for Medicaid through the expansion versus previously eligible enrollees), or the number of enrollees that contributed to the expenditures. In addition, expenditures for hospitalizations originating in the emergency room cannot be separated from the expenditures reported for the outpatient and inpatient hospitalization service categories. The impact of these data limitations on my study is provided in Section 5.3.

3.2 Treatment Assignment

Information from the Kaiser Family Foundation (2012) and Kaiser Family Foundation (2016) was used for the states' decisions to adopt the Medicaid expansion and their effective date. Figure 1 illustrates the states participating in the expansion and Table 1 lists the states by their Medicaid expansion effective date.

I define treatment states (N=31) as those states that expanded Medicaid by the data cutoff date of September 30, 2016 (i.e., AK, AZ, AR, CA, CO, CT, DE, DC, HI, IL, IN, IA, KY, MD, MA, MI, MN, MT, NH, NJ, NY, ND, NM, NV, OH, OR, PA, RI, VT, WA, and WV) and control states (N=20) as those states that did not expand Medicaid or expanded later than September 30, 2016 (i.e., AL, FL, GA, ID, KS, LA, ME, MS, MO, NE, NC, OK, SC, SD, TN, TX, UT, VA, WI¹⁵, and WY).

¹⁵Wisconsin received federal approval to offer Medicaid to childless adults below 100 percent FPL through the BadgerCare program. However, since Wisconsin did not adopt the ACA Medicaid expansion, it is included as a control state.

The Medicaid expansion became effective on January 1, 2014 for all treatment states with the exception of the following. There were seven early adopter states that expanded Medicaid to low-income, non-elderly adults through a Section 1115 waiver authority or an ACA option that allowed states to receive federal Medicaid matching funds to cover newly eligible adults¹⁶: CA (10/1/2010), CO (5/1/2012), CT (4/1/2010), DC (7/1/2010), MN (8/1/2010), NJ (4/14/2011), and WA (1/3/2011). The early adopter states were limited in terms of eligibility and generosity of insurance benefits to the newly eligible low-income adults compared to the states that adopted the expansion in 2014 or later. Most of the early adopter states still experienced considerable expansion in or after 2014. Therefore, I classified the 25 states that had their expansion start on or before January 1, 2014 have their post-expansion period begin in FY 2014.

Six states had a delayed effective date that are classified as treatment states: AK (9/1/2015), IN (2/1/2015), MI (4/1/2014), MT (1/1/2016), NH (8/15/2014), and PA (1/1/2015). To address the challenge that the expenditure data are provided by fiscal year, October 1 - September 30, I classify the treatment period for the expansion states to start when a participating state has at least six months of data in a FY. For these states, the post-expansion period begins in AK (FY 2016), IN (FY 2015), MI (FY 2014), MT (FY 2016), NH (FY 2015), and PA (FY 2015). One state, Louisiana, had a delayed effective date (7/1/2016) that allowed for only three months of data during FY 2016; therefore, Louisiana is classified as a control state in all analyses.

In addition, there were treatment and control states that offered at least some prior coverage to low-income, non-elderly adults before January 1, 2014. The five states offering the strongest prior coverage to this group were DC, DE, MA, NY, and VT. The definition of strongest prior coverage follows Simon et al. (2017) and Wherry & Miller (2016).

¹⁶States with approved Section 1115 waivers receive the regular federal matching rates for the new expansion enrollees during the 2010-2013 period. The matching rate increased to 2014 Medicaid expansion match rates (i.e., 100% during 2014-2016), after January 1, 2014. States with approved Section 1115 waivers had to provide all benefits listed in the 2014 Medicaid expansion to the new enrollment group starting January 1, 2014.

To summarize, for my main specification I include all 30 expansion states plus the District of Columbia in the treatment group and all 20 non-expansion states in the control group. This approach follows Simon et al. (2017) and Courtemanche et al. (2017b). My results should be interpreted as capturing only the effects of the 2014 Medicaid expansion; this result may be smaller than the total effect that would include early expansions that occurred between 2010-2014. To evaluate the magnitude of the underestimation, I provide sensitivity checks in which I drop the early adopter states, late adopter states, and states that the strongest Medicaid expansions prior to 2014 in Appendix Tables F1, F3, and F2, respectively. The sensitivity checks are described in more detail in Section 7.

3.3 Covariates

I add state-level, time-varying covariates on demographic characteristics, family characteristics, economic factors, and Medicaid bumps to improve precision. Three sources of data were used for the covariates. First, the monthly Current Population Survey (CPS 2016)¹⁷, a survey of non-institutionalized adults, was used to obtain data on all Medicaid enrollees' age, sex, race, citizenship, marital status, number of children in the household, education level, unemployment status¹⁸, and student status. Second, monthly data from the Bureau of Labor Statistics (BLS 2016) state-level unemployment rate was used to calculate the average FY unemployment rate by state.

Third, the ACA authorized states to amend their State Medicaid Plan to offer financial reimbursement “bumps” to encourage providers to provide services to Medicaid patients for select services. The bumps took place during FYs 2013-2016. I used data from Form CMS-179 or the CMS-64 on the individual State Plan Amendments posted on the CMS website

¹⁷Although the CMS Medicaid Analytic eXtract Validation Reports (CMS 1999) contain data on demographic characteristics (age and race) and health status proxies (i.e., deaths and enrollees with 12 months continuous enrollment), these data were not publicly available by state for all years of the study period. Therefore, I selected the monthly Current Population Survey as the source for the time-varying covariates because the monthly data could be collapsed to the state by FY level.

¹⁸Unemployment status is defined as the percentage adults aged 19-64 years that were categorized as an unemployed experienced worker or unemployed new worker for each state.

to identify states electing to amend their State Medicaid Plan to identify the exact dollar amount of enhanced payments for two service categories: primary care physician (PCP) and health homes services.

Starting in calendar year (CY) 2013, states could elect to increase payments for PCP services to equal what Medicare PCPs are paid for Medicare Part B payments. States opting into the “PCP Bump” received 100 percent federal matching funds for the increase in payments in 2013 - 2014¹⁹. Similarly, the “Health Homes Bump” allowed states to increase provider reimbursement rates and receive federal matching dollars for eight quarters for Medicaid participants that have one chronic condition and be at risk of developing another. The chronic conditions covered vary by state and may include mental health conditions, substance abuse disorder, asthma, diabetes, heart disease, cancer, cerebrovascular disease, coronary artery disease, etc.

3.4 Summary Statistics

Table 2 shows the pre- and post-expansion means for the Medicaid spending outcomes in the expansion states (treatment group) and non-expansion states (control group). As expected, average Medicaid spending for total net expenditures increased in the post-expansion period for the treatment group and was consistently greater than the average Medicaid spending for the control group. The pre-expansion (FY 1999-2013) means in Medicaid spending for the treatment and control states were similar among the 21 health care service categories. The largest differences in pre-expansion means were observed for EPSDT screening and managed care.

¹⁹The PCP bump began in CY 2013 and is only for CYs 2013 and 2014, for which there is the increased federal match. Therefore, it covers parts of FY 2013 and 2015. Some States have continued to pay PCPs the higher amount with their traditional match in CY 2015 forward.

4 Methods

4.1 Empirical Framework

I estimate difference-in-differences (DD) models that compare changes in average Medicaid spending in the expansion states to changes in average Medicaid spending in the non-expansion states. The data consists of all Medicaid expenditures for Medicaid beneficiaries (i.e., aged, disabled, adults, and children) excluding Children’s Health Insurance Program expenditures over the period FY 1999 - FY 2016. There are three years of post-policy implementation data: FY 2014 - FY 2016.

$$Y_{cst} = \alpha + \beta ME_{cs} * Post_{cst} + \eta \mathbf{X}_{cst} + \delta_{cs}t + \lambda_{cs} + \mu_{ct} + \epsilon_{cst} \quad (1)$$

Equation (1) is used to determine the short-term impact of the 2014 Medicaid expansion on Medicaid spending for service category c in state s and year t . Y_{cst} represents the log of Medicaid spending for the total computable costs (i.e., the sum of the state and federal Medical Assistance Program expenditures for each service category for every state-year combination). Service category c represents “Total Net Expenditures” in addition to the 21 service categories that are listed in Appendix Table B1.

The coefficient of interest is β and $ME_{cs} * Post_{cst}$ is the state-specific policy implementation interaction term. ME_{cs} is a binary variable equal to 1 if state s is one of the 31 expansion states (treatment group) and is equal to 0 if state s is one of the 20 non-expansion (control group) states. $Post_{cst}$ is a binary variable equal to 1 if the time period t is after the state-specific Medicaid expansion implementation; it is equal to 0 otherwise. The 25 treatment states that had their expansion start on or before January 1, 2014 have $Post_{cst}$ equal to 1 starting in FY 2014. The six treatment states that had their expansion start after January 1, 2014 have $Post_{cst}$ equal to 1 only for the FYs for which the policy was implemented. Refer to Section 3.2 for a detailed description of the treatment assignment effective dates and mapping to FY.

The term $\mathbf{X}_{cst}$ is a vector of state s at time period FY t covariates all Medicaid enrollees', divided into several categories. Demographic characteristics include indicator variables for age in years (0-4, 5-9, 10-14, ..., 85-89, and 90 plus), female, race (white, black, Native American, Asian or Pacific Islander, or multiracial), and U.S. citizenship status. Family structure characteristics included indicator variables for marital status and number of children in the household (0, 1, 2, 3, 4, or 5 plus children). Economic characteristics include education level (less than high school, high school graduate, some college, college graduate), student status, and unemployment status. The individual-level covariate data were collapsed/averaged to the state-FY level to match the granularity of the outcome data. In addition, a continuous variable for the state unemployment rate was included to control for changes in economic conditions that may independently influence Medicaid spending (e.g., differences in the recovery from the 2008-2009 economic recession across states). The term $\mathbf{X}_{cst}$ also includes the total number of dollars allocated for the Medicaid "bump" for primary care physician and health home services for state s in FYs 2013-2016.

To control for unobservable determinants of Medicaid spending, I include the state-specific linear trend, state fixed effects, and year fixed effects²⁰. $\delta_{cs}t$, is a state-specific trend coefficient multiplied by the time-trend variable, t . The state-specific linear trend was added to the specification to assess the sensitivity of my results by accounting for different trends in outcomes across states. The concern is that states that adopt the Medicaid expansion might have different pre-expansion trends than states that do not adopt the expansion. The robustness of the estimates shown in Table 3, column 2 increases the confidence in the parallel trends assumption needed for the DD analysis. Refer to Section 4.2 for a discussion of the parallel trends assumption.

State fixed effects (λ_{cs}) control for state-specific, time invariant effects (e.g. average Medicaid spending may be different in each state). State fixed effects are necessary to absorb

²⁰I tried to assess the sensitivity of my results to the inclusion of the state-specific *quadratic* time trend. However, my sample was too small resulting in not enough power to include the state-specific quadratic time trend into the specification and obtain meaningful results. The results from this robustness check are available upon request

other determinants of Medicaid spending, but leave enough variation for the identification of the effect of interest. Year fixed effects (μ_{ct}) control for year-specific, state-invariant effects (e.g., average Medicaid spending across all states - those participating in the Medicaid expansion and not participating - may be different in years 1999, 2000, etc. See Figure 2.). The error term reflects the idiosyncratic variation in potential outcomes across states and time.

The universe of data includes all Medicaid expenditures incurred by all enrollees in each state during FYs 1999-2016. The number of Medicaid enrollees is highly variable and relatively small in some states. For example, the state with the largest number of persons ever enrolled in FY 1999 was California with 6,216,983 Medicaid enrollees, compared to Wyoming with only 51,835 Medicaid enrollees (CMS 2001). Since the number of Medicaid enrollees varies widely across each state, the group average error term is highly heteroskedastic. Therefore, all regressions include heteroskedasticity-robust standard errors clustered by state to account for correlation in the state-level errors over time (Bertrand et al. 2004)²¹. Last, the data were not weighted due to the nature of the data; I am using the exact Medicaid expenditures for states over an 18 year period provided by government reports.²²

4.2 Parallel Trends Assumption

The key identifying assumption of the DD design is that Medicaid spending trends would be the same for states participating in the Medicaid expansion and the control states in the absence of the expansion. There may be differences between liberal and conservative states in their decision to adopt the expansion, thus potentially violating the parallel trends assumption and resulting in biased results.

To assess the validity of the parallel trends assumption, I first visually compare the pre-

²¹The 2014 Medicaid expansion was implemented at the state level for the states that opted in.

²²Although of Salon et al. (2015) provide guidance on weighting and recommend reporting weighted and unweighted estimates, in the case of this dataset, the data are not the product of a sampling strategy. It does not make sense to arbitrarily assign more analytic influence to larger states versus smaller states by weighting by the annual state population or number of Medicaid eligible residents.

expansion trends in Medicaid spending over time for the main outcomes for the treatment and control groups in Figure 2. Graphs of the trends in Medicaid spending over time are available for all 21 service category outcomes in Appendix Figures C1- C4. Most outcomes exhibit similar pre-expansion (FY 1999-2013) trends in Medicaid spending for expansion and non-expansion states.

I more formally test for the equality of the pre-expansion trends using the event study method. I estimate regressions that interact with the treatment group indicator with the year indicator variables (omitting FY 2013 as the reference year). I jointly test the null hypothesis that all pre-2014 interaction terms are equal to 0 using an F-test and display the results of the event study in Appendix Tables D1- C4. If the results showed that Medicaid spending was changing for the treatment group relative to the control group before the Medicaid expansion, then that would suggest the DD estimate is biased. The first three rows of the event study results (ME*Year 2016, ME*Year 2015, and ME*Year 2014) represent the Medicaid expansion effects for which to compare the prior trends.

For the majority of the service categories, the p-value for the F-tests indicate that we cannot reject the F-test that all pre-2014 interaction coefficients are equal to zero. Only one of the 21 service categories assessed, managed care, rejects the null hypothesis of equal trends. Overall, these results are evidence that the key identifying assumption of the DD design is satisfied.

5 Empirical Results

5.1 Overall Impact of the Expansion

Table 3, column 7 presents the result using my main specification for the overall impact of the expansion on Medicaid spending for *total net expenditures* using Equation (1). The coefficient can be interpreted as: after the expansion became effective, average Medicaid spending for states participating in the expansion increased by 14 percent relative to average

Medicaid spending for states not participating in the expansion²³. The result is significant at the 0.1 percent level and is similar to the increase in Medicaid spending observed in the trends in Medicaid spending graph for total net expenditures in Figure 2 for the period after 2013.

Table 3, columns 1-6 show the effect of including the components of Equation (1) in the model. Each column is a separate regression. Entries are the coefficient β from Equation (1) for the variable of states participating in the 2014 Medicaid expansion and the period after the state-specific effective date. All regressions include state and year fixed effects and standard errors clustered by state. All results are statistically significant at the 0.1 percent level.

The first order effect in column 1 without covariates or the state-specific linear trend shows that average Medicaid spending for participating states increased after the expansion. In column 2, the addition of state-specific linear trends without the covariates causes the magnitude of the estimate and standard error to shrink.

Columns 3-6 show the effect of adding in different sets of control variables. Some of the controls, including unemployment status, the state unemployment rate, student status, marital status, and the number of children have the potential to be endogenous to the Medicaid expansion and therefore lead to an over-controlling problem. Therefore, in column 3, I estimate the model with the addition of only the demographic characteristics: age in years, female, race, and U.S. citizenship status. To isolate the influence of the potentially endogenous controls, I estimate the addition of demographic and family characteristics, demographic and economic characteristics, and demographic plus Medicaid bumps variables separately in columns 4, 5, and 6, respectively. The estimates and standard errors in columns 4-6 are robust to the results reported in column 3.

Column 7 includes the full specification of the model that is used throughout the paper.

²³Since $ME_{cs} * Post_{cst}$ consists of two indicator variables, and the dependent variable (Medicaid spending) is in logs, I estimate the effect of β , the coefficient on $ME_{cs} * Post_{cst}$, as the percent change in the dependent variable as follows: $\exp(\beta) - 1 = \exp(0.127) - 1 = 0.135 = 14\%$.

The reduced magnitude of the coefficients and standard errors indicate that imposing more structure on the model by including full covariates, the state-specific linear trend, and fixed effects absorbs other determinants of Medicaid spending.

I provide two pieces of evidence to support the result on the overall impact of the expansion on Medicaid spending. First, the vast majority of Medicaid spending during the first year after the expansion was spent on the traditional Medicaid population, rather than the new adult group (Snyder et al. 2016). In FYs 2015 and 2016, an average of 14.7 percent of total net expenditures were incurred by low-income, non-elderly adults made eligible for Medicaid through the expansion²⁴. Therefore, my finding of a 14 percent increase in average Medicaid spending during the first three years after the expansion is very similar to federal government accounts.

A second source of confirmation for my result can be drawn from Medicaid expenditures incurred by non-elderly, non-disabled adults prior to the expansion. For example, in 2011, non-elderly, non-disabled individuals represented 27 percent of total Medicaid enrollees, but accounted for only 15 percent of total Medicaid expenditures (Paradise 2015). In contrast, elderly and/or disabled individuals represented 24 percent of Medicaid enrollees and had the greatest share of total Medicaid expenditures, at 63 percent. The historical comparison implies that the target group for the 2014 reform initiative is expected to use less costly medical services compared to the traditional Medicaid population.

5.2 Main Results: Impact on Health Care Service Categories

Table 4 displays the main results of this study. Only four of the 21 health care service categories assessed²⁵ experienced a statistically significant increase in average Medicaid

²⁴Author’s crude calculation of the FY 2015 CMS-64 using expenditures for the “Total VIII Group” divided by “Total Net Expenditures” from the national totals reported for the Medical Assistance Program. The calculation is not based on a regression and therefore does not incorporate covariates, the state-specific linear trend, or fixed effects. *The new adult group (referred to in the report as the Total VIII Group) expenditure breakout was only available in the FYs 2015 and 2016 CMS-64 for Total Net Expenditures and is not publicly available by health care service category for any year.*

²⁵In Appendix Table B1, I define the 21 service category groups analyzed and the years that the data were collected. The service categories reported in Table 4 are based on the results in Appendix Tables E1- E3

spending after the expansion relative to average Medicaid spending in non-expansion states: dental services, case management services, rural health clinic services, and outpatient hospital services at 201, 139, 99, and 63 percent, respectively²⁶. The relationship my results have to published studies on specific health care service category utilization and changes to the payor mix is discussed in Section 8.

5.2.1 Dental Services

I find that the expansion most strongly impacted dental services, which increased in Medicaid spending by 201 percent. The large increase was expected due to the history of dental coverage for Medicaid adults. Medicaid adult dental benefits are a state option, for adults who qualify for Medicaid under pre-ACA law and also for adults newly eligible for Medicaid under the 2014 Medicaid expansion (Hinton & Paradise 2016). Prior to the ACA, some states opted to provide limited dental coverage to adults; in many cases, restricted to extractions or emergency services. In addition, when states faced budget constraints, adult dental services in Medicaid have typically been among the first services to receive cutbacks.

The ACA established 10 essential health benefits (EHBs)²⁷; one EHB included pediatric dental benefits, but not adult dental benefits (Hinton & Paradise 2016). However, all 31 Medicaid expansion states, with the exception of Montana and North Dakota, have modified their State Medicaid Plan to offer the same dental services that the traditional Medicaid population has to low-income, nonelderly adults made eligible to Medicaid through the expansion. Nationwide, as of 2016, 15 states offer extensive benefits, 19 states offer limited dental benefits, 13 states offer emergency-only benefits, and 4 states offer no benefits for Medicaid coverage of adult dental services. Therefore, the 2014 Medicaid expansion accounted

with a statistically significant effect of at least 5 percent.

²⁶I did not adjust my results by conducting tests for multiple inference because each of the 21 service categories analyzed represented a mutually exclusive dataset.

²⁷The ten EHB categories are: (1) ambulatory patient services; (2) emergency services; (3) hospitalization; (4) maternity and newborn care; (5) mental health and substance use disorder services including behavioral health treatment; (6) prescription drugs; (7) rehabilitative and habilitative services and devices; (8) laboratory services; (9) preventive and wellness services and chronic disease management; and (10) pediatric services, including oral and vision care (CMS 2016b).

for a large increase in dental service expenditures.

5.2.2 Case Management Services

The increase in Medicaid spending on case management services was expected due to the increase in enrollment of newly eligibles. Case management services include the assessment of an eligible individual, development of a specific care plan, referral to services, and monitoring activities. Medicaid enrollees are free to choose their case manager. States could consider different modes of communication, text messages or email as opposed to in-person or telephone calls, to assist the newly eligible in gaining access to needed medical and related services and reduce costs associated with the current methods of case management support. In addition, state Medicaid agencies should use their restricted access data to identify the specific conditions or reportable communicable diseases such as asthma, diabetes, sickle cell anemia, traumatic brain injury, HIV/AIDS, substance abuse problems, or chronic mental illness that the newly eligible are utilizing at an increased rate compared to the traditional Medicaid population. These conditions may benefit from revised, targeted case management procedures to reduce case management expenditures in the long term.

5.2.3 Rural Health Clinic Services

My results show that the expansion is having a disproportionately significant increase in Medicaid spending for clinic services in rural areas compared to urban and other areas. To clarify, no statistically significant increase was observed for Medicaid spending at health clinics (exclusive of rural health clinics) or federally-qualified health centers.

This result may be due to the rates of Medicaid coverage by geographic area. Foutz et al. (2017) reported that prior to the expansion, rural areas²⁸ in expansion and non-expansion states had similar rates of Medicaid coverage. After the expansion, in rural areas, Medicaid

²⁸Foutz et al. (2017) defined rural areas using the 2010 Index of Relative Rurality (IRR) measure, which is a continuous measure of a county's degree of rurality based on population size, population density, extent of urbanized area, and distance to nearest metro. IRR was divided into five population quintiles; only the quintile with the highest degree of rurality is classified as rural.

coverage rates increased from 21 percentage points in 2013 to 26 percentage points in 2015, while it rose by only one percentage point during the same period in non-expansion states. Overall, Medicaid coverage rates are higher in rural areas than in urban or other areas. The difference in coverage by geographic area is large in some states. For example, in California, the Medicaid coverage rate is 16 percentage points higher in rural areas than in urban areas.

Although rural health clinics are a usual source of care for the low-income population in rural areas, I cannot extrapolate further using the expenditure data source for this analysis if the increase in Medicaid spending is due to a surge in the number of newly eligible Medicaid patients seeking care at rural health clinics, or, if the number of Medicaid patients attending rural health clinics remained stable and the increase in Medicaid spending was caused by a change in the payor mix.

5.2.4 Outpatient Hospital Services

Outpatient hospital services increased by 63 percent after the expansion. It is a “good” result that the significant increase in Medicaid spending on hospital services occurred for outpatient services (i.e., preventive, diagnostic, therapeutic, or rehabilitative services) as opposed to treatment for severe conditions that require overnight stays. In addition, when uninsured individuals enroll into Medicaid, hospital admissions originating through the ER should decline if the newly eligible seek care in more appropriate physician settings, preventing treatable conditions from exacerbating. However, the results for outpatient and inpatient hospital services are more challenging to explain without being able to disentangle the emergency room (ER) service expenditures from the inpatient and outpatient expenditures. To clarify, inpatient and outpatient hospitalizations that originated in the ER cannot have their ER expenditures analyzed separately²⁹.

²⁹Starting in FY 2010, a new CMS defined service category for expenditures was included in the CMS-64 dataset titled, “Emergency Hospital Services.” However, most states did not report their ER hospital expenditures in this category and continued to use the original inpatient and outpatient hospital service categories to report ER expenditures. Refer to Appendix Table B2 for more information. I confirmed with CMS that it is not possible to separate ER expenditures from inpatient and outpatient expenditures using the publicly available CMS-64 data.

5.2.5 Service Categories Not Impacted

There were 10 health care service categories with the potential to be utilized by the *non-elderly* Medicaid population, but had a statistically insignificant response to the 2014 Medicaid expansion: clinic services, federally-qualified health centers, home and community based services, intermediate care facility, laboratory or radiological services, managed care, mental health facility, other practitioners' services, pregnancy services, and prescribed drugs. Refer to Appendix Tables E1-E3. Three of the 10 service categories above are included in the ACA's EHBs: laboratory or radiological services, mental health facility, and prescribed drugs. Separate data sources would be needed to provide further explanation on the lack of impact on these services.

5.3 Limitations

One reason given by states for not expanding Medicaid was their fear of the “woodwork” or “welcome mat” effects that would increase the number of *previously* eligible individuals enrolling into Medicaid. Similar to newly eligible individuals, the previously eligible individuals have the potential for large health-related expenditures, if they had put off getting medical care during the period when they were uninsured or insured through less favorable cost-sharing health insurance plans. The fiscal concern is that states do not receive a federal match for the previously eligible individuals who enrolled after the expansion and the cost for the coverage of this category of enrollee may be large. The data used in this analysis do not include Medicaid expenditures broken down by the traditional Medicaid enrollment groups, previously eligible, and newly eligible through the expansion by service category. Therefore, I am not able to directly test the impact of the “woodwork” or “welcome mat” effect on Medicaid spending by eligibility group using this data source.

Another limitation of this analysis is that the changes in average Medicaid spending *per enrollee* cannot be assessed. Ideally, I would want to determine if the change in Medicaid spending primarily reflects changes in quantities or prices. Did average Medicaid spending

per enrollee remain the same in the participating states compared to the non-expansion states after the expansion? If so, this would indicate that the expansion states simply experienced a surge in enrollment that caused the increase in total expenditures. CMS and health policy research organizations do not publicly provide a dataset that includes the number of Medicaid enrollees (or beneficiaries) by state and year for the complete study period FYs 1999-2016 that is needed to implement this analysis.³⁰

6 Falsification Tests

I conducted two falsification tests to assess the internal validity of my results. First, I estimated models in which I assume falsely that the 2014 Medicaid expansion took place in different years prior to January 2014, using data from the period prior to the Medicaid expansion. In Table 5, the universe is restricted to FYs 1999-2013 and I re-estimate Equation (1) by assuming a placebo policy implementation date in the interaction term (i.e., ME*FalsePost2011, ME*FalsePost2009, and ME*FalsePost2007) for the Medicaid expansion effective date using three separate equations.

I examined the results of the placebo estimates and compared them to those in my results for the overall impact of the expansion reported in Table 3, column 7. The falsification test in Table 5 generated statistically insignificant results close to zero that are far away from the results presented in Table 3, column 7. This indicates that the results for the overall impact of the expansion in my study do not occur by chance because states participating in the expansion and non-participating states might have been different prior to the law.

For the second falsification test, I returned to the full universe of data, FYs 1999-2016. Table 6 uses Equation (1) to generate results for three service categories primarily utilized by

³⁰I checked multiple sources to obtain the number of enrollees (or beneficiaries) by state for FYs 1999-2016: CMS Medicaid Analytic eXtract Validation Reports, CMS MBES Data from the Performance Indicators Project, CMS MSIS Data Tables, and CMS T-MSIS Data Tables, CMS Research Data Assistance Center, CMS Medicare and Medicaid Statistical Supplement, MACStats Medicaid and CHIP Data Books, and The Kaiser Family Foundation online data. I sent follow-up messages to representatives at each organization to confirm the data for the complete study period are not publicly available.

elderly adults, a population whose eligibility for Medicaid was unaffected by the expansion. Hospice benefits, Medicare³¹, and nursing facility services are typically not utilized by the new *non-elderly adult* group; therefore, I expect there to be no association between the expansion and these services.

Hospice benefits are used by terminally ill individuals; although this service category is not designated for a specific group of individuals, the new adult group should not constitute the majority of costs for this category. The Medicare service category is for beneficiaries who are dually eligible for Medicaid and Medicare; typically low-income elderly and/or disabled individuals. Similarly, nursing facility services are typically utilized by the elderly population and should not be impacted by the expansion targeting low-income, non-elderly adults.

Table 6 confirms that there was no statistically insignificant impact on the service categories typically utilized by elderly adults. In other words, these falsification tests yield no evidence that the increases in Medicaid spending for service categories utilized by low-income, non-elderly adults targeted by the expansion are due to differential trends between the treatment and control states in omitted variables, or other potential sources of bias.

7 Sensitivity Analyses

I conducted five analyses using Equation (1) to examine the sensitivity of my main results to modifications of the model or sample, presented in Appendix F. The first three sensitivity checks aim to identify a “clean” treatment group that does not result in an over or under estimation of the impact of the Medicaid expansion due to the timing of the adoption of the policy or prior expansion status. The categories of excluded states are similar to the sensitivity checks presented by Simon et al. (2017) and Wherry & Miller (2016).

First, in Appendix Table F1, I estimate the DD model by excluding from the analysis the six states (CA, CT, DC, MN, NJ, WA) that expanded Medicaid early by adopting the

³¹Expenses reported under the Medicare service category are the expenses that Medicaid is picking up as part of Medicare cost-sharing.

expansion during 2010-2012 because these states are the ones where I expect the Medicaid expansion to be the strongest due to the early adoption of the policy. As expected, the impact of the Medicaid expansion decreased for dental, case management, rural health clinic, and outpatient hospital services in comparison to the results for these categories reported in Table 4 when the early adopter states were excluded.

Second, in Appendix Table F2, I estimate the DD model by excluding from the analysis the five states (DC, DE, MA, NY, and VT) that the strongest Medicaid expansions prior to the 2014 Medicaid expansion, thus a mild expansion in 2014. As expected, the results when the states that expanded fully prior to 2014 were excluded were similar to those in Appendix Table F1. Most notably, in both Appendix Table F1 and Appendix Table F2, the magnitude and statistical significance for case management services strongly decreased.

Third, in Appendix Table F3, I estimate the DD model by excluding from the analysis the four states (IN, MI, NH, PA) that adopted the Medicaid expansion late because these states have not had less time for Medicaid beneficiaries to utilize services and incur expenses. As expected, the impact of the Medicaid expansion increased for dental, case management, rural health clinic, and outpatient hospital services in comparison to the results for these categories reported in Table 4 when the late adopter states were excluded. This is evidence that my main results may be underestimating the true effect of the expansion when including the late adopter states in the analysis.

Fourth, in Appendix Table F4, I restrict the dataset to a balanced panel (FYs 1999-2016). The results in this sensitivity check were similar to those in Table 4 with the exception of case management services, which had 170 fewer state-year observations in Appendix Table F4. This indicates that case management services was reported less often for the state-year combinations used in this paper.

Fifth, in Appendix Table F5, I use an unbalanced panel of state-year observations for FYs 2002-2016. I exclude FYs 1999-2001 from the analysis because Medicaid spending trends for dental, case management services, and rural health are slightly different than the period

immediately following FY 2001. The results were similar to the fourth sensitivity check.

To summarize, the main results of my study for dental, rural health clinic, and outpatient hospital services presented in Table 4 are robust to a variety of modifications to the model or sample. The positive, statistically significant results for case management services reported in Table 4 appears to be driven by the early Medicaid expansion adopter states or states with prior expansions. I find no evidence of spurious results when analyzing the falsification tests and sensitivity checks.

8 Conclusion

This study used data from CMS to analyze the complete universe of medical expenditures for all Medicaid beneficiaries during FYs 1999-2016. In total, I assessed the fiscal impact of the expansion on total net expenditures as well as for 21 health care service categories. The main result is that the expansion increased total Medicaid spending by 14 percent in participating states, but this masks the substantive heterogeneity in Medicaid spending across the 21 service categories. Most notably, dental and rural health clinic services increased by 201 and 99 percent, respectively.

Early evidence on the fiscal impact of the expansion *by health care service category* may influence a state's decision to participate in the expansion, modify services included in their State Medicaid Plan, and are useful in future debates regarding health reform. Putting my results into perspective, dental services represented 0.75 percent and rural health clinic services 0.19 percent of the share of total computable costs across all service categories during the post-expansion period. In addition, the short-term nature of my estimates make the finding of increases in Medicaid spending on routine and preventive care, more striking. In conclusion, the non-elderly adult group made eligible for Medicaid through the expansion may be healthier than the traditional Medicaid population. If this group continues to seek routine and preventive care, they have the potential to decrease government expenditures in

the long-term by treating illnesses before they become severe.

The increase I found in dental services expenditures is most likely due to 28 of the 29 expansion states modifying their State Medicaid Plans to cover adult dental services. Prior to the expansion, most states offered limited to no dental coverage for adults. Comparing my result to the existing literature on dental services *utilization* after the expansion, Nasseh & Vujicic (2016) and Simon et al. (2017) relied on telephone-based survey data and found mostly insignificant results for the probability of a dental visit. As the authors suggested, it may have been too early to assess the impact on dental care use with the data sources used because respondents are asked if they had any dental visits in the past year. In comparison, a more recent study with an extended post-expansion period also used telephone-based survey data and found an increase in the likelihood of childless adults having a dental visit (Singhal et al. 2017).

Relating the increase I found for rural health clinic services to the existing literature, Cole et al. (2017) studied the impact of the expansion on patients' insurance coverage and the number of patients at community health centers found a 12 percentage point increase in patients with Medicaid coverage and an 11 percentage point decrease in uninsured patients. The authors reported no significant effect on the number of new patients served at these facilities. Shin et al. (2015) provided supporting evidence for the change in the payor mix; between 2013 and 2014 in expansion states, the number of health center patients with Medicaid coverage rose by 1.85 million. In summary, the increase in average Medicaid spending on rural health clinic services reported in my paper may be related to changes in the payor mix in rural areas.

8.0.1 Next Steps

There are four areas of research that would complement this study. First, investigate the magnitude of Medicaid spending on dental services by examining the generosity of dental coverage in states that included dental coverage to adults after the expansion. The generosity

in dental coverage measure could be used to compare Medicaid spending on dental services for states with low versus high coverage. Second, modify the existing analysis by producing separate estimates for states that expanded through fee for service programs and those that expanded through Medicaid managed care programs. It is important to capture which services are covered under managed care for states that use this option. Third, assess an alternative economic outcome, Medicaid spending *per enrollee*, to investigate what a surge in enrollment does to spending per enrollee by service category. Finally, an important priority for future work is to assess whether the Medicaid expansion leads to improvements in health outcomes. Understanding the impact on Medicaid enrollees' health is important for justifying the expenses that the government is incurring due to the 2014 Medicaid expansion³².

³²Data on the health outcomes of the Medicaid enrollees are not publicly available from CMS. Black and Kho are using data from electronic health record networks to study the impact of the 2014 Medicaid expansion on the diagnosis, treatment, and outcomes for patients with diabetes (Northwestern 2015).

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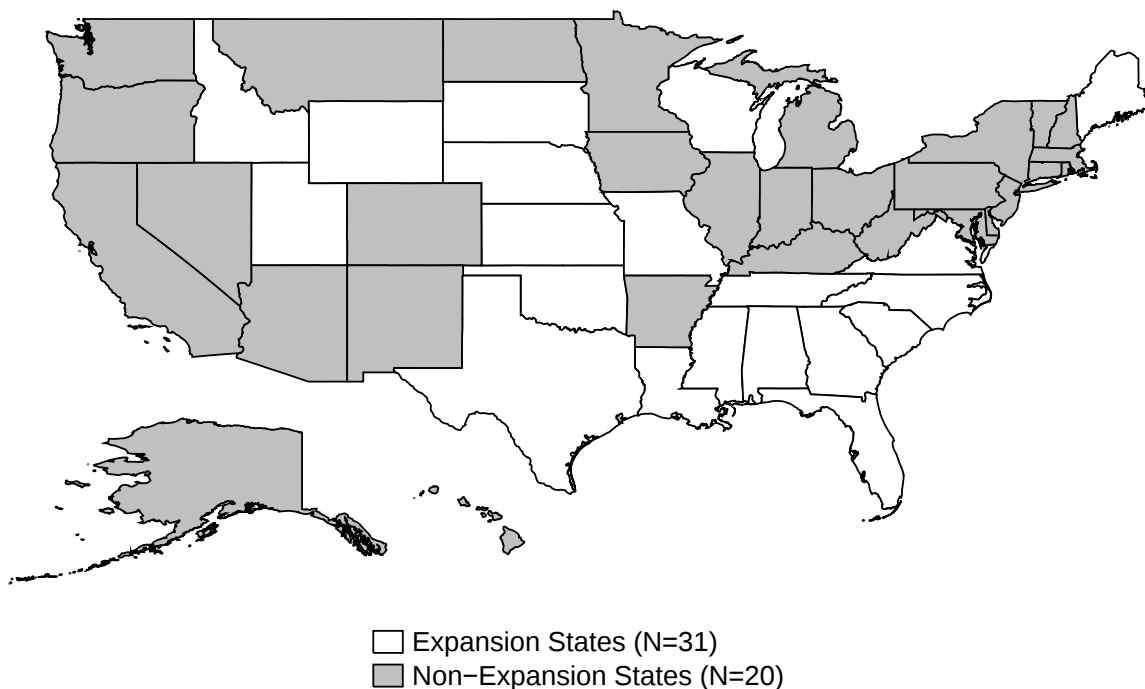
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Figures and Tables

Figure 1: State Participation in the 2014 Medicaid Expansion

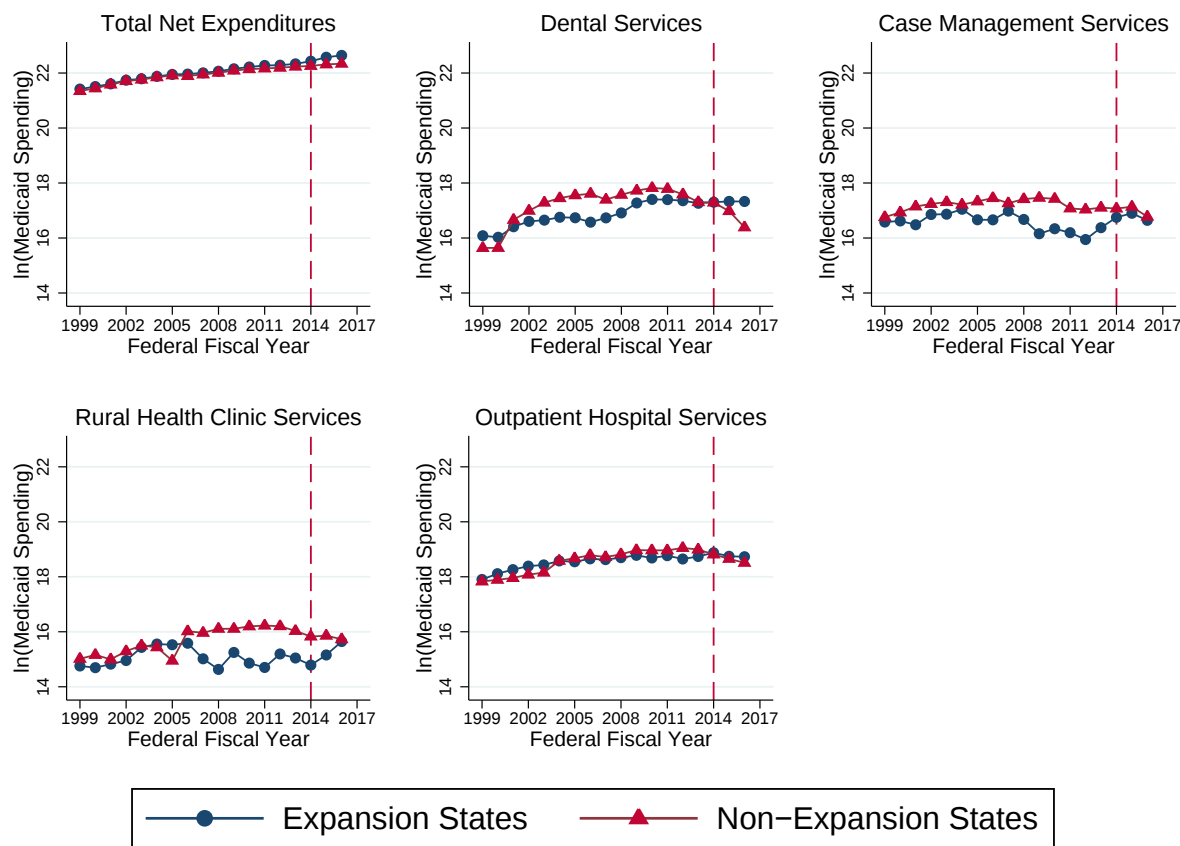


Notes: Expansion states are the states participating in the 2014 Medicaid expansion for low-income, non-elderly adults. For most states, the expansion became effective on January 1, 2014.

Non-expansion states are the states elected not to participate in the 2014 Medicaid expansion by the data cutoff date of September 30, 2016. Louisiana opted into the Medicaid expansion on July 1, 2016 and had only 3 months of post-expansion data; therefore, Louisiana is categorized as a control state.

Source: Kaiser Family Foundation (2016) for the states' decisions to adopt the Medicaid expansion and their effective date are as of the data cutoff date of September 30, 2016.

Figure 2: Trends in Medicaid Spending, Expansion Versus Non-Expansion States



Notes: The outcome variable is the log of Medicaid spending for “Total Net Expenditures.” For this outcome, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Medicaid expansion states are the states participating in the 2014 Medicaid expansion. The expansion states include the states that adopted the expansion early as well as those states that adopted the expansion on or after January 14, 2014. Control states include all states that elected not to participate in the 2014 Medicaid expansion. Refer to Table 1 for a listing of expansion and non-expansion states. Coverage under the Medicaid expansion became effective January 1, 2014 for most participating states.

Source: Based on the author’s assessment of the annual CMS-64 Financial Management Reports for FYs 1999-2016.

Table 1: Classification of States by Medicaid Expansion Participation

Early Adopters (N=7)	Expansion States		Non-Expansion States (N=20)
	Effective 1/1/14 (N=18)	Late Adopters (N=6)	
California (10/1/10)*	Arizona*	Alaska (9/1/15)	Alabama
Colorado (5/1/12)*	Arkansas*	Indiana (2/1/15)*	Florida
Connecticut (4/1/10)*	Delaware*	Michigan (4/1/14)*	Georgia
D. of Columbia (7/1/10)*	Hawaii*	Montana (1/1/16)	Idaho*
Minnesota (8/1/10)*	Illinois	New Hampshire (8/15/14)*	Kansas
New Jersey (4/14/11)*	Iowa*	Pennsylvania (1/1/15)	Louisiana (7/1/16)
Washington (1/3/11)*	Kentucky		Maine*
	Maryland*		Mississippi
	Massachusetts*		Missouri*
	Nevada		Nebraska
	New Mexico*		North Carolina
	New York*		Oklahoma*
	North Dakota*		South Carolina
	Ohio		South Dakota
	Oregon*		Tennessee
	Rhode Island		Texas
	Vermont*		Utah*
	West Virginia		Virginia
			Wisconsin*
			Wyoming

Notes: This table shows the state classification with regards to the timing of state adoption of the Medicaid expansion. The Medicaid expansion became effective on January 1, 2014 in all expansion states except for those with an early adoption or delayed effective date (the exact date is listed in parentheses for these states).

The primary specification used in the main paper classifies a state as treated if it is one of the 31 expansion states and a control if the state is one of the 20 non-expansion states. I define early adoption states to have their post-expansion period starting in fiscal year (FY) 2014 because the pre-2014 Medicaid coverage for these states was not comprehensive and/or had state-specific eligibility criteria that differed from the ACA 2014 Medicaid expansion. Since my data go through FY 2016, I identified those states that expanded after January 1, 2014 but before September 30, 2016 with the expansion turned on only in the corresponding FYs after the expansion became effective. Louisiana had only two months of post-expansion data; therefore, it is classified as a control state in all analyses. Appendix E includes sensitivity checks where separate analyses were run that exclude early adopter, later adopter, and states that had large Medicaid expansions prior to 2014.

*States offering at least some prior coverage for low-income, non-elderly adults before the 2014 Medicaid expansion. The approved Section 1115 waivers to extend coverage to this population vary significantly across states in terms of eligibility levels, benefits, and cost sharing requirements. The fourth quarter 2014 CMS-64 Financial Management Report (CMS 2014) was used to define prior coverage status as any state with both “Total Computable VIII Group Expenditures” and “Total Computable VIII Group Not Newly Eligible Expenditures” greater than zero. Table 4: “Adult Income Eligibility Limits at Application as a Percent of the Federal Poverty Level by Coverage Authority Parents” (Heberlein et al. 2012) was used to verify the prior coverage status defined as any state with the adult income eligibility greater than zero percent under the “Other Adults (Non-Disabled)” column.

Source: Kaiser Family Foundation (2016) for the effective date for states adopting the Medicaid expansion and Kaiser Family Foundation (2013) for information on prior Medicaid coverage and early adoption.

Table 2: Summary Statistics of Outcomes

	FY 1999-2013				FY 2014-2016			
	Expansion States		Non-Expansion States		Expansion States		Non-Expansion States	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total Net Expenditures	21.95	[1.15]	21.89	[1]	22.55	[1.11]	22.31	[1.02]
<i>Health Care Service Categories:</i>								
Case Management Services	16.56	[2.3]	17.21	[1.73]	16.76	[2.42]	16.99	[2.07]
Clinic Services	17.52	[1.89]	17.56	[1.75]	17.12	[2.1]	16.45	[2.69]
Dental Services	16.81	[1.84]	17.2	[1.8]	17.32	[1.65]	16.88	[2.38]
EPSDT Screening	15.02	[2.46]	16.21	[1.85]	15.07	[2.6]	16.03	[1.99]
Federally-Qualified Health Center	16.14	[1.96]	16.08	[1.38]	16.77	[2.32]	16.59	[1.37]
Home and Community Services	19.66	[1.55]	19.67	[.92]	20.06	[1.39]	20.35	[1.28]
Hospice Benefits	15.78	[2.13]	16.2	[1.98]	16.2	[2.29]	16.05	[2.9]
Inpatient Hospital Services	19.89	[1.36]	20.12	[1.18]	20.06	[1.39]	20.35	[1.28]
Intermediate Care Facility	18.08	[2.02]	18.59	[1.07]	18.12	[1.88]	18.18	[1.47]
Laboratory or Radiological	15.6	[1.73]	16.39	[1.56]	15.8	[1.95]	16.32	[1.99]
Managed Care	19.48	[3.11]	18.47	[3.44]	20.71	[3.5]	20.65	[2.78]
Medicare	18.1	[1.34]	18.28	[1.27]	18.74	[1.31]	18.87	[1.18]
Mental Health	17.8	[1.93]	17.59	[1.44]	17.51	[2.2]	17.56	[1.44]
Nursing Facility	19.92	[1.52]	20	[.97]	19.72	[2.21]	19.68	[1.46]
Other Practitioners Services	16.36	[1.66]	16.26	[1.34]	15.91	[1.99]	16.24	[1.65]
Other Services	18.65	[1.32]	18.68	[1.22]	19.32	[1.61]	19.1	[1.29]
Outpatient Hospital Services	18.52	[1.36]	18.57	[1.22]	18.78	[1.59]	18.66	[1.4]
Physician and Surgical Services	18.2	[1.3]	18.68	[1.14]	18.34	[1.67]	18.65	[1.26]
Pregnancy Services	13.48	[2.14]	13.89	[2.21]	13.51	[2.14]	13.76	[2.31]
Prescribed Drugs	19.12	[1.62]	19.66	[1.06]	18.8	[1.72]	19.27	[1.74]
Rural Health Clinic Services	15.06	[2.3]	15.68	[1.6]	15.18	[2.76]	15.81	[1.41]
States	31		20		31		20	

Notes: The outcome is the log of Medicaid spending by health care service category. Columns (1), (3), (5), and (7) display the pre- and post-expansion means for the Medicaid spending outcomes for the expansion versus non-expansion states. Standard deviations are in brackets.

Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016.

Table 3: Overall Impact of the Expansion with Different Sets of Controls

	ln(Medicaid Spending) Total Net Expenditures						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ME*Post	0.182 (0.036)***	0.138 (0.030)***	0.130 (0.027)***	0.129 (0.027)***	0.126 (0.027)***	0.132 (0.028)***	0.127 (0.027)***
Observations	918	918	918	918	918	918	918
States	51	51	51	51	51	51	51
<i>Specification</i>							
Demographic covariates	No	No	Yes	Yes	Yes	Yes	Yes
Family covariates	No	No	No	Yes	No	No	Yes
Economic covariates	No	No	No	No	Yes	No	Yes
Medicaid bump covariates	No	No	No	No	No	Yes	Yes
State-specific linear trend	No	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The columns vary by the inclusion of covariates and the state-specific linear trend. Coefficients are reported from the variable $ME_{cs} * Post_{cst}$ in Equation (1).

The outcome variable is the log of Medicaid spending for Total Net Expenditures. For this outcome, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column and row combination represents a separate regression. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year.

Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016. Demographic, family, and economic time-varying covariates were obtained from the monthly Current Population Survey and mapped to the federal fiscal year for the study time period of FYs 1999-2016. The state unemployment rate was calculated using data from the CPS Annual Social and Economic Supplement for FYs 1999-2016. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.

Table 4: Main Results: Impact of the Expansion by Medicaid Service Category

	ln(Medicaid Spending)			
	Top Service Categories Impacted			
	Dental Services	Case Management Services	Rural Health Clinic Services	Outpatient Hospital Services
ME*Post	1.101 (0.414)*	0.871 (0.422)*	0.686 (0.232)**	0.490 (0.191)*
Observations	909	836	736	914
States	51	48	47	51
<i>Specification</i>				
Full covariates	Yes	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The four columns represent the Medicaid service categories with a statistically significant result among the 21 service categories assessed. Refer to Appendix Tables A4-A6 for results on all service categories. Coefficients are reported from the variable $ME_{cs} * Post_{cst}$ in Equation (1).

The outcome variable is the log of Medicaid spending for each service category (i.e., Clinic Services, Dental Services, etc.). For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. All treatment and control states are included in each regression. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan.

Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016. Demographic, family, and economic time-varying covariates were obtained from the monthly Current Population Survey and mapped to the federal fiscal year for the study time period of FYs 1999-2016. The state unemployment rate was calculated using data from the Bureau of Labor Statistics' monthly state unemployment rate for FYs 1999-2016. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.

Table 5: Falsification Test: Placebo Policy Implementation Date

	ln(Medicaid Spending)		
	Total Net Expenditures		
	(1)	(2)	(3)
ME*FalsePost2011	0.014 (0.025)		
ME*FalsePost2009		0.037 (0.026)	
ME*FalsePost2007			0.017 (0.018)
Observations	765	765	765
States	51	51	51
<i>Specification</i>			
Covariates	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. For this falsification test, the universe was restricted to years less than 2014. Coefficients in this table are reported from the variable $ME_{cs} * FalsePostYEAR_{ct}$ from the modified version of Equation (1). Covariates exclude the 2014-2016 primary care physician and health homes financial bumps.

The outcome variable is the log of Medicaid spending for each service category (i.e., Clinic Services, Dental Services, etc.). For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. All treatment and control states are included in each regression. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan.

Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2013. Demographic, family, and economic time-varying covariates were obtained from the monthly Current Population Survey and mapped to the federal fiscal year for the study time period of FYs 1999-2016. The state unemployment rate was calculated using data from the Bureau of Labor Statistics' monthly state unemployment rate for FYs 1999-2016. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013.

Table 6: Falsification Test: Service Categories Utilized by the Non-Expansion Population

	ln(Medicaid Spending)		
	<i>Elderly</i>	<i>Adult</i>	Service Categories
	Hospice Benefits	Medicare	Nursing Facility
ME*Post	0.138 (0.295)	0.027 (0.042)	0.100 (0.237)
Observations	861	917	916
States	51	51	51
<i>Specification</i>			
Full covariates	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The columns are the Medicaid service categories typically utilized by *elderly* adults (i.e., not the target population of the Medicaid expansion) among the 21 service categories assessed. Refer to Appendix Tables A4-A6 for results on all service categories. Coefficients are reported from the variable $ME_{cs} * Post_{cst}$ in Equation (1).

The outcome variable is the log of Medicaid spending for each service category (i.e., Hospice Benefits, Medicare, etc.). For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. All treatment and control states are included in each regression. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan.

Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016. Demographic, family, and economic time-varying covariates were obtained from the monthly Current Population Survey and mapped to the federal fiscal year for the study time period of FYs 1999-2016. The state unemployment rate was calculated using data from the Bureau of Labor Statistics' monthly state unemployment rate for FYs 1999-2016. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.

Appendix A: Previous Research and Medicaid Reforms

Table A1: Relevant Studies: Impact of the 2014 Medicaid Expansion on Utilization, by Service Category

Service Category	Citation	Method	Key Findings
Clinic Services	Cole et al. (2017)	DD study using data from the federal Uniform Data System for 2011-2014	Found a 12 percentage point [95% CI: 10.0, 13.4] increase in patients with Medicaid coverage and an 11 percentage point decrease in uninsured patients [95% CI: 8.5, 13.7] (i.e., the payor mix), but no significant effect on the number of patients served at federally funded community health centers.
Clinic Services	Shin et al. (2015)	Pre-post study using data from the federal Uniform Data System for 2013-2014	Found that between 2013 and 2014 in expansion states, the number of health center patients with Medicaid coverage (i.e., the payor mix) rose by 1.85 million, or 22%.
Dental Services	Nasseh & Vujicic (2016)	DD study using data from the Gallup-Healthways Wellbeing Index Survey, a telephone-based survey, for 2010-2014	Found that dental care use increased between 2 and 6 percentage points (results varied by comparison group) in the second half of 2014, but most of these changes were not statistically significant.

Table A1: Relevant Studies: Impact of the 2014 Medicaid Expansion on Utilization, by Service Category

Service Category	Citation	Method	Key Findings
Dental Services	Simon et al. (2017)	DD study using data from the Behavioral Risk Factor Surveillance System (BRFSS), a telephone-based survey, for 2010-2016	Found no significant effect on the probability of having a dental visit. When restricting the sample to childless adults, the authors found a 4.1 percentage point increase (9 percent) in the probability of a dental visit. Among childless adults, observed a 0.08 increase (5 percent) in the number of preventive services received and a 4.1 percentage point increase (9 percent) in the probability of a dental visit. Found no evidence that risky health behaviors increased in response to health insurance coverage.
Dental Services	Singhal et al. (2017)	Regressions using data from the Behavioral Risk Factor Surveillance System, a telephone-based survey, for 2010 & 2014	Found that among states that provided dental benefits and expanded their Medicaid program, the results suggest that childless adults had a significant increase (1.8 percentage points) in the likelihood of having had a dental visit, while parents had a significant decline (8.1 percentage points).

Table A1: Relevant Studies: Impact of the 2014 Medicaid Expansion on Utilization, by Service Category

Service Category	Citation	Method	Key Findings
Emergency Services	Nikpay et al. (2017)	DD study using data from AHRQ Fast Stats database, an early-release, aggregated version of the State Emergency Department Databases and State Inpatient Databases for 2012-2014	Found that total ED use per 1,000 population increased by 2.5 visits more in Medicaid expansion states than in nonexpansion states after 2014 (95% CI 1.1 to 3.9). In expansion states the share of ED visits (i.e., the payor mix) covered by Medicaid increased 8.8 percentage points (95% CI 5.0 to 12.6).
Emergency Services	Pines et al. (2016)	DD study using data from three major Emergency Department (ED) staffing companies for 2012-2014	Found the expansion increased Medicaid-paid ED visits (i.e., the payor mix) in expansion states by 27.1 percent, but did not significantly affect overall ED use.
Emergency Services	Wherry & Miller (2016)	DD study using data from the National Health Interview Survey for 2010-2014	Found Medicaid expansions had no significant effect on ED visits.
Inpatient Hospitalizations	Dranove et al. (2016)	DD study using data from AHRQ Fast Stats database, an early-release, aggregated version of the State Emergency Department Databases and State Inpatient Databases for 2012-2014	Found evidence of changes in the payor mix; in states that expanded Medicaid under the ACA, uncompensated care costs decreased from 4.1 percentage points to 3.1 percentage points of operating costs.
Inpatient Hospitalizations	Wherry & Miller (2016)	DD study using data from the National Health Interview Survey, an in-person survey, for 2010-2014	Found Medicaid expansions were associated with increased overnight hospital stays (2.4 percentage points [CI, 0.7 to 4.2 percentage points]).

Table A1: Relevant Studies: Impact of the 2014 Medicaid Expansion on Utilization, by Service Category

Service Category	Citation	Method	Key Findings
Inpatient Hospitalizations	Nikpay et al. (2016)	DD study using data from AHRQ Fast Stats database, an early-release, aggregated version of the State Emergency Department Databases and State Inpatient Databases for 2012-2014	Found Medicaid expansion increased the share of Medicaid inpatient hospital stays by 6.2%, while it decreased the share of uninsured stays by 8.6% between the third quarter of 2013 and the second quarter of 2014.
Inpatient Hospitalizations	Freedman et al. (2017)	DD study using data from AHRQ Fast Stats database, an early-release, aggregated version of the State Emergency Department Databases and State Inpatient Databases for 2009-2014	Found changes in the payer mix, but no change in total discharges between Medicaid expansion and non-expansion states
Physician Visits	Courtemanche et al. (2017a)	DDD study using data from the Behavioral Risk Factor Surveillance System, a telephone-based survey, for 2011-2016	Found no significant effects on having a primary care doctor or a well-patient checkup.
Physician Visits	Wherry & Miller (2016)	DD study using data from the National Health Interview Survey, an in-person survey, for 2010-2014	Found Medicaid expansions were associated with increased visits to physicians in general practice (6.6 percentage points [CI, 1.3 to 12.0 percentage points]).
Prescription Drugs	Ghosh et al. (2017)	DD study using data from a proprietary, nationally representative, all-payer pharmacy transactions database for 2013-2016	Found that Medicaid-paid prescriptions (i.e., the payor mix) increased by 19 percent in expansion states relative to states that did not expand; this works out to approximately seven additional prescriptions per year per newly enrolled beneficiary.

Table A1: Relevant Studies: Impact of the 2014 Medicaid Expansion on Utilization, by Service Category

Service Category	Citation	Method	Key Findings
Prescription Drugs	Wen et al. (2016)	DD study using data from CMS' Medicaid State Drug Utilization Data for 2011-2014	Found that the expansion did not significantly affect total Medicaid drug spending. However, there was a significant increase in prescriptions (0.06 per resident per quarter) in the expansion states.

Notes: This table summarizes the previous studies on the impact of the ACA Medicaid expansion on *utilization* that are most relevant to my paper; peer-reviewed journal articles that apply econometric methods and focus on the impact of the expansion for a particular service category. I focused on nationwide studies and excluded multi-state and single-state studies. The key findings are reported for the post-expansion period for Medicaid expansion states relative to non-expansion states. DD = difference-in-differences. DDD = difference-in-difference-in-differences.

Source: Based on the author's review of the previous literature on the ACA Medicaid expansion.

Table A2: Summary of Medicaid Reforms

Year	Reform	Impact
1999	Ticket to Work and Work Incentives Improvement Act	Gives states the option to extend Medicaid coverage to working disabled individuals with incomes above 250% FPL and impose income-related premiums for the coverage.
2000	Breast and Cervical Cancer Treatment and Prevention Act	Gives states the option to extend Medicaid coverage to uninsured women with breast or cervical cancer, regardless of income or resources.
2003	Jobs and Growth Tax Relief Reconciliation Act	Temporary increase in FMAP for Medicaid by 2.95% from April 2003 through June 2004.
2003	Medicare Prescription Drug, Improvement, and Modernization Act	Effective January 1, 2006, no Medicaid coverage of drugs for dual eligible enrollees. Congress raised Disproportionate Share Hospital (DSH) allotments by 16% for FY 2004 for all States, and from FYs 2004-2009 for low DSH States.
2006	Deficit Reduction Act	For enrollees with income above 150% of FPL, States can charge higher than nominal cost sharing. For non-emergency services furnished in the emergency room, States can charge higher copayments.
2009	Children's Health Insurance Program Reauthorization Act	Gives states the option to cover recent lawfully present immigrant children and pregnant women who have been residing in the US for less than five years.
2009	American Recovery and Reinvestment Act	Temporary increase in FMAP for Medicaid by 6.2% from February 2009 through June 2011.
2010	Patient Protection and Affordable Care Act (ACA)	ACA enacted on March 23, 2010. Dependent coverage provision effective October 2010.
2012	ACA Supreme Court Decision	Medicaid expansion becomes a state option.
2013	ACA Health Insurance Marketplace	Open enrollment begins October 1, 2013; targeted for individuals with 133% to 400% FPL.
2014	ACA Modified Adjusted Gross Income (MAGI)	Effective January 1, 2014, the method for calculating eligibility for Medicaid became simplified. States can no longer apply any assets or resources test for purposes of determining eligibility for medical assistance.
2014	ACA Medicaid Expansions	Individual mandate and expansion of Medicaid eligibility to nearly all adults with family income less than 138% FPL effective on January 1, 2014. The federal government will finance a percentage of the costs of those made newly eligible for Medicaid: 2014-2016: 100% FMAP 2017: 95% FMAP 2018: 94% FMAP 2019: 93% FMAP 2020: 90% FMAP

Notes: Since its enactment in 1965, the Medicaid program has used the Federal Medical Assistance Percentage (FMAP) to determine the federal government's share of the cost of covered services in state Medicaid programs. On average, the federal share has been 57%. Beginning in 2014, the ACA established highly enhanced FMAPs for the cost of services to low-income adults with incomes up to 138% of the Federal Poverty Level (FPL) who are not currently covered.

Source: Based on the author's assessment of key Medicaid reforms during 1999-2016, provided on the Kaiser Family Foundation website: kff.org/medicaid/timeline/medicaid-timeline.

Appendix B: Service Category Definitions

Table B1: Listing of Medicaid Service Categories Included in the Analysis

Service Category Used in the Analysis	Service Category Reported on CMS-64	Years Reported
Case Management Services	Case Management	1999-2011
	Case Management - State Wide	2010-2016
	Primary Care Case Management	1999-2016
	Targeted Case Management	1999-2009
	Targeted Case Management Services - Com. Case-Man.	2010-2016
Clinic Services	Clinic Services	1999-2016
Dental Services	Dental Services	1999-2016
EPSDT Screening	EPSDT Screening	1999-2016
Federally-Qualified Health Center	Federally-Qualified Health Center	1999-2016
Home and Community Based Services	Home & Community-Based Services - Reg. Pay. (Waiv)	2010-2016
	Home & Community-Based Services - St. Plan 1915(i) Only Pay.	2010-2016
	Home & Community-Based Services - St. Plan 1915(j) Only Pay.	2010-2016
	Home & Community Based Services State Plan 1915(k) Community First Choice	2012-2016
	Home and Community	1999-2009
	Home And Community - Disabled Elderly Community Supported	1999-2009
	Health Home w Chronic Conditions	2011-2016
	Home Health Services	1999-2016
	Personal Care Services	1999-2009
	Personal Care Services - Reg. Payments	2010-2016
	Personal Care Services - SDS 1915(j)	2010-2016
Hospice Benefits	Hospice Benefits	1999-2016
Inpatient Hospital Services	Inpatient Hospital - DSH	1999-2016
	Inpatient Hospital - GME Payments	2010-2016
	Inpatient Hospital - Reg. Payments	1999-2016
	Inpatient Hospital - Sup. Payments	2010-2016
Intermediate Care Facility	Intermediate Care - Private	1999-2016
	Intermediate Care Facility - Public	1999-2016
	Intermediate Care Facility - Mentally Retarded: Supplemental Payments	2010-2014
Laboratory or Radiological	Laboratory/Radiological	1999-2016
Managed Care	Medicaid - Coinsurance	1999-2016
	Medicaid - Group Health	1999-2016

Table B1: Listing of Medicaid Service Categories Included in the Analysis

Service Category Used in the Analysis	Service Category Reported on CMS-64	Years Reported
	Medicaid - MCO	1999-2016
	Medicaid - Other	1999-2016
	Medicaid - PHP	1999-2003
	Medicaid MCO - Community First Choice	2013-2016
	Medicaid MCO - Evaluation and Management	2013-2016
	Medicaid MCO - Preventive Services Grade A	2013-2016
	OR B, ACIP Vaccines and their Admin	
	Medicaid MCO - Vaccine codes	2013-2016
	MCO PAHP - Community First Choice	2013-2016
	MCO PAHP - Evaluation and Management	2013-2016
	MCO PAHP - Preventive Services Grade A	2013-2016
	OR B, ACIP Vaccines and their Admin	
	MCO PAHP - Vaccine codes	2013-2016
	MCO PIHP - Community First Choice	2013-2016
	MCO PIHP - Evaluation and Management	2013-2016
	MCO PIHP - Preventive Services Grade A OR	2013-2016
	B, ACIP Vaccines and their Admin	
	MCO PIHP - Vaccine codes	2013-2016
	Prepaid Ambulatory Health Plan	2004-2016
	Prepaid Inpatient Health Plan	2004-2016
Medicare	Medicare - Part A	1999-2016
	Medicare - Part B	1999-2016
	120% - 134% Of Poverty	1999-2016
	135% - 175% Of Poverty	1999-2009
Mental Health Facility	Mental Health Facility Services - Reg. Payments	1999-2016
	Mental Health Facility - DSH	1999-2016
Nursing Facility Services	Nursing Facility Services	1999-2009
	Nursing Facility Services - Reg. Payments	2010-2016
	Nursing Facility Services - Sup. Payments	2010-2016
Other Practitioners Services	Other Practitioners	1999-2009
	Other Practitioners Services - Reg. Payments	2010-2016
	Other Practitioners Services - Sup. Payments	2010-2016
Other Services	Non-Emergency Medical Transportation	2010-2016
	Nurse Practitioner Services	2010-2016
	Occupational Therapy	2010-2016
	Other Care Services	1999-2016
	Physical Therapy	2010-2016
	Private Duty Nursing	2010-2016
	Prosthetic Devices, Dentures, Eyeglasses	2010-2016
	Rehabilitative Services (non-school-based)	2010-2016
	School Based Services	2010-2016
	Services for Speech, Hearing & Language	2010-2016
Outpatient Hospital Services	Outpatient Hospital Services	1999-2009
	Outpatient Hospital Services - Reg. Payments	2010-2016

Table B1: Listing of Medicaid Service Categories Included in the Analysis

Service Category Used in the Analysis	Service Category Reported on CMS-64	Years Reported
	Outpatient Hospital Services - Sup. Payments	2010-2016
Physician and Surgical Services	Diagnostic Screening & Preventive Services	2010-2016
	Physician & Surgical Services - Evaluation and Management	2013-2016
	Physician & Surgical Services - Reg. Payments	2010-2016
	Physician & Surgical Services - Sup. Payments	2010-2016
	Physician & Surgical Services - Vaccine codes	2013-2016
	Physicians' Services	1999-2009
	Preventive Services Grade A OR B, ACIP Vaccines and their Admin	2013-2016
Pregnancy Services	Abortions	1999-2016
	Freestanding Birth Center	2011-2016
	Nurse Mid-Wife	2010-2016
	Sterilizations	1999-2016
	Tobacco Cessation for Preg Women	2011-2016
Prescribed Drugs	Prescribed Drugs	1999-2016
Rural Health Clinic Services	Rural Health	1999-2016
Total Net Expenditures	Total Net Expenditures	1999-2016

Notes: Column 1 is defined by the author to represent a consolidated service category that groups related services together to create a panel of expenditures over time. Column 1 contains the service categories used in the analysis. Column 2 displays the original service category reported on the annual CMS-64 Financial Management Report. The CMS-64 Financial Management Report separates Medicaid expenditures for the Medical Assistance Plan (MAP) from the Administrative (ADM) costs. All service included in this analysis come from the MAP. The definition of the service categories in Column 2 are provided on the “Medicaid Budget Expenditure System (MBES) Category of Service Line Definitions” available at: <https://www.cms.gov/Research-Statistics-Data-and-Systems/Computer-Data-and-Systems/MedicaidBudgetExpendSystem/Downloads/CMS649Base.pdf>. Column 3 displays the federal fiscal years that each service category was reported on the annual CMS-64 Financial Management Reports. Each state has the authority to decide which services to include in their state Medicaid plan. For more information on individual state changes to service coverage over time, refer to the “Medicaid State Plan Amendments” available at <https://www.medicaid.gov/State-Resource-Center/Medicaid-State-Plan-Amendments/Medicaid-State-Plan-Amendments.html>.

Definitions: DSH = Disproportionate Share Hospital, GME = Graduate Medical Education, Reg = Regular, Sup = Supplemental, SDS = Self-Directed Services, MCO = Managed Care Organization, PAHP = Prepaid Ambulatory Health Plan, PIHP = Prepaid Inpatient Health Plan, ACIP = Advisory Committee on Immunization Practices, EPSDT = Early and Periodic Screening, Diagnostic and Treatment.

Source: Based on the author’s assessment of the annual CMS-64 Financial Management Reports for years 1999-2016 and corresponding documentation.

Table B2: Listing of Medicaid Service Categories Excluded from the Analysis

Service Category Reported on CMS-64	Description/Reason for Exclusion
<i>Panel A. Healthcare Services</i>	
All-Inclusive Care Elderly	Insufficient data. Among the 918 state-year observations reported over FYs 1999-2016, only 35.3% (N=306) were for expenditures greater than zero reported by 36 states (21 expansion, 15 non-expansion).
Critical Access Hospitals	Insufficient data. Among the 306 state-year observations reported over FYs 2010-2016, only 45.1% (N=138) were for expenditures greater than zero reported by 27 states (18 expansion, 9 non-expansion).
Emergency Hospital Services	Insufficient data. Among the 306 state-year observations reported over FYs 2010-2016, only 43.5% (N=133) were for expenditures greater than zero reported by 29 states (20 expansion, 9 non-expansion).
Emergency Services for Undoc. Aliens	Insufficient data. Among the 918 state-year observations reported over FYs 1999-2016, only 34.0% (N=295) were for expenditures greater than zero reported by 37 states (21 expansion, 16 non-expansion).
Service Category "C-" Codes	Insufficient data. Service categories specific to the Medicaid CHIP expansion population during years 2010-2016.
Service Category "T-" Codes	Historical service category designation that was not used during the 2002-2016 period.
<i>Panel B. Administrative Line Items</i>	
64.21U Adjustments	Childrens Health Insurance Program (CHIP) adjustments for years 2010-2016.
Balance	The sum of all service categories reported on the CMS-64, excluding any adjustments, collections, rebates, offsets, "C-" codes, and "T-" codes.
Coinsurance	Expenses for dually insured Medicare and Medicaid beneficiaries.
Collections	Reimbursements to the State, including third party liability, probate and audit work.
Drug Rebate Offset - National	State-level agreements for reimbursements. States typically receive these funds approximately one year after the service was rendered.

Table B2: Listing of Medicaid Service Categories Excluded from the Analysis

Service Category Reported on CMS-64	Description/Reason for Exclusion
Drug Rebate Offset - State Sidebar Ag	State-level agreements for reimbursements. States typically receive these funds approximately one year after the service was rendered.
Increased ACA OFFSET - Fee for Service	State-level agreements for reimbursements. States typically receive these funds approximately one year after the service was rendered.
Increased ACA OFFSET - MCO	State-level agreements for reimbursements. States typically receive these funds approximately one year after the service was rendered.
MCO - National Agreement	State-level agreements for reimbursements. States typically receive these funds approximately one year after the service was rendered.
MCO - State Sidebar Agreement	State-level agreements for reimbursements. States typically receive these funds approximately one year after the service was rendered.

Notes: Column 1 displays the original service category reported on the annual CMS-64 Financial Management Report under the Medical Assistance Plan. Column 2 is a description of the service category and reason for exclusion provided by the author. These service categories were excluded from the analysis for one of three reasons: (1) Insufficient data to be included in the analysis due to the number of state-years with data reported in the pre-expansion period, the number of expenditures greater than zero, and/or the number of states reporting any data. (2) The service category does not represent a service that an individual utilized. Instead, it is an administrative line item: adjustments, collections, rebates, offsets, or rebates. (3) Historical service categories that were listed on the CMS-64, but not reported on during the period of analysis.

Source: Based on the author's assessment of the annual CMS-64 Financial Management Reports for years 1999-2016 and corresponding documentation.

Table B3: Summary of Medicaid Service Categories' Expenditures

Service Category	State-Years with Medicaid Spending:			
	>0 (%)	=0 (%)	<0 (%)	Total (N)
Case Management Services	91.0	8.1	0.9	918
Clinic Services	97.2	2.4	0.3	918
Dental Services	99.0	0.7	0.3	918
EPSDT Screening	88.6	9.0	2.4	918
Federally-Qualified Health Center	91.3	8.0	0.7	918
Home and Community Based Services	100			918
Hospice Benefits	93.4	6.6		918
Inpatient Hospital Services	100			918
Intermediate Care Facility	94.8	5.1	0.1	918
Laboratory or Radiological	98.3	1.6	0.1	918
Managed Care	94.7	4.0	1.3	918
Medicare	99.9	0.1		918
Mental Health	96.3	2.9	0.8	918
Nursing Facility Services	99.9		0.1	918
Other Practitioners Services	95.4	4.4	0.2	918
Other Services	99.9		0.1	918
Outpatient Hospital Services	99.5	0.3	0.1	918
Physician and Surgical Services	99.4	0.6		918
Pregnancy Services	88.7	9.2	2.1	918
Prescribed Drugs	99.9		0.1	918
Rural Health Clinic Services	80.3	18.3	1.4	918

Notes: Medicaid spending for Total Net Expenditures is assessed in *levels* by combining the federal and state share of the total computable costs reported for the Medical Assistance Program. Each row represents a separate service category. All Medicaid expansion states and control states are included. The percent of expenditures (across rows) that are positive, equal to zero, or negative are displayed in Column >0, Column =0, and Column <0, respectively. The Total (N) column displays the number of state-years with any expenditures for each service category.

Source: Based on the author's assessment of the annual CMS-64 Financial Management Reports for years 1999-2016.

Table B4: Probability of a Zero or Negative Expenditure

	ln(Medicaid Spending)			
	Main Results Service Categories			
	Dental Services	Case Management Services	Rural Health Clinic Services	Outpatient Hospital Services
ME*Post	-0.026 (0.026)	-0.029 (0.028)	0.041 (0.054)	-0.022 (0.021)
Observations	918	918	918	918
States	51	51	51	51
<i>Specification</i>				
Full covariates	Yes	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

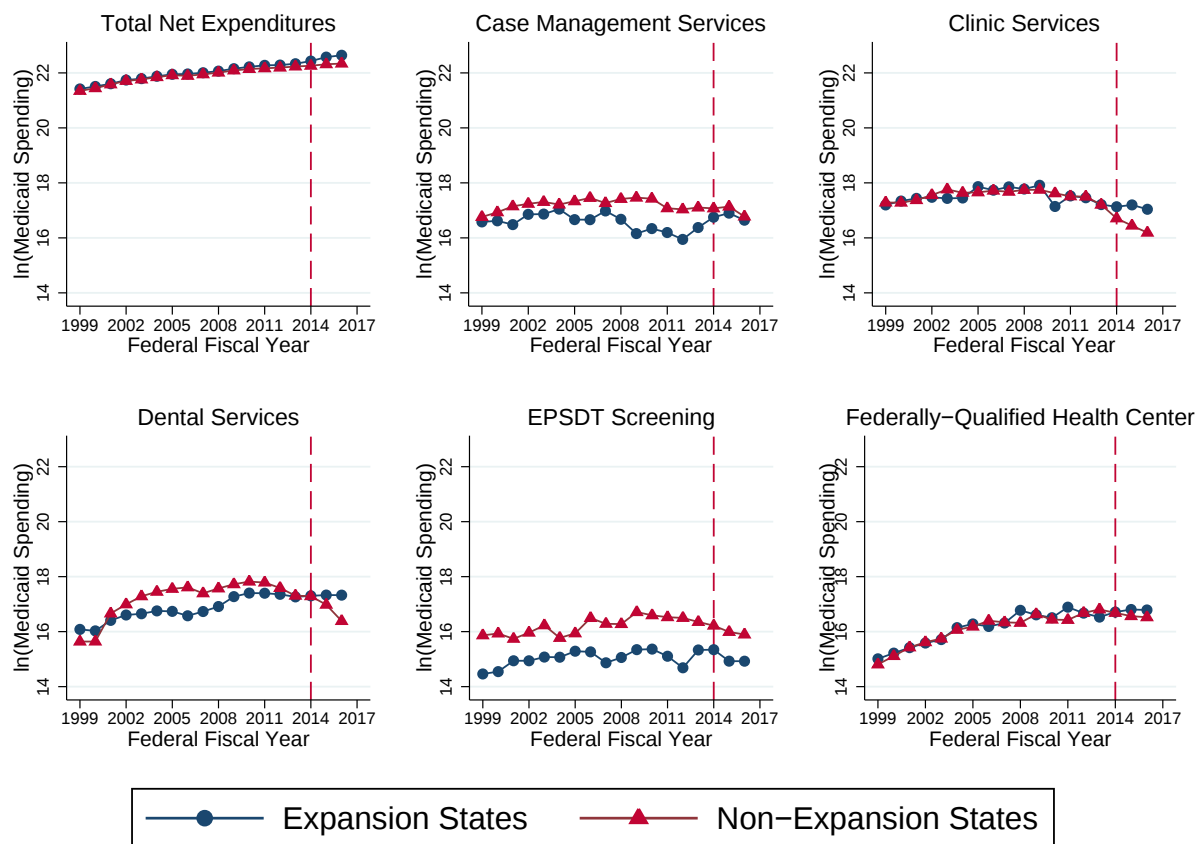
Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The purpose of this robustness check is to see if there is an association with negative or zero expenditures and state participation in the Medicaid expansion. Refer to Appendix Table B3 for a summary of positive, zero, and negative expenditures by service category. The columns in this table are the Medicaid service categories reported in Table 4: Main Results. All Inpatient Hospital Services' expenditures were greater than zero for all state-years. Coefficients are reported from the variable $ME_{cs} * Post_{cst}$ in Equation (1).

The outcome variable is the log of Medicaid spending for each service category (i.e., Clinic Services, Dental Services, etc.). For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. All treatment and control states are included in each regression. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan.

Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016. Demographic, family, and economic time-varying covariates were obtained from the monthly Current Population Survey and mapped to the federal fiscal year for the study time period of FYs 1999-2016. The state unemployment rate was calculated using data from the Bureau of Labor Statistics' monthly state unemployment rate for FYs 1999-2016. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.

Appendix C: Trends in Medicaid Spending

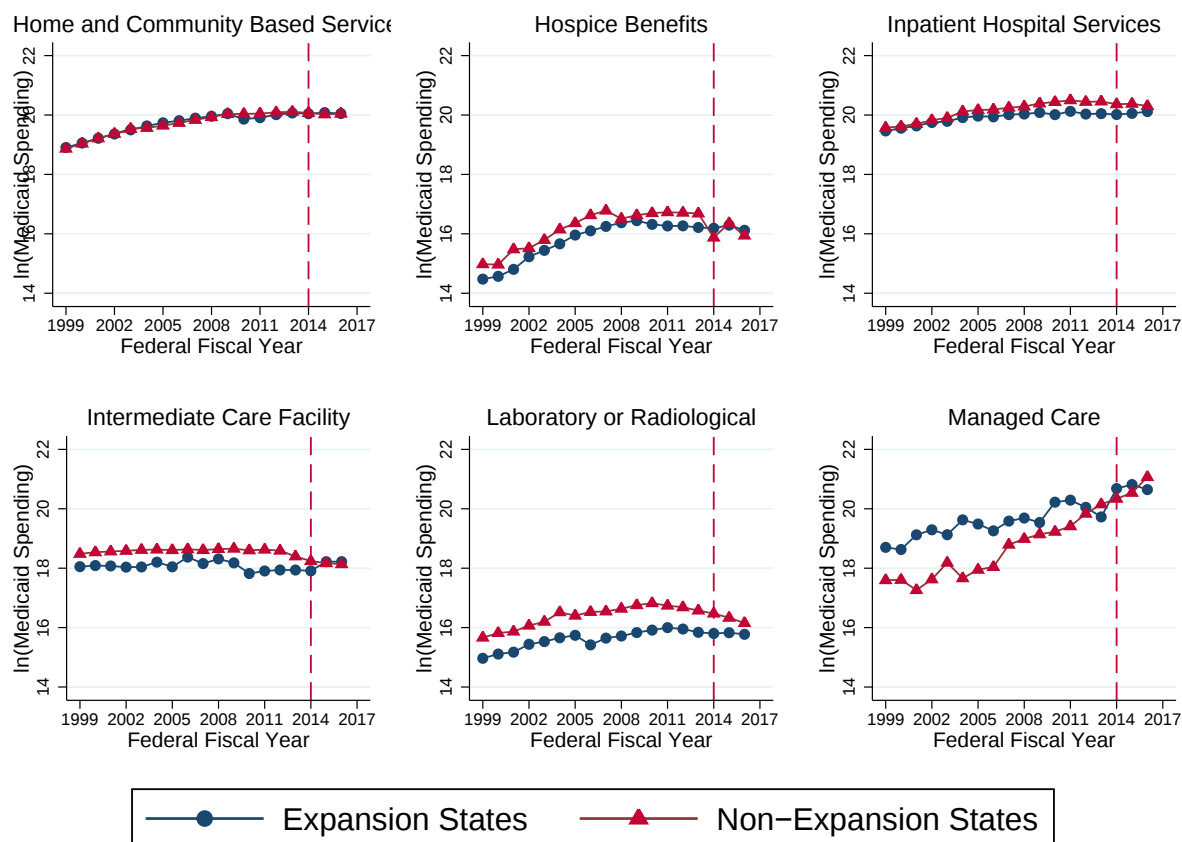
Figure C1: Trends in Medicaid Spending, Expansion Versus Non-Expansion States



Notes: The outcome variable is the log of Medicaid spending. For this outcome, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Medicaid expansion states are the states participating in the 2014 Medicaid expansion for low-income, non-elderly adults. Non-expansion states are the states that elected not to participate in the 2014 Medicaid expansion. Coverage under the Medicaid expansion became effective January 1, 2014 for most participating states.

Source: Based on the author's assessment of the annual CMS-64 Financial Management Reports for FYs 1999-2016.

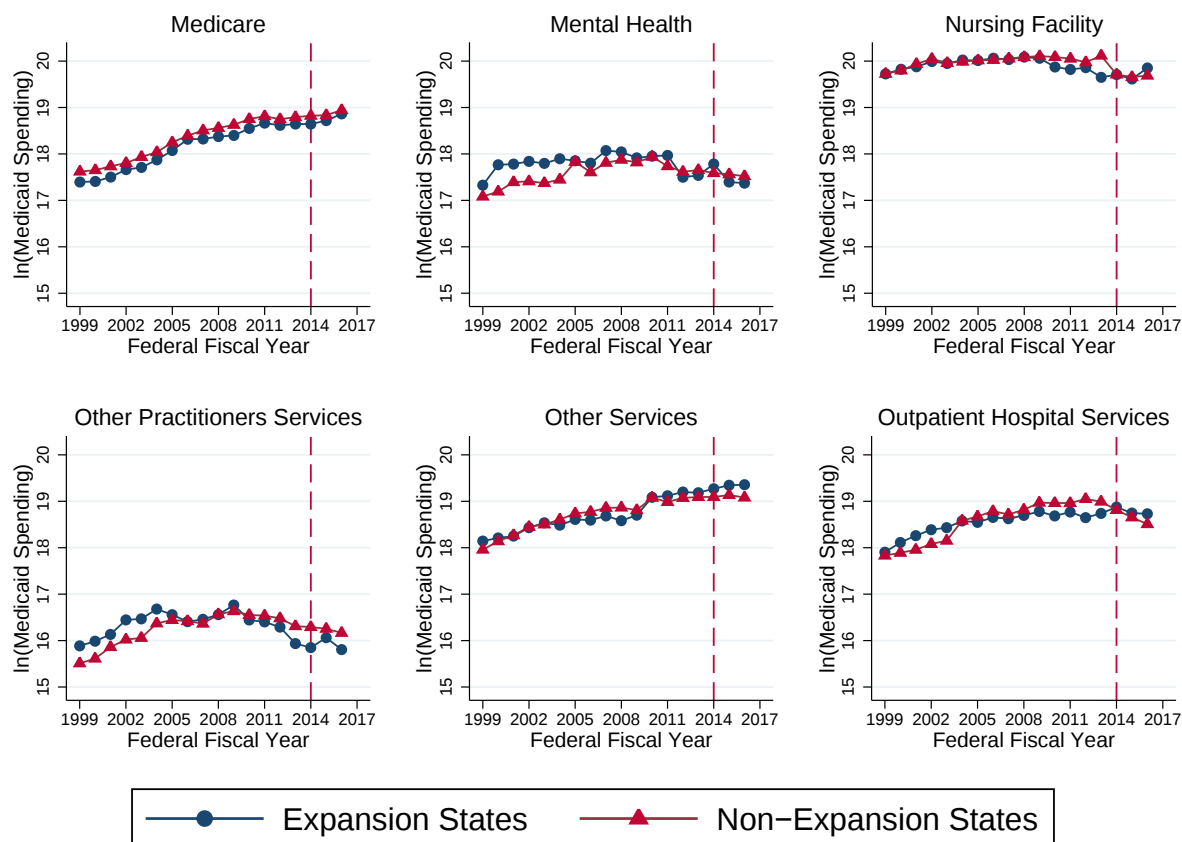
Figure C2: Trends in Medicaid Spending, Expansion Versus Non-Expansion States



Notes: The outcome variable is the log of Medicaid spending. For this outcome, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Medicaid expansion states are the states participating in the 2014 Medicaid expansion for low-income, non-elderly adults. Non-expansion states are the states that elected not to participate in the 2014 Medicaid expansion. Coverage under the Medicaid expansion became effective January 1, 2014 for most participating states.

Source: Based on the author's assessment of the annual CMS-64 Financial Management Reports for FYs 1999-2016.

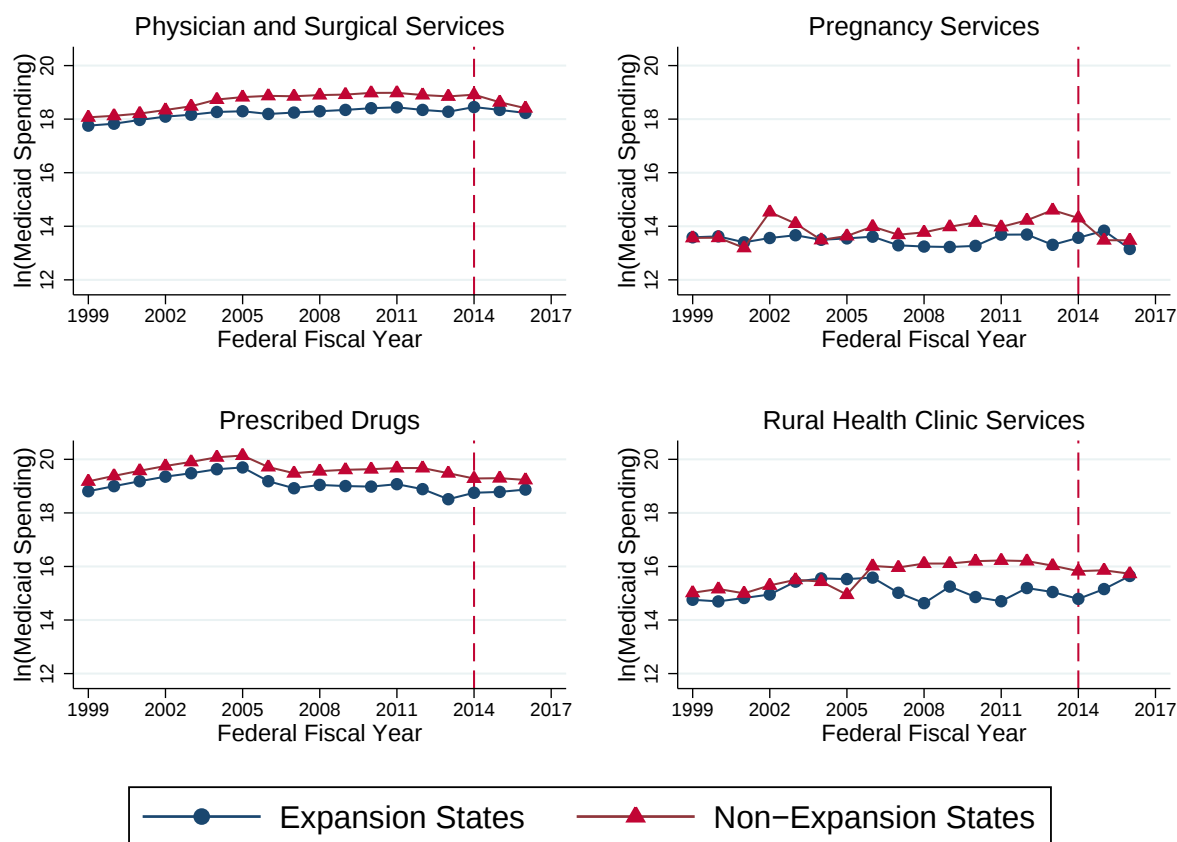
Figure C3: Trends in Medicaid Spending, Expansion Versus Non-Expansion States



Notes: The outcome variable is the log of Medicaid spending. For this outcome, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Medicaid expansion states are the states participating in the 2014 Medicaid expansion for low-income, non-elderly adults. Non-expansion states are the states that elected not to participate in the 2014 Medicaid expansion. Coverage under the Medicaid expansion became effective January 1, 2014 for most participating states.

Source: Based on the author's assessment of the annual CMS-64 Financial Management Reports for FYs 1999-2016.

Figure C4: Trends in Medicaid Spending, Expansion Versus Non-Expansion States



Notes: The outcome variable is the log of Medicaid spending. For this outcome, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Medicaid expansion states are the states participating in the 2014 Medicaid expansion for low-income, non-elderly adults. Non-expansion states are the states that elected not to participate in the 2014 Medicaid expansion. Coverage under the Medicaid expansion became effective January 1, 2014 for most participating states.

Source: Based on the author's assessment of the annual CMS-64 Financial Management Reports for FYs 1999-2016.

Appendix D: Tests for Parallel Trends

Table D1: Event Study Results by Health Care Service Category

	ln(Medicaid Spending)					
	Total Net Expenditures	Case Management Services	Clinic Services	Dental Services	EPSDT Screening	Federally-Qual. Health Center
<i>Coefficient estimates of interest (2013 is base year)</i>						
ME*Year 2016	0.203 (0.034)***	0.819 (0.567)	0.947 (0.627)	1.088 (0.540)**	0.234 (0.399)	0.703 (0.352)*
ME*Year 2015	0.165 (0.033)***	0.994 (0.522)*	0.840 (0.446)*	0.629 (0.542)	0.006 (0.321)	0.685 (0.262)**
ME*Year 2014	0.072 (0.038)*	0.357 (0.333)	0.373 (0.359)	0.233 (0.455)	-0.113 (0.305)	0.307 (0.174)*
ME*Year 2012	-0.001 (0.021)	-0.183 (0.319)	0.110 (0.316)	-0.099 (0.236)	-0.415 (0.264)	0.340 (0.256)
ME*Year 2011	-0.001 (0.025)	-0.117 (0.354)	0.157 (0.317)	-0.331 (0.398)	-0.083 (0.301)	0.708 (0.472)
ME*Year 2010	-0.035 (0.029)	-0.281 (0.518)	-0.079 (0.351)	-0.554 (0.371)	-0.138 (0.328)	0.064 (0.432)
ME*Year 2009	-0.048 (0.028)*	-0.723 (0.613)	0.272 (0.408)	-0.584 (0.405)	-0.338 (0.360)	0.248 (0.372)
ME*Year 2008	-0.057 (0.031)*	-0.046 (0.563)	0.056 (0.377)	-0.628 (0.527)	-0.274 (0.436)	0.425 (0.319)
ME*Year 2007	-0.057 (0.030)*	0.483 (0.713)	0.324 (0.400)	-0.420 (0.480)	0.044 (0.433)	0.314 (0.291)
ME*Year 2006	-0.023 (0.032)	0.103 (0.727)	0.035 (0.421)	-0.795 (0.504)	0.046 (0.502)	0.025 (0.270)
ME*Year 2005	-0.067 (0.038)*	0.406 (0.755)	0.229 (0.437)	-0.511 (0.488)	0.282 (0.547)	0.366 (0.409)
ME*Year 2004	-0.071 (0.037)*	0.330 (0.628)	-0.205 (0.473)	-0.589 (0.522)	0.091 (0.674)	0.323 (0.348)
ME*Year 2003	-0.068 (0.037)*	0.387 (0.669)	0.123 (0.429)	-0.292 (0.496)	0.410 (0.549)	0.220 (0.432)
ME*Year 2002	-0.057 (0.046)	0.382 (0.701)	0.309 (0.451)	-0.134 (0.545)	0.338 (0.595)	0.249 (0.420)
ME*Year 2001	-0.077 (0.050)	0.061 (0.742)	0.623 (0.491)	0.093 (0.634)	-0.029 (0.789)	0.372 (0.422)
ME*Year 2000	-0.064 (0.047)	0.416 (0.688)	0.535 (0.522)	0.389 (0.924)	-0.184 (0.745)	0.225 (0.405)
ME*Year 1999	-0.018 (0.048)	0.601 (0.735)	0.394 (0.558)	0.625 (0.861)	-0.471 (0.730)	0.426 (0.449)
p-Value for test that all pre-2014 interaction coefficients are = 0	0.1049	0.8133	0.5898	0.5560	0.8972	0.3031
Observations	918	836	893	909	812	841
States	51	48	51	51	50	50

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. Standard errors, heteroscedasticity-robust and clustered by state, are in parentheses. Each column represents a separate regression. All regressions include full covariates and state fixed effects. Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016.

Table C2: Event Study Results by Health Care Service Category

	ln(Medicaid Spending)					
	Home & Community Based Services	Hospice Benefits	Inpatient Hospital Services	Intermediate Care Facility	Laboratory or Radiological	Managed Care
<i>Coefficient estimates of interest (2013 is base year)</i>						
ME*Year 2016	0.074 (0.212)	0.288 (0.243)	0.276 (0.123)**	0.400 (0.311)	0.340 (0.275)	0.112 (0.643)
ME*Year 2015	0.174 (0.199)	0.318 (0.249)	0.134 (0.078)*	0.380 (0.338)	0.333 (0.214)	0.575 (0.597)
ME*Year 2014	0.056 (0.099)	0.304 (0.269)	0.085 (0.071)	0.082 (0.307)	-0.022 (0.204)	0.761 (0.495)
ME*Year 2012	-0.041 (0.078)	-0.069 (0.205)	-0.003 (0.076)	-0.255 (0.194)	-0.093 (0.140)	0.370 (0.396)
ME*Year 2011	-0.154 (0.162)	0.004 (0.222)	0.018 (0.088)	-0.235 (0.295)	-0.053 (0.181)	0.938 (0.463)**
ME*Year 2010	-0.213 (0.131)	-0.069 (0.241)	-0.034 (0.114)	-0.312 (0.238)	-0.212 (0.196)	1.421 (0.751)*
ME*Year 2009	-0.034 (0.134)	0.131 (0.280)	0.053 (0.113)	0.090 (0.405)	-0.213 (0.285)	1.239 (0.673)*
ME*Year 2008	0.034 (0.146)	0.207 (0.305)	0.088 (0.114)	0.093 (0.391)	-0.363 (0.294)	1.297 (0.661)*
ME*Year 2007	0.148 (0.166)	0.146 (0.293)	0.130 (0.106)	-0.130 (0.364)	-0.272 (0.264)	0.881 (0.583)
ME*Year 2006	0.074 (0.139)	0.180 (0.272)	0.135 (0.115)	-0.059 (0.273)	-0.377 (0.360)	1.236 (0.571)**
ME*Year 2005	0.132 (0.196)	0.244 (0.303)	0.184 (0.139)	-0.060 (0.294)	-0.009 (0.304)	1.659 (0.686)**
ME*Year 2004	-0.036 (0.183)	0.160 (0.356)	0.167 (0.126)	0.096 (0.373)	-0.250 (0.328)	1.343 (0.637)**
ME*Year 2003	-0.098 (0.169)	0.373 (0.348)	0.252 (0.120)**	-0.004 (0.353)	-0.156 (0.361)	1.067 (0.608)*
ME*Year 2002	-0.097 (0.148)	-0.034 (0.474)	0.264 (0.138)*	0.053 (0.404)	-0.186 (0.383)	1.260 (0.698)*
ME*Year 2001	-0.012 (0.176)	0.088 (0.381)	0.278 (0.156)*	0.092 (0.422)	-0.117 (0.411)	1.399 (0.808)*
ME*Year 2000	-0.089 (0.175)	0.305 (0.383)	0.291 (0.132)**	0.157 (0.425)	-0.275 (0.396)	0.701 (0.659)
ME*Year 1999	-0.064 (0.169)	0.202 (0.355)	0.227 (0.132)*	0.214 (0.427)	-0.296 (0.368)	0.558 (0.725)
p-Value for test that all pre-2014 interaction coefficients are = 0	0.7832	0.6035	0.1439	0.9525	0.4099	0.0273
Observations	918	861	918	869	903	870
States	51	51	51	50	51	51

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. Standard errors, heteroscedasticity-robust and clustered by state, are in parentheses. Each column represents a separate regression. All regressions include full covariates and state fixed effects. *Source*: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016.

Table C3: Event Study Results by Health Care Service Category

	ln(Medicaid Spending)					
	Medicare	Mental Health Services	Nursing Facility Services	Other Practitioners Services	Other Services	Outpatient Hospital Services
<i>Coefficient estimates of interest (2013 is base year)</i>						
ME*Year 2016	0.090 (0.074)	0.067 (0.253)	0.524 (0.272)*	-0.004 (0.319)	0.129 (0.199)	0.530 (0.249)**
ME*Year 2015	0.063 (0.045)	-0.002 (0.226)	0.456 (0.265)*	0.299 (0.300)	0.090 (0.176)	0.462 (0.196)**
ME*Year 2014	-0.035 (0.042)	0.167 (0.172)	0.312 (0.246)	-0.119 (0.124)	0.037 (0.151)	0.361 (0.193)*
ME*Year 2012	0.028 (0.032)	-0.034 (0.160)	0.228 (0.238)	0.066 (0.230)	-0.083 (0.170)	-0.152 (0.138)
ME*Year 2011	0.011 (0.044)	0.155 (0.189)	0.203 (0.225)	0.234 (0.287)	-0.033 (0.187)	0.052 (0.174)
ME*Year 2010	-0.042 (0.033)	-0.217 (0.196)	0.184 (0.236)	0.255 (0.278)	-0.117 (0.237)	-0.061 (0.177)
ME*Year 2009	-0.080 (0.041)*	-0.161 (0.184)	0.323 (0.299)	0.493 (0.347)	-0.277 (0.271)	-0.016 (0.192)
ME*Year 2008	-0.044 (0.068)	-0.049 (0.228)	0.356 (0.316)	0.380 (0.394)	-0.450 (0.309)	0.044 (0.220)
ME*Year 2007	-0.031 (0.056)	0.159 (0.228)	0.375 (0.336)	0.493 (0.389)	-0.348 (0.293)	0.182 (0.235)
ME*Year 2006	0.010 (0.061)	0.207 (0.280)	0.451 (0.297)	0.355 (0.420)	-0.252 (0.289)	0.054 (0.222)
ME*Year 2005	-0.010 (0.081)	0.023 (0.235)	0.352 (0.281)	0.535 (0.449)	-0.254 (0.279)	0.143 (0.280)
ME*Year 2004	0.020 (0.082)	0.334 (0.334)	0.353 (0.311)	0.678 (0.419)	-0.346 (0.281)	0.281 (0.263)
ME*Year 2003	-0.058 (0.072)	0.365 (0.369)	0.384 (0.286)	0.567 (0.425)	-0.153 (0.272)	0.570 (0.353)
ME*Year 2002	0.017 (0.082)	0.317 (0.332)	0.283 (0.280)	0.578 (0.423)	-0.215 (0.253)	0.550 (0.331)
ME*Year 2001	-0.057 (0.076)	0.342 (0.281)	0.286 (0.299)	0.492 (0.449)	-0.204 (0.294)	0.481 (0.296)
ME*Year 2000	-0.058 (0.078)	0.415 (0.333)	0.427 (0.320)	0.441 (0.448)	-0.069 (0.274)	0.368 (0.260)
ME*Year 1999	-0.088 (0.087)	0.166 (0.491)	0.303 (0.282)	0.495 (0.411)	-0.044 (0.291)	0.178 (0.271)
p-Value for test that all pre-2014 interaction coefficients are = 0	0.5640	0.4982	0.2133	0.2004	0.3668	0.3394
Observations	917	885	916	876	916	914
States	51	50	51	49	51	51

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. Standard errors, heteroscedasticity-robust and clustered by state, are in parentheses. Each column represents a separate regression. All regressions include full covariates and state fixed effects. *Source:* Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016.

Table C4: Event Study Results by Health Care Service Category

	ln(Medicaid Spending)			
	Physician & Surgical Services	Pregnancy Services	Prescribed Drugs	Rural Health Clinic Services
<i>Coefficient estimates of interest (2013 is base year)</i>				
ME*Year 2016	0.453 (0.219)**	1.082 (0.786)	0.549 (0.428)	0.803 (0.335)**
ME*Year 2015	0.382 (0.144)**	1.583 (0.747)**	0.543 (0.339)	0.438 (0.300)
ME*Year 2014	0.138 (0.112)	0.462 (0.364)	0.430 (0.340)	-0.034 (0.361)
ME*Year 2012	-0.045 (0.106)	0.917 (0.591)	0.107 (0.246)	-0.392 (0.256)
ME*Year 2011	0.012 (0.140)	0.974 (0.624)	0.330 (0.321)	-0.247 (0.259)
ME*Year 2010	-0.038 (0.159)	0.394 (0.547)	0.255 (0.320)	-0.412 (0.347)
ME*Year 2009	-0.102 (0.182)	0.560 (0.706)	0.245 (0.360)	-0.243 (0.290)
ME*Year 2008	-0.130 (0.186)	0.533 (0.779)	0.247 (0.358)	-0.338 (0.416)
ME*Year 2007	-0.038 (0.168)	0.894 (0.766)	0.384 (0.348)	-0.295 (0.321)
ME*Year 2006	-0.081 (0.210)	0.684 (0.790)	0.417 (0.404)	-0.272 (0.351)
ME*Year 2005	0.041 (0.254)	0.946 (0.951)	0.476 (0.416)	0.798 (0.653)
ME*Year 2004	0.057 (0.227)	1.202 (0.899)	0.419 (0.394)	0.356 (0.511)
ME*Year 2003	0.127 (0.239)	0.700 (0.769)	0.498 (0.394)	0.287 (0.526)
ME*Year 2002	0.118 (0.257)	0.355 (0.740)	0.461 (0.399)	0.223 (0.539)
ME*Year 2001	0.177 (0.301)	1.489 (0.974)	0.523 (0.414)	0.317 (0.531)
ME*Year 2000	0.102 (0.294)	1.429 (0.820)*	0.524 (0.408)	0.010 (0.421)
ME*Year 1999	-0.022 (0.227)	1.199 (0.906)	0.403 (0.398)	0.064 (0.449)
p-Value for test that all pre-2014 interaction coefficients are = 0	0.9443	0.1611	0.2935	0.9732
Observations	912	818	916	736
States	51	49	51	47

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. Standard errors, heteroscedasticity-robust and clustered by state, are in parentheses. Each column represents a separate regression. All regressions include full covariates and state fixed effects. Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016.

Appendix E: Difference-in-Differences Results

Table E1: Difference-in-Differences Results by Health Care Service Category

	ln(Medicaid Spending)						
	Case Management Services	Clinic Services	Dental Services	EPSDT Screening	Federally- Qualified Health Center	Home & Community Based Services	Hospice Benefits
ME*Post	0.871 (0.422)*	0.765 (0.429)	1.101 (0.414)*	-0.154 (0.346)	0.199 (0.250)	0.070 (0.137)	0.138 (0.295)
Observations	836	893	909	812	841	918	861
States	48	51	51	50	50	51	51
<i>Specification</i>							
Full covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The columns are the 21 Medicaid service categories assessed. Coefficients are reported from the variable $ME_{cs}^{*Post_{cst}}$ in Equation (1). The outcome variable is the log of Medicaid spending for each service category. For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. Panels differ by treatment states. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan. *Source:* Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016. Demographic, family, and economic time-varying covariates were obtained from the monthly Current Population Survey and mapped to the federal fiscal year for the study time period of FYs 1999-2016. The state unemployment rate was calculated using data from the Bureau of Labor Statistics' monthly state unemployment rate for FYs 1999-2016. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.

Table E2: Difference-in-Differences Results by Health Care Service Category

	ln(Medicaid Spending)						
	Inpatient Hospital Services	Intermediate Care Facility	Laboratory or Radiological	Managed Care	Medicare	Mental Health Facility	Nursing Facility Services
ME*Post	0.158 (0.081)	0.432 (0.298)	0.119 (0.277)	-0.235 (0.506)	0.027 (0.042)	0.125 (0.157)	0.100 (0.237)
Observations	918	869	903	870	917	885	916
States	51	50	51	51	51	50	51
<i>Specification</i>							
Full covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The columns are the 21 Medicaid service categories assessed. Coefficients are reported from the variable $ME_{cs} * Post_{cst}$ in Equation (1). The outcome variable is the log of Medicaid spending for each service category. For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. Panels differ by treatment states. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan. *Source:* Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016. Demographic, family, and economic time-varying covariates were obtained from the monthly Current Population Survey and mapped to the federal fiscal year for the study time period of FYs 1999-2016. The state unemployment rate was calculated using data from the Bureau of Labor Statistics' monthly state unemployment rate for FYs 1999-2016. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.

Table E3: Difference-in-Differences Results by Health Care Service Category

	ln(Medicaid Spending)						
	Other Practitioners Services	Other Services	Outpatient Hospital Services	Physician & Surgical Services	Pregnancy Services	Prescribed Drugs	Rural Health Clinic Services
ME*Post	-0.120 (0.191)	0.201 (0.153)	0.490 (0.191)*	0.266 (0.160)	0.410 (0.738)	0.292 (0.274)	0.686 (0.232)**
Observations	876	916	914	912	818	916	736
States	49	51	51	51	49	51	47
<i>Specification</i>							
Full covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The columns are the 21 Medicaid service categories assessed. Coefficients are reported from the variable $ME_{cs} * Post_{cst}$ in Equation (1). The outcome variable is the log of Medicaid spending for each service category. For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. Panels differ by treatment states. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan. *Source:* Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016. Demographic, family, and economic time-varying covariates were obtained from the monthly Current Population Survey and mapped to the federal fiscal year for the study time period of FYs 1999-2016. The state unemployment rate was calculated using data from the Bureau of Labor Statistics' monthly state unemployment rate for FYs 1999-2016. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.

Appendix F: Sensitivity Checks

Table F1: Sensitivity Check: Excluding States that Adopted the Expansion Early

	ln(Medicaid Spending)			
	Main Results Service Categories			
	Dental Services	Case Management Services	Rural Health Clinic Services	Outpatient Hospital Services
ME*Post	1.056 (0.440)*	0.233 (0.452)	0.636 (0.231)**	0.447 (0.192)*
Observations	783	731	664	788
States	44	42	42	44
<i>Specification</i>				
Full covariates	Yes	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The purpose of this robustness check is to see if the main results are impacted when the six states that adopted the expansion before January 1, 2014 (i.e., California, Connecticut, District of Columbia, Minnesota, New Jersey, and Washington) are excluded from the analysis. The columns in this table are the Medicaid service categories reported in Table 4: Main Results.

The outcome variable is the log of Medicaid spending for each service category (i.e., Clinic Services, Dental Services, etc.). For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. All treatment and control states are included in each regression. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan.

Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016. Demographic, family, and economic time-varying covariates were obtained from the monthly Current Population Survey and mapped to the federal fiscal year for the study time period of FYs 1999-2016. The state unemployment rate was calculated using data from the Bureau of Labor Statistics' monthly state unemployment rate for FYs 1999-2016. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.

Table F2: Sensitivity Check: Excluding States that Expanded Fully Prior to 2014

	ln(Medicaid Spending)			
	Main Results Service Categories			
	Dental Services	Case Management Services	Rural Health Clinic Services	Outpatient Hospital Services
ME*Post	1.012 (0.397)*	0.267 (0.482)	0.637 (0.238)*	0.426 (0.169)*
Observations	819	786	716	825
States	46	45	45	46
<i>Specification</i>				
Full covariates	Yes	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The purpose of this robustness check is to see if the main results are impacted when the five states that implemented the expansion fully prior to January 1, 2014 (i.e., Delaware, District of Columbia, Massachusetts, New York, and Vermont) are excluded from the analysis. The columns in this table are the Medicaid service categories reported in Table 4: Main Results.

The outcome variable is the log of Medicaid spending for each service category (i.e., Clinic Services, Dental Services, etc.). For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. All treatment and control states are included in each regression. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan.

Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016. Demographic, family, and economic time-varying covariates were obtained from the monthly Current Population Survey and mapped to the federal fiscal year for the study time period of FYs 1999-2016. The state unemployment rate was calculated using data from the Bureau of Labor Statistics' monthly state unemployment rate for FYs 1999-2016. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.

Table F3: Sensitivity Check: Excluding States that Implemented the Expansion Late

	ln(Medicaid Spending)			
	Main Results Service Categories			
	Dental Services	Case Management Services	Rural Health Clinic Services	Outpatient Hospital Services
ME*Post	1.309 (0.487)*	1.134 (0.508)*	0.861 (0.270)**	0.647 (0.219)**
Observations	801	744	628	806
States	45	42	41	45
<i>Specification</i>				
Full covariates	Yes	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The purpose of this robustness check is to see if the main results are impacted when the four states that implemented the expansion after January 1, 2014 (i.e., Indiana, Michigan, New Hampshire, and Pennsylvania) are excluded from the analysis. The columns in this table are the Medicaid service categories reported in Table 4: Main Results.

The outcome variable is the log of Medicaid spending for each service category (i.e., Clinic Services, Dental Services, etc.). For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. All treatment and control states are included in each regression. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan.

Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 1999-2016. Demographic, family, and economic time-varying covariates were obtained from the monthly Current Population Survey and mapped to the federal fiscal year for the study time period of FYs 1999-2016. The state unemployment rate was calculated using data from the Bureau of Labor Statistics' monthly state unemployment rate for FYs 1999-2016. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.

Table F4: Sensitivity Check: Data Restricted to a Balanced Panel (FYs 1999-2016)

	ln(Medicaid Spending)			
	Main Results Service Categories			
	Dental Services	Case Management Services	Rural Health Clinic Services	Outpatient Hospital Services
ME*Post	0.964 (0.425)*	0.319 (0.264)	0.653 (0.265)*	0.375 (0.174)*
Observations	864	666	594	882
States	48	37	33	49
<i>Specification</i>				
Full covariates	Yes	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The purpose of this robustness check is to see if the main results are impacted when states that did not report data for every year of the panel are excluded from the analysis. The columns in this table are the Medicaid service categories reported in Table 4: Main Results. In Table 4, there were 51 states reporting data for each service category. However, for four of the categories, not every state reported expenditures >0 for every year. For example, in the Clinic Services category, five of the 51 states did not report data for at least one of the study years, resulting in 46 states in the balanced panel. The number of states and observations varies by service category in the balanced panel because the balanced panel is created separately for each category. Coefficients are reported from the variable $ME_{cs} * Post_{cst}$ in Equation (1).

The outcome variable is the log of Medicaid spending for each service category (i.e., Clinic Services, Dental Services, etc.). For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. All treatment and control states are included in each regression. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan.

Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 2002-2016. Demographic and health status covariates are from the CMS Medicaid Analytic eXtract (MAX) Validation Report for 2002. The 2002 state unemployment rate was calculated using data from the Current Population Survey, 2003 Annual Social and Economic Supplement. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.

Table F5: Sensitivity Check: Data Restricted to FYs 2002-2016

	ln(Medicaid Spending)			
	Main Results Service Categories			
	Dental Services	Case Management Services	Rural Health Clinic Services	Outpatient Hospital Services
ME*Post	0.830 (0.401)*	0.800 (0.476)	0.723 (0.253)**	0.503 (0.203)*
Observations	757	696	616	764
States	51	48	47	51
<i>Specification</i>				
Full covariates	Yes	Yes	Yes	Yes
State-specific linear trend	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Notes: ***Significant at the 0.1 percent level; **significant at the 1 percent level; *significant at the 5 percent level. The purpose of this robustness check is to see if the selection of the first year of the panel impacts the main results. The columns in this table are the Medicaid service categories reported in Table 4: Main Results. Coefficients are reported from the variable $ME_{cs} * Post_{cst}$ in Equation (1).

The outcome variable is the log of Medicaid spending for each service category (i.e., Clinic Services, Dental Services, etc.). For each service category, I combine the federal and state share of the total computable costs reported for the Medical Assistance Program. Each column represents a separate regression. All treatment and control states are included in each regression. Standard errors were clustered by state. Observations are the aggregate Medicaid spending for each state-year. The number of observations varies by service category because each state decides which Medicaid services to include in their annual State Medicaid Plan.

Source: Based on the author's assessment of expenditures reported in the annual CMS-64 Financial Management Reports for 2002-2016. Demographic and health status covariates are from the CMS Medicaid Analytic eXtract (MAX) Validation Report for 2002. The 2002 state unemployment rate was calculated using data from the Current Population Survey, 2003 Annual Social and Economic Supplement. The Medicaid State Plan Amendments were used to obtain the Medicaid bump data for 2013-2016.