Three Papers Toward a Better Understanding of
State Medicaid Programs and Program Efficiency

A Dissertation submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy at George Mason University

by

Brian Christopher Blase
Master of Arts
George Mason University, 2010
Bachelor of Science
Pennsylvania State University, 2003
Bachelor of Arts
Pennsylvania State University, 2003

Director: Thomas Stratmann, Professor
Department of Economics

Spring Semester 2013
George Mason University
Fairfax, VA

DEDICATION

I dedicate this dissertation to my wife and my best friend. Two days after my first PhD class in Microeconomics with Professor Williams, she gave birth to our first son. In the following six years, we would have two additional sons. She handled the many nights that I had class and the seemingly countless hours that I spent working on this dissertation with grace. She pushed me to finish the program when I had doubts, and at least half of the accomplishment this PhD represents belongs to her.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

vi

LIST OF TABLES

**PAPER 3 : STATEWIDE HEALTH IMPACT OF TENNESSEE'S
  MEDICAID EXPANSION**

LIST OF FIGURES

PAPER 1: SUBSIDIZING MEDICAID GROWTH – THE IMPACT OF THE FEDERAL REIMBURSEMENT ON STATE MEDICAID PROGRAMS

PAPER 2: IMPACT OF HOSPITAL AND NURSING HOME TAXES ON STATE MEDICAID SPENDING

PAPER 3 : STATEWIDE HEALTH IMPACT OF TENNESSEE'S MEDICAID EXPANSION

ABSTRACT

THREE PAPERS TOWARD A BETTER UNDERSTANDING OF
STATE MEDICAID PROGRAMS AND PROGRAM EFFICIENCY

Brian Christopher Blase, PhD

George Mason University, 2013

Dissertation Director: Dr. Thomas Stratmann

The federal government provides an uncapped reimbursement of state Medicaid spending. In theory, states can use the federal Medicaid funds as a replacement for state funds or the federal funds, which take the form of a matching grant that reduces the relative price of Medicaid, can increase (or stimulate) spending on Medicaid with state-raised tax revenue. In the first dissertation paper, *Subsidizing Medicaid Growth: The Impact of the Federal Reimbursement on State Medicaid Programs*, I use a state panel data set from 1992 to 2006 to assess the impact of the federal reimbursement on the size of state Medicaid programs. I find that a one point increase in a state's Medicaid reimbursement percentage increases state per capita Medicaid spending between $5 and $16 and increases the percentage of the state's population receiving Medicaid benefits by 0.04 percent to 0.29 percent.

The first paper also utilizes a case study that shows significant growth in Alaska's Medicaid program after its effective federal Medicaid reimbursement increased 50 percent between 1998 and 1999. The large growth in Alaska's Medicaid program after this increase provides evidence that states respond to large increases in the federal Medicaid subsidy in a stimulative manner by increasing spending with state-raised revenue. Overall, the results in the first paper are consistent with the hypothesis that decentralization in the form of intergovernmental matching grants increases the size of government. I also find that states with wealthier and more liberal populations tend to have larger Medicaid programs and that states with Democratic legislatures tend to have more Medicaid beneficiaries than states with Republican legislatures all else equal.

Since 2008, states have experienced significant budgetary pressure; in large part, because of rising Medicaid enrollment due to the recession and weak recovery. Between 2009 and 2011, many states enacted health care provider taxes as a way to bring in additional revenue through the federal Medicaid reimbursement. Provider taxes are generally supported by health care providers since states often give providers an implicit or explicit guarantee of a return of at least as much funding through higher payment rates or supplemental payments. In the second dissertation paper, *Impact of Hospital and Nursing Home Taxes on State Medicaid Spending*, I assess the impact of the two largest provider taxes, the hospital tax and the nursing home tax, on state Medicaid expenditures using a panel dataset of 42 states from between 2007 and 2011. I find significantly larger Medicaid spending growth for hospitals in states that added hospital taxes and significantly larger Medicaid spending growth for nursing homes in states that added

nursing home taxes within the first two years of the enactment of the tax. I also find some evidence that states with hospital taxes were able to increase their total Medicaid spending more than states without hospital taxes during the economic downturn and initial recovery period. This paper also contains evidence that nursing home taxes diverted Medicaid spending from home and community based services to nursing homes.

In the third dissertation paper, *Statewide Health Impact of Tennessee's Medicaid Expansion*, I utilize a quasi-experimental approach to assess the impact of a large statewide public health insurance expansion on access to health care services, health care utilization, and health outcomes. In 1994, Tennessee expanded its state Medicaid program, called TennCare, by about ten percent of the state's population. Along with a major Medicaid expansion, Tennessee increased government subsidies for individuals to purchase health insurance coverage and emphasized managed care. Using a difference-in-difference methodology with Tennessee's neighboring states as controls, I found that TennCare's impact on utilization was mixed as blood pressure and cholesterol checks increased but regular physician check-ups decreased relative to the surrounding region. Surprisingly, both self-reported health and mortality rates were less favorable in Tennessee relative to the control states after TennCare. Ultimately, the evidence in this paper suggests that health reform built around a significant public insurance expansion is likely to result in minimal, if any, overall health gains measured in the entire population, at least in the short run.

The final dissertation section summarizes the findings from the three dissertation papers, discusses the economic efficiency of the uncapped federal Medicaid

reimbursement and state provider taxes, and makes several predictions related to the

Medicaid expansion in the Patient Protection and Affordable Care Act.

PAPER 1: SUBSIDIZING MEDICAID GROWTH – THE IMPACT OF THE FEDERAL REIMBURSEMENT ON STATE MEDICAID PROGRAMS

I. Introduction

Empirical work estimating the impact of higher-level government grants on lower-level government behavior has centered on the flypaper effect, the tendency of lower-level governments to spend the bulk of the grant on services rather than to decrease taxes (Hines and Thaler 1995; Inman 2008). The flypaper effect is an economic anomaly because the unconditional grant essentially represents an increase in the income of a jurisdiction. According to economic theory, if the marginal tax rate of a lower governmental unit is 10 percent, then roughly 90 percent of the unconditional grant will be rebated to taxpayers. But, substantial tax rebates following unconditional grants are uncommon (Courant et al. 1979; Hines and Thaler 1995). While economists have done significant work toward better understanding the flypaper effect, the literature is surprisingly scarce on empirical tests of the impact of matching grants. According to economic theory, intergovernmental matching grants – which combine a substitution effect from a relative price change with an income effect – should have a greater impact on particular programs than unconditional grants. In this paper, I seek to better

understand the impact of matching grants using the largest federal grant to states – the federal Medicaid subsidy.

The federal Medicaid subsidy takes the form of the federal government reimbursing a percentage of state Medicaid spending, which is officially called the Federal Medical Assistance Percentage (FMAP). In this paper, I explain the economics of the federal Medicaid subsidy and then estimate the marginal impact of the FMAP on per capita Medicaid spending, average beneficiary[1] spending, and the number of state Medicaid beneficiaries both with and without state fixed effects. In the process, this paper attempts to explain the variation between and within state Medicaid programs using a multitude of economic, demographic, and political factors.

The hypothesis is that a higher FMAP encourages a state to form a more generous program because an increased percentage of the program cost is paid by federal and not state taxpayers. I measured state Medicaid program generosity along three dimensions: the percentage of the state population that receives Medicaid-financed services, average state spending per Medicaid beneficiary, and per capita state Medicaid spending. Using a panel data set of the states for a 15-year period from 1992 to 2006, I find that states respond to higher FMAPs by increasing the size of their Medicaid programs. The estimates indicate that a one point increase in a state's FMAP leads to between a $4 increase and a $12 increase in per capita state Medicaid spending[2] and a 0.04 increase to a 0.29 increase in the percentage of the state's population receiving Medicaid benefits. There is not a discernible impact of the state FMAP on state Medicaid spending per

---

[1] In this paper, I use the term 'beneficiary,' which could be used interchangeably with the term 'recipient.'
[2] The corresponding figures are $5 and $16 adjusted for 2012 dollars.

beneficiary. For the purposes of this paper, state Medicaid spending includes both federal revenue and state revenue, unless otherwise noted.

After the general empirical analysis, I provide a case study of Alaska's Medicaid program to demonstrate the impact of a substantial increase in a state's FMAP on the size of its Medicaid program. Between 1992 and 2006, several states had a gradual change in their FMAP while the majority of states had little change.[3] Alaska, however, experienced a substantial FMAP increase between 1998 and 1999. One of the provisions of the 1997 Balanced Budget Act effectively increased Alaska's federal subsidy by 50 percent beginning in 1999.[4] I find that Alaska's Medicaid program grew substantially following its FMAP increase. This indicates that the panel estimates shown in the paper may substantially underestimate the impact of a significant FMAP change on state Medicaid program generosity.

A key question is whether the federal reimbursement of state Medicaid spending simply replaces state tax dollars with federal tax dollars or whether the reimbursement, which lowers the relative cost of Medicaid to the state, stimulates state Medicaid spending with state-raised revenue. Determining the true impact of the Medicaid subsidy is difficult because the counterfactual – the size of the state program without the matching grant – is not observed. Alaska's FMAP change, however, is useful for

---

[3] Excluding Arizona, between 1992 and 2006, four states (AK, FL, HI, and NV) experienced FMAP increases of at least 4 percent. No states had an FMAP increase between 2 and 4 percent, and 23 states experienced FMAP changes of less than 2 percent in either direction. Eleven states in the time period (AL, ID, KY, MS, NC, NM, OK, SC, TX, VT, WI) experienced FMAP decreases of between 2 and 4 percent between 1992 to 2006. Finally, 11 states (CO, LA, MN, NE, ND, SD, TN, UT, WA, WV, WY) experienced FMAP decreases of more than 4 percent.

[4] The Balanced Budget Act of 1997 was an omnibus legislative package enacted using the budget reconciliation process. It increased some welfare and children's healthcare spending and cut the growth in Medicare spending.

understanding state behavior when a program becomes much cheaper to the state because of a substantially more generous federal matching grant. I will present evidence that for Alaska, the higher federal reimbursement did not simply replace Alaska's state tax dollars with federal tax dollars, but rather significantly increased what Alaskan taxpayers spent on Medicaid. This result suggests that intergovernmental aid in the form of matching grants can significantly increase lower-level government spending as well as upper-level government spending.

II. Medicaid Background

Medicaid – the government health care program for certain categories of the poor, seniors, and the disabled – along with Medicare, the health care program largely for seniors but also for the poor and disabled, was created on July 30, 1965, through Title XIX of the Social Security Act. Medicaid was not even mentioned at the bill-signing ceremony, which focused exclusively on Medicare.[5] Although Medicaid began as an afterthought compared to Medicare, it is now the nation's largest health coverage program (in terms of beneficiaries).[6] In June 2011, nearly 53 million Americans were enrolled in Medicaid.[7] Medicaid pays for over 40 percent of all births[8] and over 40

---

[5] President Lyndon B. Johnson's remarks with President Truman at the signing of the Medicare bill. (1965, July 30). Retrieved from:
http://www.lbjlib.utexas.edu/johnson/archives.hom/speeches.hom/650730.asp.
[6] Center for Medicare and Medicaid Services. (2011). *2010 Actuarial Report on the Financial Outlook for Medicaid*. Retrieved from: https://www.cms.gov/ActuarialStudies/downloads/MedicaidReport2010.pdf.
[7] Kaiser Family Foundation. *Medicaid Enrollment: June 2011 Data Snapshot*. Retrieved from:
http://www.kff.org/medicaid/upload/8050-05.pdf.
[8] Kaiser Family Foundation. *Births Financed by Medicaid as a Percent of Total Birth, 2007*. Retrieved from: http://www.statehealthfacts.org/comparemaptable.jsp?yr=18&typ=2&ind=223&cat=4&sub=57.

percent of all long-term care expenses in the United States.[9] While Medicaid is

commonly thought of as public health insurance for poor children (and children are

nearly half of all beneficiaries), Medicaid spending on children is only 20 percent of total

Medicaid spending. Two-thirds of Medicaid expenditures support the health care and

long-term care of the elderly and disabled, who make up only a quarter of program

beneficiaries.[10]

In 2010, Medicaid payments in the United States totaled around $400 billion,

representing nearly 16 percent of all American health care spending – up from 10 percent

in 1990.[11] While total health care spending showed dramatic growth between 1990 and

2010 – up nearly 260 percent – Medicaid spending grew much faster – up nearly 445

percent.[12] Medicaid growth was driven by rising health care costs, but also by increased

program generosity. Between 1992 and 2006, the median increase in state per capita

Medicaid spending was $350 (state spending figures include state-only sources and

federal support), the median increase in state spending per Medicaid beneficiary was

approximately $600,[13] and the median increase in the number of individuals receiving

Medicaid benefits was about 6.7 percent of the state's population. By 2006, Medicaid

---

[9] Kosimar, Harriet and Shirley Thompson, Lee. (2006, February). *National Spending for Long-Term Care*. Georgetown University, Long-Term Care Financing Project. Retrieved from: *http://ltc.georgetown.edu/pdfs/natspendfeb07.pdf*; Kaiser Family Foundation. *Births Financed by Medicaid as a Percent of Total Births, 2003*. Retrieved from: http://www.statehealthfacts.org/comparemaptable.jsp?ind=223&cat=4.
[10] Kaiser Family Foundation. *Payments by Enrollment Group, FY 2008*. Retrieved from: http://www.statehealthfacts.org/comparemaptable.jsp?ind=858&cat=4.
[11] Medicaid figures come from the National Health Expenditures Data from the Center for Medicare and Medicaid Services. At the time of writing this paper, the national figures are available through 2010, but the state figures are available only through 2006.
[12] These figures shown in this sentence are not adjusted for inflation.
[13] These figures and the subsequent ones are adjusted for inflation using the consumer price index in 2000.

expenditures were about 20 percent of total state expenditures, and the median state spent (including federal funds) over $700 per capita on Medicaid – a 350 percent increase in inflation-adjusted dollars from 20 years earlier.

State participation in Medicaid is voluntary; however, all states have participated since 1982 (Buchanan et al 1991). While federal law mandates certain minimum coverage for subgroups that must be covered or benefits that must be provided through the program, Medicaid is largely decentralized and states have broad flexibility in shaping aspects of their individual programs. States are free to expand eligibility criteria and benefits beyond mandated thresholds, states set provider payment rates, and states negotiate contracts with managed care companies.

The federal reimbursement provides states with a large incentive to participate in the Medicaid program. While there are several exceptions,[14] the federal share of most Medicaid expenditures is equal to the Federal Medical Assistance Percentage (FMAP). A state's FMAP is typically determined by a formula that compares state per capita income with national per capita income.[15] The FMAP formula is designed so that poorer states face fewer burdens in financing the state share of the Medicaid program.

---

[14] Exceptions to the regular FMAP rate have been made for certain states (e.g., the District of Columbia and the territories), situations (e.g., during economic downturns), populations (e.g., certain women with breast or cervical cancer and individuals in the Qualifying Individuals program), providers (e.g., primary care physicians and Indian Health Service facilities), and services (e.g., family planning and home health services). In addition, the federal share for most Medicaid administrative costs does not vary by state and is generally 50 percent.

[15] $FMAP_{state} = 1 - ((\text{Per capita income }_{state})^2 / (\text{Per capita income }_{U.S.})^2 * 0.45)$. The 0.45 factor in the formula is designed to ensure that a state with per capita income equal to the U.S. average has an FMAP of 55 percent with a state share of 45 percent.

Typically, the states with the highest per capita income have an FMAP of 50 percent while the poorest states have an FMAP of approximately 75 percent.[16]

The FMAP formula uses a three-year average of per capita income data, and a state's FMAP is set a year in advance of its taking effect. For example, a state's 2000 FMAP was set in the fall of 1998 as a function of the state's per capita income for 1995, 1996, and 1997 relative to national per capita income in those years. Since the FMAP is set more than a year prior to its taking effect, states have time to modify their existing eligibility criteria and program benefits before program spending is impacted by the new FMAP. Medicaid financing rules require states to spend their own funds to receive a federal reimbursement, and there are no federal limits on how much state spending can be reimbursed (Coughlin and Zuckerman 2002). Typically, the federal government pays about 57 percent of national Medicaid expenditures, although the federal share significantly increased as a result of a provision of the American Reinvestment and Recovery Act.[17] The relative size of the transfer is enormous as almost half of all federal funds transferred to the states are channeled through the federal reimbursement of state Medicaid spending.[18]

The federal Medicaid reimbursement allows state politicians to increase state government spending while passing at least half of the cost to taxpayers outside their

---

[16] Section 1905(b) of the Social Security Act

[17] In 2010, the federal share of Medicaid spending was $269.5 billion, which represented 67.1 percent of total Medicaid spending, which was $401.4 billion. The federal share of Medicaid spending in 2010 was about 10 percent greater than the traditional share because of the 2009 American Recovery and Reinvestment Act's provision increasing the federal share of Medicaid spending.

[18] In 2006, over 43 percent of federal funds transferred to states were channeled through Medicaid. This percentage has consistently risen over the last few decades.

jurisdiction. Before Congress in 2004, Kathryn Allen – Director of Health Care for

Medicaid and Private Health Insurance Issues – testified that states often go to creative

lengths to increase incoming federal Medicaid funds:

> For many years states have used varied financing schemes, sometimes
> involving IGTs [inter-governmental transfers], to inappropriately increase
> federal Medicaid matching payments. Some states, for example, receive
> federal matching funds on the basis of large Medicaid payments to certain
> providers, such as nursing homes operated by local governments, which
> greatly exceed established Medicaid rates. In reality, the large payments
> are often temporary, since states can require the local-government
> providers to return all or most of the money to the states. States can use
> these funds – which essentially make a round-trip from the states to the
> providers and back to the states – at their own discretion.[19]

This practice, in which states induce the federal government to increase the federal share

of spending without real state contributions, is commonly referred to as "Medicaid

maximization." The federal match also encourages states to bring as many health care

programs under the Medicaid umbrella as possible. By shifting services into Medicaid,

states get federal dollars to help pay for services that previously had been financed solely

with state funds (Coughlin and Zuckerman 2002). This practice has occurred for decades

as Holahan and Cohen found that states shifted previously state-funded health programs

into Medicaid in the 1980s (Holahan and Cohen 1986).

---

[19] Allen, Kathryn, Director of Health Care – Medicaid and Private Health Insurance testimony before the
House Committee on Energy and Commerce Health Subcommittee. (2004, March 18). *Intergovernmental
Transfers Have Facilitated State Financing Schemes*. Retrieved from:
http://www.gao.gov/new.items/d04574t.pdf.

III. Theory of Intergovernmental Grants

In theory, intergovernmental grants should generally serve one or more of three primary purposes: to internalize spillover benefits gained by other jurisdictions, to equalize fiscal capacity across jurisdictions, and to improve the overall tax system (Oates 1999). The federal Medicaid subsidy does not satisfy any of these purposes, however. While health care does contain externalities – treatments of contagious disease for example – health care is generally a private good. Moreover, Medicaid spending by one state is unlikely to produce many spillover benefits to residents in other states, especially given the federal floor for both eligibility and coverage of services. The goal of fiscal equalization could be achieved directly and more efficiently by redistributing tax revenue from wealthier states to poorer states in the form of unconditional grants. Rather, the primary rationale for the federal Medicaid subsidy is to lower the state cost of paying for health care services received by lower income residents. By lowering this cost, the federal subsidy encourages states to undertake initiatives that they would not have otherwise or to go beyond what they would have done without the federal match (Coughlin and Zuckerman 2002).

In theory, federal matching grants can have two effects on a state's spending with state revenue: a replacement effect or a stimulative effect. A grant to the states has a replacement effect if states simply spend federal dollars in lieu of state dollars. In this case, the program's size and scope is roughly the same with or without the federal subsidy. Since money is fungible, the state could use the bulk of the grant to increase spending in some other area or to reduce state taxes. Bradford and Oates (1971) describe

this effect as equivalent to a reduction in the tax burden for state taxpayers. The second possibility is that the matching grant, by lowering the relative price of state spending for the program affected by the grant, stimulates spending on the program with state-raised revenue as a way to leverage additional federal dollars.

Figure 1 graphically demonstrates the impact of the federal Medicaid match. The solid line represents the state budget constraint and shows the tradeoff between the quantity of state-financed Medicaid services and the quantity of all other items in the state budget. The state median voter has preferences regarding this tradeoff, which is represented by the indifference curve. In the absence of the federal grant, the median voter's optimal bundle of Medicaid and other state spending is located at point A. Economic theory shows that intergovernmental matching grants have both a substitution effect and an income effect. The substitution effect, which reduces the relative price of Medicaid to the state, induces state policymakers to spend additional funds on Medicaid. The income effect will likely also induce an increase in Medicaid spending as health care and social welfare programs are normal goods. The impact of the federal Medicaid matching grant is to rotate the budget constraint outward (as illustrated by the dotted line) as the price of providing a unit of services through Medicaid becomes relatively cheaper.

The impact of the matching grant will be to move the state from point A to somewhere on the new budget line between the two points where the budget line intersects the indifference curve. Although possible, it is highly unlikely that the federal Medicaid match will result in the state spending less on Medicaid when the federal funds are included in total Medicaid expenditures. This means any point to the left of point C

10

on Figure 1 is unlikely. This does not mean that a state will necessarily spend more of its own resources on Medicaid; only that the state will not purchase an amount of Medicaid services less than what it would purchase in the absence of the matching grant.

At point C, the state is purchasing the same quantity of Medicaid as before the grant but instead of state taxpayers bearing the full cost, much of the cost is now being paid by federal taxpayers. This frees up state resources, allowing the state government to purchase more of other items, such as teachers, police, or bridges. The state could also conceivably end up at point D or point E. At point D, the state is buying a greater amount of Medicaid services as well as more of other items. And at point E, the Medicaid matching grant has reduced the price of purchasing Medicaid services to such a great extent that the state is buying more Medicaid services with state-raised revenue and less of other items. The more stimulative the effect of the grant, the greater amount of Medicaid services purchased with state-raised revenue relative to other items in the budget. Therefore, although point D and point E both represent a stimulative effect, point E illustrates a point with a greater stimulative effect.

Previous Research

Many economists have tested whether decentralization of government power has a constraining effect on the size of government. The key appears to be whether decentralization results in tax competition between jurisdictions. Since increasing taxes on a mobile resource provides an incentive for the resource (generally people or capital) to leave the jurisdiction, tax competition between jurisdictions exerts a constraining

11

influence on government size. Alternatively, Rodden (2003) showed that if

decentralization is funded by "common pool" resources, such as intergovernmental

grants, government often grows. Using a panel data set of OECD countries, Rodden

found that decentralization funded by common pool resources is directly related to

growth in government. Rodden's work builds upon previous work (Buchanan 1977;

Weingast et al. 1981) that demonstrated that when the costs of government expenditures

are externalized to individuals outside the jurisdiction, individuals within the jurisdiction

consume public resources beyond the socially optimal quantity.

Oates (1991) noted that intergovernmental grants create the appearance that local

public expenditures are funded by nonresidents, and this causes voters to demand an

excessive amount. Although the decentralization of Medicaid allows states to experiment

with different coverage and payment designs, most of the cost of a state's program is not

borne by the state's own taxpayers. Medicaid dollars that come from out-of-state

taxpayers initially benefit the patients and health care and long-term care industries in a

state, before the spending multiplies through the economy. Some economists view

intergovernmental grants like the federal Medicaid subsidy as cartel-like collusion among

lower-level governments to avoid the effects of tax competition (Grossman 1989;

Grossman and West 1994). Careaga and Weingast (2000) refer to this as the "fiscal law

of 1 over n" in which state incentives for fiscal discipline are undermined by federal

revenue sharing.

Several researchers have tried to measure the influence of the FMAP on state

Medicaid programs. Adams and Wade attempted to estimate the relative importance of

the replacement effect versus the stimulative effect of the FMAP using a state panel data set from 1984 to 1992. They found that states spent more on Medicaid as its price was lowered (its FMAP was raised) by using the additional federal funds to slightly reduce state taxes after the FMAP increase (Adams and Wade 2001). They tempered their results by acknowledging that estimating actual substitution rates for matching grants is difficult.

Using data for 47 states from 1977 through 1987, Buchanan et al. tested a model that focused on economic, political, and administrative factors to explain variation across state Medicaid programs. They controlled for the FMAP and found that it was not related to greater state Medicaid spending, although they did not use state fixed effects (Buchanan et al. 1991). Holahan and Cohen, in contrast, found that higher federal matching rates were associated with additional Medicaid spending (Holahan and Cohen 1986). More recently, Holahan observed that most states do not take advantage of the higher matching funds and that the federal and state spending per person in poverty is much greater in wealthier states. According to his argument, poorer states are less able to afford increased Medicaid spending and this mitigates the impact of their higher FMAP (Holahan 2007). Holahan may be correct, but it is also possible that states take advantage of higher FMAPs and other factors, such as greater wealth, fewer people in poverty, or different views of the social safety net are the reason wealthier states spend more on Medicaid per person in poverty.

In order to receive the federal match, states must provide Medicaid coverage to certain populations, such as children under the age of six and pregnant women whose

13

family income is at or below 133 percent of the federal poverty level, Supplemental Security Income recipients, infants born to Medicaid-eligible pregnant women, and certain people with Medicare.[20] Since 1984, Congress has allowed states to expand Medicaid eligibility to individuals with higher incomes within federally-set limits (Baughman and Milyo 2008). Since states have discretion with regards to optional populations, Kousser hypothesized that state characteristics, such as state income, party control of the legislature, and the FMAP would have a greater impact on state Medicaid spending on optional groups than on mandatory groups. Using data for 46 states from 1980 to 1993, Kousser found that the federal match was strongly correlated with increased state Medicaid spending on optional populations while the federal match was more weakly correlated, although still significant in one of the two specifications, with spending on mandatory groups.

Baughman and Milyo (2008) found that the federal matching rate was negatively associated with state eligibility levels for the State's Children Health Insurance Program (S-CHIP). This finding would seem to violate the economic theory of intergovernmental matching grants that shows grants should increase spending in the area impacted by the grant. However, the federal reimbursement of S-CHIP is not actually a matching grant. As opposed to the open-ended federal Medicaid reimbursement, the federal contribution to states for S-CHIP is capped. Therefore, while poorer states receive a higher contribution for their S-CHIP, the marginal federal reimbursement for spending beyond

---

[20] Centers for Medicare and Medicaid Services. *Mandatory Eligibility Groups*. Retrieved from: https://www.cms.gov/medicaideligibility/03_mandatoryeligibilitygroups.asp.

the cap is zero. The federal S-CHIP reimbursement would be more appropriately modeled as an unconditional grant.

IV. Other Factors Impacting the Generosity of State Medicaid Programs

Buchanan et al. (1991) found that state per capita income was the strongest predictor of state Medicaid expenditures, but neither the degree of state liberalism nor interparty competition were significant predictors of state Medicaid expenditures. Hanson (1984) found that party control did not have a significant effect on the size of state Medicaid programs. After separating out spending on mandatory and optional Medicaid populations, Kousser (1993) found that Republican control of both houses of the state legislature led to lower spending for optional groups. Kousser found that a larger minority population was also associated with less Medicaid spending for optional groups. This finding was consistent with several other studies (Grogan 1994; Kronebusch 1993) that have found that the larger a state's nonwhite population, the less money spent on welfare programs. In addition to the federal match, Kousser found that state per capita income, a female head of household, and state population under 18 were positively associated with state Medicaid spending on optional beneficiaries. Kousser's research also showed that the factors that impact optional spending are not the same as factors that impact total spending. Although he had a panel data set, Kousser did not utilize state fixed effects.

Baughman and Milyo (2008) found wide disparity across the states in the percentage of children eligible for Medicaid and S-CHIP, ranging from between 32

15

percent of children on the low end to 80 percent of children on the high end. In their

working paper, they simulated the fraction of children who would be eligible for

Medicaid/S-CHIP in a state using a single national cross-sectional sample in order to

determine the factors that were responsible for the wide variation in eligibility thresholds

for S-CHIP.[21] Baughman and Milyo found that the generosity of S-CHIP was positively

associated with a greater percentage of Democrats in the state legislature but other

political factors, such as the party of the governor, voter turnout, and legislative term

limits were not important. Baughman and Milyo also found that higher state per capita

income was strongly correlated to increased eligibility, and perhaps surprisingly they

found that higher eligibility thresholds were positively correlated to the percentage of the

state population that was black.

V. Model

In a cross-sectional regression, states with higher FMAPs are expected to have

more generous Medicaid programs all else equal. I was able to obtain Medicaid spending

and recipients, by state, from before 1999 from the Health Care Financing Association

Form 2082 and from 1999 and later from the Medicaid Statistical Information System

State Summary Data.

---

[21] Baughman and Milyo used an eligibility measure that collapsed all the different eligibility guidelines into a single measure of how many children would be eligible for Medicaid or SCHIP in the state. According to Baughman and Milyo, the measure captures only legislative decisions and not changes in the demographic composition of state population because an eligibility percentage is estimated for each state and year using the full national sample.

Many state demographic, economic, and political factors are likely to also influence the generosity of state Medicaid programs. In order to control for demographic, economic, and political factors that may influence state Medicaid program generosity, I included the following variables in the model: percentage of the state population below 18, percentage of the state population above 65, percentage of the state population that is female of child-bearing age (15-44), state per capita income, state unemployment rate, state poverty rate, electorate ideology, and dummy variables for the party of the governor, Democratic control of both houses of the state legislature, Republican control of both houses of the state legislature, and region of the country.[22]

The advantage of using a cross-sectional regression to estimate each factor's impact is that these factors exhibit significant variation across states. This variation is beneficial for approximating the impact of each factor on the size of state Medicaid programs. Greater variation in the independent variables generally produces more reliable estimates of the true effect of the variable. I clustered standard errors by state since each observation is not independent as states in different years are not independent from each other.

It is possible that unobserved state characteristics could be correlated with explanatory variables. For example, if states with a culture of generosity toward the poor have higher FMAPs on average, there would be an upward bias in the estimate of the FMAP parameter. Therefore, I also ran regressions with state dummies to control for

---

[22] Electorate ideology is determined using the presidential election results for 1992, 1996, 2000, 2004, and 2008 by state. I calculated state ideology as the Democratic percentage of the two-party presidential vote in the state subtracted by the national Democratic percentage. In the non-presidential election years, the values are interpolated.

unmeasured or unobservable state characteristics. The key assumption with state fixed

effects is that unobserved variables by state do not change over time. However, the

limitation of using state fixed effects is that there is only slight variation for many of the

factors over time within a state. Therefore, confidence that the estimates from the model

capture the true effect of the factors on the size of state Medicaid programs will be

bolstered if the estimates for the cross-sectional and fixed effects regressions are

consistent and significant.

The estimated equation is:

(1) $M_{st} = \beta FMAP_{st} + \delta X_{st} + \zeta_t + \nu_s + \varepsilon_{st}$

M_{st} is the generosity of the state Medicaid program in year t and it takes on the

following three specifications: the percentage of the state population that receives

Medicaid benefits, Medicaid spending per beneficiary, and state Medicaid spending per

capita (all amounts include the federal share of Medicaid spending).[23] $FMAP_{st}$ is the

FMAP for state s in year t. X_{st} is a matrix of control variables for state s in year t.

Finally, ζ_t is a year dummy, ν_s is a state dummy (which is present in the regressions with

---

[23] Some researchers have criticized using spending as a dependent variable because of the impact of
unobserved factors, such as the price of health care and the take-up rate of public programs. However,
while using state eligibility thresholds to measure generosity has its advantages, this choice of a dependent
variable misses other key characteristics of state generosity. For example, the reimbursement rates states
pay providers as well as state outreach to Medicaid eligible populations are clearly components of state
Medicaid generosity that will be picked up using program spending, but not eligibility thresholds.

fixed effects), and ε_{st} is the error term. I ran these regressions using a panel data set consisting of 49 states.[24]

All the regressions were replicated after excluding four states (New York, Alaska, Hawaii, and Wyoming) with highly variable program features as a robustness check of the initial estimates. New York was excluded for two reasons. The first reason is that New York's Medicaid program from 1992 to 2006 dwarfed the size of other state programs. In 2006, New York's Medicaid expenditures equaled about 15 percent of national Medicaid expenditures, although New York only had about 6.4 percent of the national population.[25] While New York has an extremely generous Medicaid program, it also has the lowest possible FMAP. Therefore, including New York might bias the FMAP coefficient downward. The second reason, which may be a contributing cause of New York's large program is that New York counties pay half of the state share of Medicaid spending or one-fourth of the state's total Medicaid expenditures. Since state general fund revenue only accounts for a quarter of New York's Medicaid expenditures, New York State elected officials have an incentive to expand the state's Medicaid program.

Most state FMAPs have small changes, if any, from year to year. Three states experienced sizeable FMAP changes between 1992 and 2006: Alaska, Hawaii, and Wyoming. Alaska was the only state between 1992 and 2006 to have a large FMAP

---

[24]Arizona was omitted because of its unusual program characteristics – at the beginning of the period. Medicaid care was delivered through managed care and it has a very limited and unusual program. It has been standard in empirical Medicaid studies to exclude Arizona.

[25] The Public Policy Institute of New York. *2006 Medicaid spending, total and per capita.* Retrieved from: http://ppinys.org/reports/jtf/medicaidtotal.html.

change (effectively increasing its federal Medicaid reimbursement by 50 percent) from

one year to the next. Hawaii's FMAP change was similarly large, although more gradual.

Hawaii received a steady FMAP increase from 50 percent in 1999 to nearly 59 percent in

2003 – rising by about two percent each year. Both of these FMAP changes were made

by the 1997 Balanced Budget Act under the rationale that the standard FMAP calculation

harmed Alaska and Hawaii.[26] Finally, Wyoming was an outlier because of the substantial

decline in its FMAP between 1992 and 2006. Wyoming's real per capita income

increased by $17,000 during this 14-year period, nearly $10,000 greater than the national

increase. As Wyoming's wealth grew, its FMAP declined from 69.1 percent to 54.2

percent between 1992 and 2006. Its FMAP decline of 14.9 was twice as high as the state

with the next highest drop, South Dakota.

VI. Results

Table 1 presents summary statistics of the variables, and it shows the wide

differences between state economic, demographic, and political characteristics as well as

state Medicaid spending and enrollment. For example, as stated earlier, New York's

Medicaid program is by far the most generous in the nation. Between 1992 and 2006,

New York's Medicaid spending per beneficiary was $7,508 (in 2000 dollars) and its per

capita Medicaid spending was $1,443 – two and a half times the mean of state per capita

Medicaid spending ($600). At the other end, Nevada's average per capita Medicaid

---

[26] These two states have both a high cost of living and a high poverty rate. These characteristics did not lead to a higher reimbursement percentage because the FMAP formula only takes per capita income into account.

spending in this 15-year period was $270 – less than half the mean of state per capita

Medicaid spending. The results presented in Table 3 and Table 4 attempt to explain

Medicaid program differences between (Table 3) and within (Table 4) states.

Medicaid Program Generosity Between States

The results presented in Table 3 show the parameter estimates of Equation (1),

with standard errors clustered by state and regional dummies instead of state fixed

effects. The first two columns show the estimated effect of the explanatory variables on

per capita state Medicaid spending (again, all spending figures include the federal share),

the third and fourth columns show the estimated effect on spending per beneficiary, and

the final two columns show the estimated effect on the percentage of the state's

population receiving Medicaid benefits. The first column in each category shows the

results for all the states, except Arizona. The second column in each category shows the

results after removing Alaska, Hawaii, New York, and Wyoming.

The state FMAP is a significant factor in explaining the disparity in Medicaid

program generosity between states. The FMAP coefficient in the per capita Medicaid

spending specification is significant at the 5 percent level, including and excluding the

four states. Moreover, the coefficients are very similar and indicate that a one percentage

point increase in a state FMAP is associated with an approximate $11.50 increase in per

capita state Medicaid spending all else equal.[27] The positive association between the

---

[27] $11.50 in 2000 dollars is approximately $15.33 in 2012 dollars.

FMAP and state Medicaid spending is driven by a positive association between the FMAP and the number of program beneficiaries.

In both specifications – with and without the outlier states – a one percentage point higher state FMAP is associated with an additional 0.29 percent of the state population receiving Medicaid. Using this point estimate, two otherwise identical states with five million people would be expected to differ by about 14,500 Medicaid beneficiaries for each one percent difference in the state FMAPs. The higher FMAP likely either causes states to raise eligibility thresholds or to engage in greater outreach to enroll individuals in Medicaid. It is also possible that a higher FMAP leads states to increase payment rates to providers, which in turn cause more providers to treat Medicaid recipients, and as a result a greater number of program beneficiaries.[28]

The explanatory variables – other than the state FMAP – are state demographic, economic, and political factors. Of the three factors, state economic characteristics are most strongly correlated to variation in state Medicaid program generosity. The results suggest that wealthier states spend more per capita on Medicaid with both higher spending per beneficiary and greater numbers of beneficiaries. An extra $1,000 in state per capita income is associated with a $12 increase in per capita Medicaid spending all else equal for the full data set. The estimate is smaller ($6 increase), though still significant, when New York and Alaska – states with high per capita income and very generous programs – as well as Wyoming and Hawaii are excluded. Although not precise, the results suggest that an extra $1,000 in state per capita income leads to about

_____

[28] All of these areas are worthy of further research.

$40 more spending per beneficiary and an additional 0.05 percent of state residents

receiving Medicaid benefits.[29]

As expected, per capita state Medicaid spending is positively correlated with both

the state unemployment rate and the state poverty rate. A one percent higher

unemployment rate is associated with $41 in additional Medicaid spending per capita in

the entire data set and $16 in additional Medicaid spending per capita when the outlier

states are removed.[30] The increase is a result of both more beneficiaries and additional

spending per beneficiary, although neither of these effects is significant. It is not

surprising that a higher unemployment rate is associated with a greater number of

Medicaid recipients. This is because the individuals who are most likely added to

Medicaid programs when unemployment increases are children and their parents who

experience a drop in household income. These individuals tend to be relatively healthy,

which would seemingly lower average beneficiary spending. It is surprising, therefore,

that the unemployment rate coefficient for the spending per beneficiaries regressions is

also positive.

A one percentage point increase in the state poverty rate is associated with a $19

increase in state per capita spending in the full data set and a $7 increase when the outlier

states are removed.[31] Both these coefficients are significant at about the ten percent

significance level. Although there is no discernible relationship between the state

---

[29] Unless otherwise noted, the coefficients reported in this section are the average of the coefficients from the regressions with the full data set and the regressions after excluding Alaska, Hawaii, New York, and Wyoming.
[30] These corresponding figures are $55 and $21 adjusted for 2012 dollars.
[31] These corresponding figures are $25 and $9 adjusted for 2012 dollars.

poverty rate and average beneficiary spending, higher state poverty rates are strongly

correlated to greater numbers of program beneficiaries. Holding the other factors

constant, a one percentage point increase in the state poverty rate corresponds to an

additional 0.29 percent of the state's population receiving Medicaid benefits. It is

noteworthy that a one percentage point increase in the state poverty rate and a one

percentage point increase in the state FMAP produce a virtually identical increase in the

number of Medicaid beneficiaries.

The model included four political variables: the ideology of the state electorate

and dummy variables for the party of the governor, Republican control of both houses of

the state legislature, and Democrat control of both houses of the state legislature. Along

with the FMAP and per capita income, the ideology of the state electorate was the only

variable significant in both per capita spending regressions (Columns 1 and 2) at the 5

percent level. A more liberal state electorate is strongly associated with a greater number

of program beneficiaries. A one percentage point increase in the presidential Democratic

two-party vote share (the proxy of electorate ideology) is associated with an increase of

$5.40 in per capita state Medicaid spending and an increase of approximately 0.14

percent of the state population receiving Medicaid benefits all else equal.[32] For example,

on the ideology scale Alabama is about 12 points more conservative than the median state

and Pennsylvania is about 3 points more liberal than the median state. All else equal, this

15-point spread means Pennsylvania is expected to spend about $75 more per capita on

---

[32] $5.40 in 2000 dollars is approximately $7.20 in 2012 dollars.

Medicaid and have about 2 percent more of its population receiving Medicaid benefits than Alabama.[33]

The party of the governor is not associated with significant differences in state Medicaid generosity, although Democratic governors are associated with slightly more beneficiaries and somewhat less spending per beneficiary. Although not significant, Republican control of both bodies of the state legislature is associated with less Medicaid beneficiaries equal to about 0.8 percent of the state population. Unified state legislative bodies, whether Republican or Democrat, are associated with greater spending per beneficiary, but the estimates are imprecise. When the outlier states are excluded, a unified Democratic legislature is associated with an additional $287 of spending per beneficiary and a unified Republican legislature is associated with an additional $116 of spending per beneficiary.[34]

Most of the demographic variables are not correlated with state Medicaid program generosity. Of the age variables, the only one with a meaningful impact on state Medicaid generosity is the percentage of the state population consisting of women of child-bearing age (15-44). An additional one percent of the state population consisting of women of child-bearing age is associated with about $30 more per capita Medicaid spending[35] and about 1.1 percent more of the state population receiving Medicaid benefits.[36] Since Medicaid pays for roughly 40 percent of births nationally, the direction

---

[33] $75 in 2000 dollars is approximately $100 in 2012 dollars.
[34] These corresponding figures are $383 and $155 adjusted for 2012 dollars.
[35] $30 in 2000 dollars is approximately $40 in 2012 dollars.
[36] These figures, like the subsequent ones in the paper, are an average of the estimates in the two specifications in Table 3.

of this relationship is unsurprising. The coefficient probably exceeds one because the percentage of women of child-bearing age in a state is likely strongly correlated with the percentage of young children in a state; and other than pregnant women, young children have the highest probability of being enrolled in Medicaid.

Since seniors typically have much higher average health expenses and Medicaid is the nation's largest payer of long-term care services, I expected that states with higher concentrations of seniors would have higher per capita Medicaid spending all else equal. This did not turn out to be the case, however. States with higher concentrations of seniors do not have more generous Medicaid programs all else equal. The percentage of the state under the age of 18 is weakly associated with less generous Medicaid programs. The regression estimates also suggest that state Medicaid generosity is not significantly impacted by the racial make-up of the state population. The Hispanic percentage of the state is the only race variable with a statistically significant relationship to state Medicaid generosity. A larger concentration of Hispanics in a state is associated with more Medicaid beneficiaries but less spending per beneficiary. This finding is somewhat contrary to several studies (Alesina et al. 2001; Grogan 1994; Kronebusch 1993) that have found increased racial diversity to be a strong predictor of less redistributive government policies.

I included regional dummies to account for additional factors, such as geographic variation in health care practices, cost of living, and attitudes toward welfare programs, which would impact state Medicaid programs. Moreover, regional dummies can correct

for part of the empirical problem that state parties are different than national parties.[37]

For example, between 1992 and 2006 – particularly the earlier part of the period –

Democrats dominated state legislatures in the South. But, Democrats in the South tend to

be far more conservative than Democrats in New England, where Democrats also tend to

dominate state legislatures. Controlling for geographic region allows me to better

separate the impact of the Democratic legislature from other state cultural factors that

influence attitudes toward government programs.

Table 2 shows the means of the three dependent variables as well as the means of

the independent variables which are most significant in explaining variation in state

Medicaid programs across eight geographic regions of the country. The table shows that

states in the South and on the Pacific coast have more Medicaid beneficiaries than

average while states in the Mid-West and Mountain regions have fewer beneficiaries.

States in New England and the Mid-Atlantic region spend over $1,000 more per

beneficiary than mean state spending per Medicaid beneficiary while states in the South

and on the Pacific coast spend nearly $1,000 less.[38] Between 1992 and 2006, average per

capita Medicaid spending in New England was $814, which was more than 30 percent

higher than mean state per capita Medicaid spending of $601.[39] The Mid-Atlantic region

was also well above the national average, spending $751 on Medicaid per capita during

this period, but this was solely because of New York's large program.[40] After excluding

---

[37] Electorate ideology also partly corrects for the problem that state parties are different than national parties.
[38] $1,000 in 2000 dollars is approximately $1,333 in 2012 dollars.
[39] These corresponding figures are $1,085 and $801 adjusted for 2012 dollars.
[40] $751 in 2000 dollars is approximately $1,001 in 2012 dollars.

27

New York, the mid-Atlantic region drops to slightly below mean state per capita

Medicaid spending. The Mountain region and the Pacific coast (especially when Alaska

and Hawaii are excluded) spend significantly less per capita on Medicaid relative to the

rest of the country.

Table 2 also shows that higher FMAPs are not directly correlated with greater per

capita Medicaid spending. New England states have relatively low state FMAPs and they

spend the most on Medicaid. Other than Southern states, states along the Rocky

Mountains have the highest FMAPs. But, these states spend 25 percent less per capita on

Medicaid relative to mean state per capita Medicaid spending. However, the Mountain

states are the most conservative part of the country (on average, Mountain states were

slightly more conservative between 1992 and 2006 than states in the South) and they also

had a relatively low unemployment rate during the time period, both of which are factors

correlated with less generous Medicaid programs.

Medicaid Program Generosity Within States

The difference between the estimates in Table 3 and the estimates in Table 4 are

that the ones in Table 4 include state fixed effects to control for unobserved variation

between states while the ones in Table 3 have the geographic dummies. The advantage

of using state fixed effects is that factors that vary across states but not necessarily across

regions or factors that vary across states in the same region that were left out of the model

may impact the estimates in Table 3. State dummies control for unique state

characteristics that are excluded from the model. As a result, the coefficients in Table 4

measure changes in Medicaid generosity within states resulting from changes in the underlying explanatory variables within the state over time. However, some variables, in particular the demographic ones, do not change a great deal from year to year. Thus, there is a risk of attributing a large effect to a small change in an explanatory variable. For this reason, Table 4b shows the results after excluding the demographic variables.

The results from the per capita spending regressions indicate that a higher state FMAP produces greater per capita Medicaid spending. The estimates from Table 4a show that an increase in a state FMAP of one percentage point corresponds to an increase in state Medicaid spending of approximately $5.[41] The estimates are nearly identical with and without Alaska, Hawaii, New York, and Wyoming, and the estimates are significant at the 7 percent level when the four states are removed. When the population demographic variables are removed, there is a spread between the estimates from the full data set and the estimates when the four states are removed. The FMAP coefficient increases to $9 using the full data set and declines to about $4 when Alaska, Hawaii, New York, and Wyoming are excluded. Taken together, however, the significance of the four regression coefficients suggests that increases in FMAPs cause states to spend more on Medicaid. Based upon these four estimates, it is likely that the true effect of a one percentage point increase in the state FMAP is an increase in state per capita Medicaid spending in the range of $4 to $9.[42]

The estimates in Column (3) – Column (6) of Table 4a and Table 4b show that changes in the FMAP are more strongly correlated with the number of beneficiaries than

---

[41] $5 in 2000 dollars is approximately $6.50 in 2012 dollars.
[42] These corresponding figures are $5.33 and $12 adjusted for 2012 dollars.

average spending per beneficiary. The FMAP coefficient is positive in all four

specifications in the beneficiary regressions (Columns 5 and 6 in Table 4a and 4b). The

average of the four coefficients indicates that a one percentage point increase in the state

FMAP produces about a 0.10 percent increase in the percentage of the state population

receiving Medicaid benefits. The estimate is significant in one of the four specifications

at the 5 percent level and in three specifications at the 16 percent level.

The demographic variables from Table 4a show that an increasing percentage of

seniors are correlated with greater per capita Medicaid spending, which is somewhat

surprisingly driven by an increasing percentage of the state population as beneficiaries

and not by greater spending per beneficiary. A greater percentage of women of child-

bearing age within a state are predictably associated with increasing beneficiaries over

time without a discernible impact on spending per beneficiary. The coefficients for the

demographic variables should be interpreted somewhat cautiously, however, as they are

based on very small year-to-year changes in the make-up of the state population.

Of the remaining variables, the only ones with a meaningful impact on changes in

the size of Medicaid programs over time are the unemployment rate, the party of the

governor, and a unified Democratic state legislature. When the unemployment rate

increases in a state, spending per beneficiary goes down substantially while a greater

number of individuals become Medicaid beneficiaries. This finding may be indicative of

the budget constraint faced by states and the need to reduce spending per beneficiary,

likely through reductions in provider payment rates or other limits on utilization, when

the number of Medicaid beneficiaries increase. It is also likely that average beneficiary

spending declines when the unemployment rate increases, in part, because relatively healthy people join the program.

Within a state, a Democratic governor and a unified Democratic legislature are associated with a more generous Medicaid program. This is especially true after dropping the four states with strong variability, which makes sense since New York had a Republican governor from 1994 to 2006. Averaging the coefficients in Table 4a and Table 4b for the sample of 45 states indicates that a state with a Democratic governor spends about $14 more per capita on Medicaid and $83 more per program beneficiary than when the state has a Republican governor.[43] The impact of a Democratic legislature appears to add individuals onto the Medicaid program by about half of one percent of the state's population while lowering average beneficiary spending by about $100.[44] This suggests that Democratic-controlled legislatures are more prone than Republican-controlled legislatures to both expand program eligibility and to reduce Medicaid payment rates or to initiate other utilization controls.

Summary of FMAP's Effect on State Medicaid Program Size

The FMAP coefficient in the per capita spending regressions from Table 3, Table 4a, and Table 4b is significant in four of the six specifications at the 5 percent level and five of the six specifications at the 10 percent level. Adding the state dummies cuts the coefficient from $11.50 to $5,[45] but the coefficient remains significant at the 5 percent

---

[43] These corresponding figures are $19 and $111 adjusted for 2012 dollars.
[44] $100 in 2000 dollars is approximately $133 in 2012 dollars.
[45] These corresponding figures are $15.33 and $6.50 adjusted for 2012 dollars.

level in regressions with the full data set. By splitting program generosity into an

eligibility component and spending per beneficiary component, I found that changes to a

state's FMAP are more likely to impact Medicaid eligibility than average beneficiary

spending. In all six of the number of beneficiary regressions, the coefficient is positive;

in three it is significant at the 5 percent level and in five it is significant at the 16 percent

level.

VII. Exogeneity of the FMAP

One potential concern with the model is whether the FMAP is exogenous. While

omitted variables are controlled in the state fixed effects regressions, the FMAP would be

endogenous if changes in state Medicaid program generosity affect the state FMAP. For

example, if increased Medicaid spending is related to a healthier population and a

healthier population is more productive and earns higher income – and as a result the

state FMAP lowers – then the directional relationship is the reverse of the one

hypothesized. This would produce a coefficient that is biased upwards. Another

possibility is that greater Medicaid generosity, which increases the tax on work for both

the recipient (implicit) and the taxpayer (explicit), negatively affects state per capita

income and subsequently increases the state FMAP. This would produce a coefficient

that is biased downward.

Despite these possibilities, the case for an exogenous FMAP is strong. First, state

politicians generally cannot directly influence the FMAP. The federal Department of

Health and Human Services announces the state FMAP schedule about a year in advance

of its taking effect based on the formula discussed in Section II and a minimum allowable

FMAP of 50 percent.[46] As a result of the formula, changes in a state's FMAP are nearly

always the result of a lagged change in the state's per capita income relative to national

per capita income and not the result of either legislation or lobbying efforts to increase

the state's reimbursement percentage.[47]

It is unlikely that there is a problem of reverse causality, in which increased

Medicaid spending leads to a lower FMAP. First, access to health care only accounts for

a relatively small part of a person's health. According to one study, genetic

characteristics and individual behavior combined accounted for about 70 percent of

variation in early mortality, a typical proxy used by health economists to measure overall

health, with inadequate health care accounting for only about ten percent of early

mortality (McGinnis et al. 2002).   Second, the majority of Medicaid spending is for

individuals who are either elderly or disabled, and both types of these individuals are

likely out of the workforce. In 2007, 25 percent of national Medicaid spending was on

the elderly, and 42 percent was on the disabled. About 21 percent of national Medicaid

spending was on children and about 12 percent was on non-disabled, non-elderly adults.[48]

And this later group overwhelmingly consists of mothers whose children are Medicaid

---

[46] Congressional Research Service. (2010, September). *Medicaid: The Federal Medical Assistance Percentage*. Retrieved from: http://aging.senate.gov/crs/medicaid6.pdf.

[47] The exception was the increase in Alaska's FMAP in 1999 and Hawaii's increase beginning in 1999 and continuing through 2003. During the recent recession, state FMAPs were significantly increased to assist states in dealing with falling tax revenue. However, there was not a substantial increase in state FMAPs during the 1992 through 2006 time period. There was a small increase in state FMAPs in 2003 as a way to deal with falling state revenues, but the increase was only about 2 percent and it impacted all states similarly.

[48] Kaiser Family Foundation. *Payments by Enrollment Group, FY 2007.* Retrieved from: http://www.statehealthfacts.org/comparemaptable.jsp?ind=858&cat=4.

enrollees and pregnant women, two categories of non-disabled, non-elderly adults who are more likely to be out of the workforce.

There is a possibility of a lag effect if children receive better health care when they are young because of Medicaid and then earn higher future income because of it. The magnitude of this effect is probably relatively small, however. First, Gruber and Simon (2008) estimate the crowd-out effect of Medicaid expansions at 60 percent, which means that many families simply replace private coverage for their children with public coverage as Medicaid eligibility becomes more generous. Second, Gruber and Currie (1996) only found small improvements in infant birth weight from Medicaid expansions in the 1984 through 1992 period. Additionally, increased geographic mobility means that nearly half of adults do not reside in the same state as where they were born.[49]

VIII. Alaska Case Study

Alaska's FMAP increased from 50 percent to near 60 percent between the years 1998 and 1999 because of a provision of the Balanced Budget Act of 1997. The stated Congressional rationale behind the increase was that Alaska had a higher cost of living and different poverty guidelines than the rest of the nation.[50] Since the federal Medicaid reimbursement percentage is generally based only on an average of state per capita

---

[49] U.S. Census Bureau American Community Survey Briefs. (2011, November). *Lifetime Mobility in the United States: 2010*. Retrieved from: http://www.census.gov/prod/2011pubs/acsbr10-07.pdf.
[50] The source for the rationale in Alaska's change is a January 20, 1999 statement from Hawaii's Democratic Senator Daniel Akaka on the Senate floor. He is arguing the reasons that Hawaii should receive the same increase in its FMAP as Alaska did. He discussed that many of the characteristics that were responsible for Alaska's increase are shared by Hawaii.

income and does not take other factors into account, Alaska's politicians and

policymakers felt that its reimbursement rate was unfairly low.[51]

When the federal reimbursement rate in Alaska was 50 percent, every $2 Alaska

spent on its Medicaid program was shared between federal taxpayers and Alaskan

taxpayers with a cost of $1 each. From 1999 to 2006, Alaska's reimbursement rate was

nearly 60 percent. A 60 percent FMAP meant that if Alaska increased its Medicaid

spending to $2.50, federal taxpayers would pay $1.50 of the bill (60 percent of $2.50)

with Alaskan taxpayers still liable for only $1. Thus, in effect, the legislation resulted in

a 50 percent increase in Alaska's federal Medicaid subsidy as the federal government

increased the match by $.50 for each $1 of Alaska's Medicaid spending financed with

state-raised tax revenue.

While the Alaska case study demonstrates one state's response to a large shock to

its FMAP, the Alaska example also addresses potential concerns about the endogeneity of

the FMAP. The FMAP change in Alaska was a dramatic year-over-year increase in its

federal reimbursement that was not the result of a change in the economic, political, or

demographic characteristics of the state. The change in Alaska's program generosity

from the exogenous increase in its FMAP provides a useful quasi-experiment for

measuring the impact on state behavior from a significantly higher federal Medicaid

matching rate. In order to estimate the magnitude of the impact of the FMAP increase on

---

[51] Alaska was probably benefited from the fact that the Chair of the Senate Appropriations Committee at
the time – Ted Stevens – was an Alaskan. Don Young, Alaska's lone congressman since 1973, was the
Chairman of the House Natural Resources Committee from 1995 to 2001 and the House Transportation and
Infrastructure Committee from 2001 to 2007 and has a reputation for steering federal tax dollars into
Alaska.

Alaska's Medicaid program, I estimated a second equation on a data set of Alaska's

Medicaid program along with the yearly means of a set of control states.

(2) $M_{st} = \beta_0 + \beta_1 t + \beta_2 s + \beta_3(s*t) + \varepsilon_{st}$

Each regression was performed on a data set of 30 observations – half for Alaska

and half for the control states – over the 15-year period from 1992-2006. The control

state data consists of the yearly mean of each of the three measures (per capita state

Medicaid spending, average Medicaid spending per beneficiary, and the percentage of the

state population receiving Medicaid benefits) for the states in the particular grouping. M_{st}

takes on an identical meaning as in Equation (1) – the generosity of Medicaid programs

on the three dimensions. β_1 is the coefficient on the time term, which takes a value of 1 if

the year is 1999 or later – the period after the increase in Alaska's FMAP – and 0 before

1999. β_2 is the coefficient on the state term, which takes a value of 1 for Alaska and 0 for

the control grouping. β_3 is the coefficient on the interaction or treatment term, which

takes a value of one for Alaska in the years after the FMAP increase.

In this specification, β_3 is the estimated causal effect of the increase in Alaska's

federal Medicaid reimbursement. If the interaction term is significant throughout these

specifications, it provides evidence that the increased federal reimbursement rate drove

increases in Alaska's Medicaid program generosity. The estimated parameter provides

an indication of the magnitude of the response. To demonstrate robustness, I ran the

regression using four different control groups. The first control group consisted of the

states in the continental United States with the lowest population densities – Idaho, Montana, New Mexico, North Dakota, South Dakota, and Wyoming. The second control group consisted of the ten states that like Alaska had FMAPs of 50 percent from 1992 through 1998. The third group consists of pre-trend control states, states with similar trends in the 1992 through 1998 period as Alaska with respect to increases in population coverage and beneficiary spending. The states in this group were Missouri, New Hampshire, North Carolina, Pennsylvania, South Carolina, and West Virginia. And finally, I used a control group of all the other states.

IX. Alaska Results

Table 5a contrasts the generosity of Alaska's program to average state generosity for the remainder of the states in three years: 1992, 1998, and 2006. 1992 represents the beginning year of the data, 1998 is the last year Alaska had a 50 percent FMAP, and 2006 is the last year in the dataset. Table 5b shows the difference-in-difference estimates of changes in the size of Alaska's Medicaid program compared to changes in the average size of Medicaid programs in the rest of the country. Alaska's Medicaid program was growing more rapidly than the average state program prior to its FMAP increase. Between 1992 and 1998, average state per capita inflation-adjusted Medicaid spending increased $108 across the other states while Alaska's increase was $176. This was mostly driven by Alaska's spending increase per Medicaid beneficiary exceeding the corresponding increase in average state beneficiary spending by over $500 in this six-year period.

Medicaid spending increased more rapidly between 1998 and 2006 across the country than it did between 1992 and 1998, but the increase was more pronounced for Alaska. Alaska's per capita inflation-adjusted Medicaid spending grew $637 between 1998 and 2006 compared to a $235 mean increase across the rest of the states. The increase in per capita Medicaid spending in Alaska was driven by a massive increase in spending per beneficiary. Between 1998 and 2006, beneficiary spending in Alaska increased nearly six times as much as the average increase across the rest of the states. The basic difference-in-difference estimates suggest that Alaska's FMAP increase from a provision of the 1997 Balanced Budget Act resulted in about a $334 increase in per capita Medicaid spending, about a $1,324 increase in spending per beneficiary, and about an additional 1.91 percent of Alaska's population receiving Medicaid benefits.

While the basic difference-in-difference estimates seem substantial, the regression results indicate the statistical significance of the estimates. Table 6 presents the estimates of the interaction term from equation (2) along with the robust standard errors. The coefficients represent the effect of the increased reimbursement on the size of Alaska's Medicaid program relative to various sets of control groups. A distinction between the estimates in Table 6 from the estimates in Table 5 is that Table 6 is based on a regression using all fifteen years of data while Table 5 contrasted the six-year trend when Alaska's FMAP was 50 percent and the eight-year trend when Alaska's FMAP was nearly 60 percent.

The estimates in Table 6 are generally similar, regardless of control group. This similarity lends credence to the estimates as being reliable. The estimated impact of the

increase in Alaska's FMAP was a Medicaid expansion of roughly two percent of

Alaska's population, additional spending per Medicaid beneficiary of approximately

$1,300, and an increase in per capita Medicaid spending (including federal funds) in

excess of $300. Eleven of the twelve estimates are significant at the 5 percent level – and

the other one is significant at the 10 percent level – indicating a substantial and robust

increase in the generosity of Alaska's Medicaid program following the FMAP increase.

The evidence clearly indicates that when federal taxpayers began paying a much larger

percentage of Alaska's Medicaid bill, Alaska's Medicaid program almost certainly grew

larger than it would have in the absence of the FMAP increase.

 The 60 percent FMAP certainly made Alaskans better off than when its state

FMAP was only 50 percent. This is because Alaska could have substituted federal funds

for state funds, achieved identical program generosity, and spent the substituted state

funds in other ways. However, the evidence from Table 5 and Table 6 indicates that this

was not the case. Since Alaska's Medicaid program grew to such a large extent after its

FMAP increase, it is clear that the increase in its FMAP had a stimulative effect on

Alaska's Medicaid spending and not a replacement effect. Table 7 summarizes the

generosity of Alaska's program over time, including the breakdown of federal and state

Medicaid spending as well as some measures of the state economy. The substantial

growth in Alaska's Medicaid program cannot be explained by adverse economic

conditions in the state as both Alaska's poverty rate and unemployment rate were lower

in the later time period than the earlier period.

Figure 2 plots Alaska's per capita Medicaid spending over time, separating out the federal component from the state component. Between 1992 and 1998 – when Alaska's FMAP was 50 percent – Alaska's inflation-adjusted per capita Medicaid spending financed with state dollars and federal dollars both increased by 45 percent. The spending growth was more pronounced after Alaska's FMAP increase, shown by the significantly steeper slope after 1998. Between 1998 and 2005, per capita federal spending in Alaska increased 168 percent in inflation-adjusted dollars. As evidence of the stimulative impact of the increased FMAP, Alaska's inflation-adjusted per capita Medicaid spending with *state-raised revenue* increased 98 percent during that seven-year period.

X. Conclusion

The main goal of this paper was to better understand the impact that federal matching grants have on state behavior. I did so by utilizing the largest federal transfer to the states, which is the federal reimbursement of a percentage of state Medicaid spending. The paper also examined factors related to variation in Medicaid programs across states and changes in state Medicaid programs over time. The regional dummies show that Medicaid generosity varies considerably across the country all else equal. States in the Northeast spend considerably more on their Medicaid programs than states in the South and states in the West all else equal.

I found evidence that wealthier states have more generous programs, largely by spending slightly more on each beneficiary, and more liberal state populations are

40

associated with a greater number of program beneficiaries. When states have unified

Republican legislatures, they tend to have fewer Medicaid beneficiaries than when states

have unified Democratic legislatures or there is split control of the state legislative

bodies. Without state fixed effects, the unemployment rate and state poverty rate are

positively correlated to larger amounts of state Medicaid spending and greater numbers of

program beneficiaries. However, adding state fixed effects basically eliminates the

significance of these correlations and suggests that as the state unemployment rate

increases, states spend less on Medicaid per capita by spending less per beneficiary.

This paper shows that federal matching grants can have profound impacts on state

behavior. In most specifications, a higher FMAP increases the generosity of state

Medicaid programs, mostly by increasing the number of people receiving benefits

through the program. The estimates suggest that a one percent increase in a state FMAP

leads to between a $4 to $12 increase in state per capita Medicaid spending[52] and an

additional 0.04 to 0.29 percent of the state population receiving benefits through the

program. The tremendous growth of Alaska's Medicaid program following the 50

percent increase in Alaska's federal Medicaid reimbursement between 1998 and 1999

demonstrates how more generous matching grants can lead states to significantly increase

spending in the area affected by the grant. The Alaska estimates suggest than a one point

increase in the state FMAP resulted in more than $30 of increased Medicaid spending per

capita[53] and about 0.20 percent of the state's population gaining benefits.[54]

---

[52] $The corresponding figures are $5 and $16 adjusted for 2012 dollars.
[53] $30 in 2000 dollars is approximately $40 in 2012 dollars.

Policy Implications

Since the 1980s, federal grants to states for most purposes shrank substantially, and Medicaid became the main method by which states could increase federal revenues. Although Medicaid growth increases state expenditures, it also brings in at least as many federal dollars – and much more in poorer states – because of the federal Medicaid subsidy. The results from the paper support the claim that decentralized government does not by itself constrain the growth of government. Medicaid is largely decentralized as states have wide flexibility to shape programs to their preferred specifications. The majority of most states' Medicaid spending, however, is financed by out-of-state taxpayers. Because of the federal match, states weigh the benefits of their Medicaid program with subsidized costs. As a result, states form larger programs than if funding came solely from internal state sources.

This paper leaves unanswered the important question of whether the Medicaid subsidy design promotes overall social welfare. This is a question worthy of future research as spending on Medicaid, which has been the fastest growing entitlement program over the past two decades, represents nearly one-sixth of all health care spending in the United States and about 2.8 percent of the nation's total output.[55] The main benefit of the current Medicaid funding structure is the net benefit to individuals of the additional

---

[54] The estimates in Table 6 show the impact on Medicaid spending per capita, Medicaid spending per beneficiary, and the number of state Medicaid beneficiaries from a nearly 10 percentage point increase in the state FMAP. Dividing those estimates by 10 yields the interpolated estimates for the impact of a one percentage point increase in Alaska's FMAP.
[55] According to the Center for Medicare and Medicaid Services, in 2010, U.S. GDP was $14,526.5 billion, Medicaid expenditures were $401.4 billion, and health expenditures were $2,591.9 billion.

health care and long-term care services that they receive compared to what they would otherwise have received without the federal subsidy.

In addition to the benefits, the costs, which mainly arise because the federal match distorts state behavior and leads to a greater excess burden of taxation, need to be counted as well. Most states have attempted to channel as many programs as possible into Medicaid in order to qualify for additional federal funds. In times of budgetary difficulties, Medicaid is sensibly one of the last programs state politicians look to cut because each dollar cut results in a loss of federal funds of at least a dollar and in several states a loss greater than three federal dollars. Therefore, it is one of the government programs where inefficiency and waste are most likely to be found.

Although federal grants to state governments often have the appearance of being "free", the revenue funding the grant must be raised through the collection of taxes from federal taxpayers or through deficit financing. The cost of financing the program must be included when considering the overall merits of the current financing structure of the program. Replacing the current Medicaid financing structure with a system of conditional block grants would likely increase the efficiency of state programs. Since states will tend to overlook the costs borne by taxpayers outside of their state, however, reform likely needs to be initiated at the federal level.

The findings in this paper also have implications for state response to the Affordable Care Act (ACA). The ACA contained a requirement that states expand Medicaid eligibility by 2014 to cover all individuals under 133 percent of the federal poverty level. The federal government agreed to pay 100 percent of the costs of the

expansion population, which will vary by state based upon how generous state eligibility was when the ACA was enacted, from 2014 through 2016 and at least 90 percent of the costs thereafter. According to the ACA, states that did not expand Medicaid program eligibility would lose all their federal Medicaid funding. However, the Supreme Court ruled that this provision was unduly coercive on states and effectively made the Medicaid expansion optional.

Economic theory and the empirical evidence presented in this paper show that the high Medicaid reimbursement rate for the expansion population offers states a significant reason to expand program eligibility and increase benefit packages. Although many states have initially refused to expand their Medicaid programs because of strong political opposition in the state to the ACA, the extremely high federal reimbursement rate for the expansion population will likely lead almost all states to expand their Medicaid programs over time. However, while increasing the federal share of Medicaid spending will undoubtedly increase the size of state Medicaid programs, the ACA's expansion may decrease economic efficiency. Economic theory suggests that the optimal size of state Medicaid programs may be better determined when states absorb more of the cost of their decisions about the program rather than when they are able to pass the majority of the cost to federal taxpayers.

Table 1: Summary Statistics

All monetary amounts in this table are in 2000 dollars.
* The dummy variable equals 0 for Republican governors and 1 for Democratic governors

Variable	Mean	Std. Dev.	Minimum	Maximum
State Pop Are Med. Ben.	14.60	4.86	5.86	35.29
State Spending Per Ben	$4,249	$1,181	$1,528	$8,354
State Per capita Med. Spending	$601	$242	$220	$1,794
State FMAP	60.60	8.57	50	79.99
Youth Percent	27.0%	2.1%	22.7%	37.3%
Senior Percent	12.6%	1.9%	4.3%	18.5%
Women of Child-bearing age percent	21.8%	1.1%	19.1%	24.6%
White Percent	84.2%	11.4%	31.9%	98.7%
Black Percent	10.5%	9.5%	0.3%	37.2%
Hispanic Percent	6.6%	8.2%	0.5%	41.1%
Per Capita State Income	$32,592	$6,263	$20,423	$60,610
State Unemployment Rate	5.02%	1.36%	2.3%	11.3%
State Poverty Rate	12.25%	3.56%	4.5%	26.4%
Governor Party*	0.456	0.498	0	1
Ideology	-0.023	0.081	-0.221	0.154
Republican Legislature	0.349	0.471	0	1
Democratic Legislature	0.411	0.487	0	1

Table 2: Summary Statistics, by Geographic Region

The numbers in parentheses are the averages for the Mid-Atlantic states, Mountain states, and Pacific states after excluding the outlier states, New York, Wyoming, Alaska, and Hawaii. New England states are Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Mid-Atlantic states are Delaware, Maryland, New Jersey, New York, and Pennsylvania. Southern states are Arkansas, Kentucky, North Carolina, Oklahoma, Tennessee, Virginia, and West Virginia. States in the deep South are Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas. Rust Belt states are Illinois, Indiana, Michigan, Ohio, and Wisconsin. Mid-West states are: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota. Mountain states are Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming. The Pacific states are Alaska, California, Hawaii, Oregon, and Washington. All monetary amounts in this table are in 2000 dollars.

	Per capita Spending	Spending per Beneficiary	Population as Beneficiaries	State FMAP	Per-capita Income	Unemp Rate	Poverty Rate	Ideo-logy	Rep. Legis.	Dem. Legis.	Hispanic Percentage
New England	$814	$5,588	15.2%	55.0	$34,452	4.7%	9.7%	0.08	0.17	0.71	4.1%
Mid-Atlantic	$751	$5,469	13.5%	50.9	$39,739	5.2%	10.6%	0.06	0.29	0.25	7.2%
	($589)	($4,987)	(12.0%)	(51.1)	($39,735)	(4.9%)	(9.4%)	(0.04)	(0.37)	(0.32)	(5.6%)
South	$610	$3,550	17.6%	67.0	$29,019	5.2%	14.7%	-0.05	0.06	0.73	2.5%
Deep South	$562	$3,330	17.0%	67.0	$28,984	5.5%	16.1%	-0.06	0.21	0.64	8.0%
Rust Belt	$559	$4,325	13.2%	57.3	$32.672	5.1%	11.0%	0.00	0.45	0.05	4.3%
Mid-West	$556	$4,656	12.2%	61.9	$31,505	3.8%	10.8%	-0.06	0.64	0.16	2.8%
Mountain	$454	$3,967	11.6%	64.7	$31,409	4.9%	12.3%	-0.09	0.61	0.19	13.6%
	($449)	($3,912)	(11.7%)	(65.1)	($30,499)	(5.0%)	(12.6%)	(-0.08)	(0.55)	(0.22)	(14.8%)
Pacific	$550	$3,459	16.4%	54.5	$36,524	6.1%	11.3%	0.00	0.34	0.46	10.9%
	($489)	($2,911)	(17.5%)	(54.4)	($34,129)	(6.3%)	(12.5%)	(0.03)	(0.27)	(0.44)	(14.6%)
State average	$601	$4.249	14.6%	60.6	$32,592	5.0%	12.2%	-0.02	0.35	0.41	6.6%

Table 3: Estimates of Factors Affecting Medicaid Program Generosity (Across States)

Columns 1, 3, and 5 exclude AZ, and Columns 2, 4, and 6 exclude AZ, AK, HI, NY, and WY. The dependent variables are per capita Medicaid spending, Medicaid spending per beneficiary, and the percentage of the state population that is a Medicaid beneficiary. Standard errors are clustered by state. Estimates for year dummies are not reported. Data is for the years 1992 through 2006. All monetary amounts in this table are in 2000 dollars.

Dependent Variable	Per capita Spending		Spending/Beneficiary		Pop. as Beneficiaries	
	(1)	(2)	(3)	(4)	(5)	(6)
State FMAP	11.71	11.27	2.78	-0.48	0.29	0.29
	(4.10)**	(2.16)**	(25.26)	(21.21)	(0.06)**	(0.07)**
Youth Percent	-13.07	-7.61	-67.35	-44.84	-0.15	-0.09
	(8.73)	(7.08)	(67.26)	(66.88)	(0.23)	(0.23)
Senior Percent	-13.58	25.34	-132.81	12.02	0.14	0.41
	(21.24)	(14.04)*	(144.09)	(141.68)	(0.46)	(0.52)
Women of Child-bearing age percent	8.65	49.92	-172.63	-21.13	0.96	1.34
	(37.58)	(29.05)**	(178.88)	(182.47)	(0.67)	(0.77)*
White Percent	-1.26	6.80	-8.97	-18.91	0.02	0.20
	(1.63)	(4.14)	(8.51)	(38.93)	(0.03)	(0.16)
Black Percent	-2.97	7.29	-29.47	-35.24	0.10	0.30
	(3.40)	(4.97)	(19.08)	(46.53)	(0.07)	(0.18)
Hispanic Percent	-2.38	1.04	-23.12	-21.14	0.07	0.12
	(2.01)	(1.61)	(12.26)*	(13.26)	(0.04)	(0.04)**
Per Capita State Income ($1,000)	11.61	5.85	50.25	33.46	0.08	0.02
	(5.54)**	(1.59)**	(38.22)	(31.18)	(0.07)	(0.09)
State Unemployment Rate	40.50	15.72	137.43	62.30	0.40	0.17
	(14.19)**	(9.97)	(87.23)	(81.71)	(0.31)	(0.31)
State Poverty Rate	19.41	6.69	21.18	-28.85	0.32	0.25
	(12.22)	(3.53)*	(46.16)	(27.08)	(0.10)**	(0.07)**
Governor Party	-21.59	-0.22	-212.06	-93.76	0.18	0.12
	(20.04)	(13.00)	(116.03)*	(103.19)	(0.41)	(0.48)
Ideology	4.88	5.24	-8.72	-6.79	0.13	0.15
	(2.34)**	(2.44)**	(19.38)	(21.13)	(0.06)**	(0.07)**
Rep Legislature	-47.00	-33.79	34.79	116.10	-0.80	-0.88
	(37.98)	(24.41)	(196.27)	(174.33)	(0.57)	(0.57)
Dem Legislature	-29.48	36.40	26.72	287.07	-0.20	0.03
	(60.83)	(22.33)	(284.76)	(205.48)	(0.74)	(0.64)
South	19.03	-30.62	749.62	754.93	-0.02	-0.04
	(68.16)	(55.85)	(405.09)*	(446.63)*	(0.02)	(0.02)*
Deep South	-16.95	-87.26	868.82	960.37	-0.05	-0.07
	(96.04)	(79.83)	(595.13)	(689.78)	(0.03)*	(0.03)**
New England	340.18	228.39	2666.56	2404.44	-0.02	-0.03
	(74.36)**	(51.27)**	(497.44)**	(492.31)**	(0.02)	(0.02)
Mid-Atlantic	268.74	62.81	2610.19	1963.24	-0.04	-0.06
	(137.69)*	(44.02)	(624.08)**	(508.02)**	(0.02)*	(0.02)**
Rust Belt	92.48	49.19	1479.38	1520.60	-0.04	-0.05
	(55.63)	(44.53)	(351.63)**	(392.32)**	(0.02)**	(0.02)**
Mid-West	156.37	78.44	1860.27	1689.40	-0.03	-0.04
	(72.14)**	(64.26)	(518.41)**	(541.45)**	(0.02)*	(0.02)**
Mountain	-32.05	-15.18	977.23	1258.67	-0.06	-0.06
	(64.21)	(48.70)	(383.64)**	(368.19)**	(0.02)**	(0.02)**
Adjusted R sq	0.69	0.81	0.60	0.64	0.68	0.69

** $p < 0.05$, * $p < 0.10$

Table 4a: Estimates of Factors Affecting State Medicaid Program Generosity (Within States)

The dependent variables are per capita Medicaid spending, Medicaid spending per beneficiary, and the percentage of the state population that is a Medicaid beneficiary. Robust standard errors are reported. Estimates for state and year dummies are not reported. Data is for the years 1992 through 2006. All monetary amounts in this table are in 2000 dollars.

Dependent Variable	Per capita Spending		Spending/Beneficiary		Pop. as Beneficiaries	
	(1)	(2)	(3)	(4)	(5)	(6)
State FMAP	5.37	5.51	25.19	1.45	0.04	0.13
	(2.65)**	(3.04)*	(15.09)*	(17.13)	(0.06)	(0.08)
Youth Percent	-3.56	2.48	-142.88	15.26	0.42	0.16
	(9.84)	(10.02)	(57.16)**	(55.89)	(0.21)*	(0.23)
Senior Percent	39.84	28.55	33.39	-18.84	0.94	0.95
	(16.72)**	(18.11)	(88.98)	(85.59)	(0.33)**	(0.37)**
Women of Child-bearing age Percent	6.21	7.72	-165.66	89.81	0.86	0.45
	(22.58)	(24.00)	(120.98)	(126.16)	(0.40)**	(0.47)
White Percent	-15.95	21.08	8.90	111.68	-0.31	-0.24
	(9.22)*	(9.22)**	(56.86)	(58.18)*	(0.18)*	(0.24)
Black Percent	0.18	33.18	-2.04	31.84	-0.61	-0.52
	(13.29)	(13.02)**	(80.97)	(76.21)	(0.32)*	(0.38)
Hispanic Percent	-21.92	-20.41	-4.80	-79.61	-0.20	-0.12
	(4.88)**	(4.26)**	(31.98)	(30.20)**	(0.09)**	(0.11)
Per Capita State Income ($1,000)	1.72	-2.43	15.51	-28.29	0.0002	0.11
	(2.72)	(2.89)	(17.92)	(19.44)	(0.001)	(0.07)
State Unemployment Rate	0.98	-4.25	-26.89	-69.77	0.22	0.24
	(5.18)	(4.76)	(33.62)	(32.32)**	(0.12)*	(0.13)*
State Poverty Rate	3.61	3.38	12.92	16.90	-0.04	-0.05
	(2.26)	(2.20)	(13.75)	(13.27)	(0.05)	(0.06)
Governor Party	1.61	9.41	28.68	64.65	0.02	-0.07
	(7.11)	(6.79)	(40.51)	(42.20)*	(0.17)	(0.18)
Ideology	1.50	1.60	12.32	29.70	-0.052	-0.11
	(1.74)	(1.75)	(11.68)	(12.60)**	(0.053)	(0.06)*
Rep Legislature	-5.54	-14.54	-15.95	-62.16	0.25	-0.27
	(8.77)	(8.42)*	(60.64)	(59.63)	(0.29)	(0.29)
Dem Legislature	-0.97	0.60	-124.30	-133.54	0.51	0.54
	(10.86)	(10.72)	(66.91)*	(67.07)**	(0.29)*	(0.29)*
Adjusted R sq	0.91	0.89	0.87	0.86	0.87	0.87
Excluded States	AZ	AZ, AK, HI, NY, WY	AZ	AZ, AK, HI, NY, WY	AZ	AZ, AK, HI, NY, WY

** p <0.05, * p < 0.10

Table 4b: Estimates of Factors Affecting State Medicaid Program Generosity (Within States), Excluding Possible Endogenous Controls

The dependent variables are per capita Medicaid spending, Medicaid spending per beneficiary, and the percentage of the state population that is a Medicaid beneficiary. Robust standard errors are reported. Estimates for state and year dummies are not reported. Data is for the years 1992 through 2006. All monetary amounts in this table are in 2000 dollars.

Dependent Variable	*Per capita Spending*		*Spending/Beneficiary*		*Pop. as Beneficiaries*	
	(1)	(2)	(3)	(4)	(5)	(6)
State FMAP	9.04	4.19	20.89	-7.28	0.11	0.12
	(3.15)**	(3.29)	(17.20)	(18.45)	(0.05)**	(0.08)
Per Capita State Income ($1,000)	3.58	3.02	11.15	-37.35	0.02	0.09
	(3.25)	(2.96)	(19.27)	(17.29)**	(0.06)	(0.07)
State Unemployment Rate	-3.05	-9.08	-35.19	-77.57	0.17	0.15
	(5.60)	(5.00)*	(33.74)	(32.10)**	(0.13)	(0.13)
State Poverty Rate	3.05	2.49	13.71	12.60	-0.05	-0.06
	(2.24)	(2.21)	(13.72)	(13.35)	(0.05)	(0.06)
Governor Party	5.65	17.72	47.34	101.00	0.05	0.04
	(7.55)	(6.87)**	(41.86)	(41.81)**	(0.16)	(0.18)
Ideology	56.98	-0.11	-68.84	15.67	-0.05	-0.11
	(146.25)	(154.08)	(107.48)	(11.54)	(0.05)	(0.06)*
Rep Legislature	-6.62	-8.83	-3.77	-23.59	0.21	-0.25
	(9.03)	(8.61)	(59.52)	(59.39)	(0.29)	(0.29)
Dem Legislature	3.38	2.73	-75.83	-95.83	0.54	0.59
	(11.92)	(11.84)	(65.23)	(65.07)	(0.29)*	(0.29)**
Adjusted R sq	0.90	0.88	0.86	0.86	0.87	0.87
Excluded States	AZ	AZ, AK, HI, NY, WY	AZ	AZ, AK, HI, NY, WY	AZ	AZ, AK, HI, NY, WY

** p <0.05, * p < 0.10

Table 5a: Alaska Medicaid Compared to Average of Other States

The values under the heading 'Remaining States Average' are the means of per capita Medicaid spending, the percentage of state populations that are Medicaid beneficiaries, and Medicaid spending per beneficiary across the 48 remaining states (Arizona and Alaska excluded) in 1992, 1998, and 2006. All monetary values in this table are in 2000 dollars.

	Alaska			Remaining States Average		
Year	Per Capita Spending	Spend per Beneficiary	Pop. as Beneficiaries	Per Capita Spending	Spend per Beneficiary	Pop. as Beneficiaries
1992	$391	$3,957	9.88%	$425	$3,925	11.09%
1998	$567	$4,648	12.19%	$533	$4,090	13.75%
2006	$1,204	$6,760	17.82%	$768	$4,452	17.82%

Table 5b: Difference-in-Difference Estimates of Impact of Alaska FMAP Increase

The first line equals the difference in the 1998 and 1992 values from Table 5a. The second line equals the difference in the 2006 and 1998 values from Table 5a. The third line equals the difference in the 1998 to 2006 difference line from this table and the 1992 to 1998 difference line from this table. The last line in this table represents the difference-in-difference estimate and it is the difference between Alaska's values in the third line and the Remaining States Average values in the third line. All monetary values in this table are in 2000 dollars.

	Alaska			Remaining States Average		
Time Period	Per Capita Spending	Spend per Beneficiary	Pop. as Beneficiaries	Per Capita Spending	Spend per Beneficiary	Pop. as Beneficiaries
'92 to '98 increase	$176	$691	2.31%	$108	$165	2.66%
'98 to '06 increase	$637	$2,112	5.63%	$235	$362	4.07%
Diff. in change	$461	$1,521	3.32%	$127	$197	1.41%
Diff. in Diff. estimate	$334	$1,324	1.91%			

Table 6: Interaction Term Estimates for Impact of Alaska's FMAP Increase

Robust-standard errors are provided in parentheses. Estimates for the state and time coefficients are not reported. Data is for the years 1992 through 2006. All monetary amounts in this table are in 2000 dollars.

Dependent variable	Per Capita Spending	Spend per Beneficiary	Pop. as Beneficiaries
Low density states	$341 ($99)**	$1,276 ($365)**	.0240 (.0096)**
50 FMAP states	$341 ($101)**	$1,580 ($373)**	.0189 (.0093)*
Pre-trend control states	$314 ($99)**	$1,105 ($376)**	.0249 (.0091)**
All other states	$328 ($99)**	$1,371 ($365)**	.0198 (.0093)*

** $p < .05$, * $p < .10$

Table 7: Alaska Medicaid Program and Demographic Characteristics, by Year

Per capita Alaska Medicaid Spending is equal to (100-state FMAP)/100 x Per capita Medicaid spending. Per capita Federal Medicaid Spending is equal to state FMAP/100 x Per capita Medicaid spending. The data for Medicaid beneficiaries in 1997 was unreliable, and so it was excluded. All monetary amounts in this table are in 2000 dollars.

Year	State FMAP	State Unemp Rate	State Poverty Rate	Percent Pop. are Ben.	Spend Per Ben.	Per Capita Med Spending	Per Capita Alaska Spending	Per Capita Federal Spending
1992	50	9.2	10.2	9.88%	$3,957	$391	$196	$196
1993	50	7.7	9.1	10.89%	$3,978	$433	$217	$217
1994	50	7.8	10.2	11.49%	$4,092	$470	$235	$235
1995	50	7.1	7.1	11.31%	$4,187	$474	$237	$237
1996	50	7.5	8.2	11.41%	$4,422	$504	$252	$252
1997	50	7.1	8.8	.	.	$566	$283	$283
1998	50	6.1	9.4	12.19%	$4,648	$567	$284	$284
1999	59.8	6.2	7.6	13.55%	$4,896	$664	$267	$397
2000	59.8	6.2	7.6	15.37%	$4,908	$754	$303	$451
2001	56.04	6.2	8.5	16.66%	$5,167	$861	$378	$483
2002	57.38	7.1	8.8	17.07%	$5,997	$1,023	$436	$587
2003	58.27	7.7	9.6	17.87%	$6,730	$1,202	$502	$700
2004	58.39	7.4	9.1	17.85%	$6,988	$1,248	$519	$729
2005	57.58	6.9	10.0	18.72%	$7,071	$1,324	$562	$762
2006	57.48	6.5	8.9	17.82%	$6,760	$1,204	$512	$692

Figure 1: Impact of Matching Medicaid Grant on State Spending
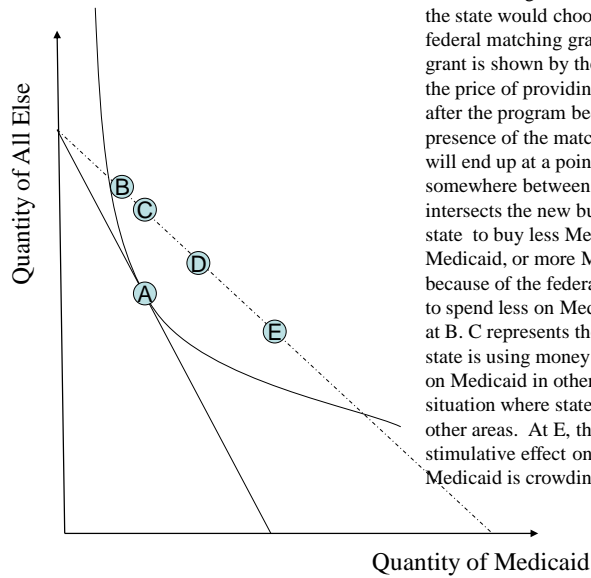
The state has the choice of spending on Medicaid or on something else. Using standard economic theory, the state would choose point A in the absence of the federal matching grant. The effect of the matching grant is shown by the dashed line, which illustrates the price of providing a unit of Medicaid services after the program becomes relatively cheaper. The presence of the matching grant means that the state will end up at a point on the new budget line, somewhere between where the indifference curve intersects the new budget line. It is possible for the state to buy less Medicaid, the same amount of Medicaid, or more Medicaid and be better off because of the federal match. The state is unlikely to spend less on Medicaid after the grant and end up at B. C represents the replacement effect where the state is using money that it was previously spending on Medicaid in other ways. D corresponds to the situation where states spend more on Medicaid and other areas. At E, the matching grant has such a stimulative effect on state Medicaid spending that Medicaid is crowding out spending on other areas.

Figure 2: Alaska's Medicaid Spending
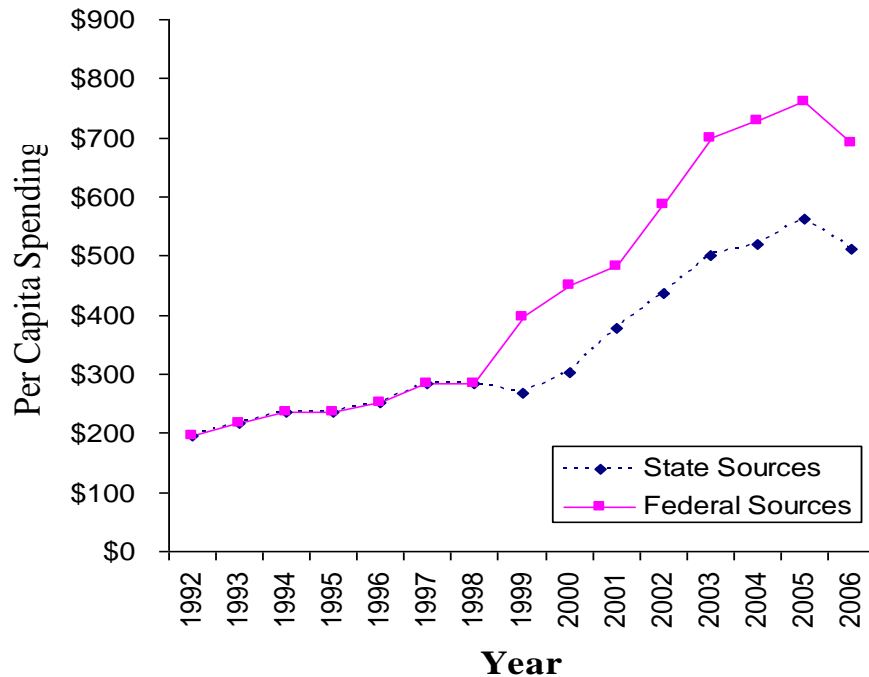
PAPER 2: IMPACT OF HOSPITAL AND NURSING HOME TAXES ON STATE MEDICAID SPENDING

I. Introduction

In 2011, the United States spent $408 billion on Medicaid, the joint federal-state program that finances health care services as well as long-term care services and supports for a diverse group of individuals, including lower-income mothers and their children as well as middle-class seniors.[56] The federal government provides a reimbursement of state Medicaid expenditures, effectively an uncapped intergovernmental matching grant, with a state's reimbursement percentage largely determined by per capita state income. Of the $408 billion spent on Medicaid in 2011, the federal share was $248 billion, or about 61 percent of total expenditures.[57] According to recent projections of the Centers for Medicare and Medicaid Services (CMS), annual spending on Medicaid will reach nearly $900 billion in 2020.[58]

States have considerable flexibility for financing the state share of Medicaid expenditures. One technique employed by nearly every state to raise revenue to finance

---

[56] Centers for Medicare and Medicaid Services. *Table 3 – National Health Expenditures; Levels and Annual Percent Change, by Source of Funds: Selected Calendar Years 1960-2011*. Retrieved from: http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/tables.pdf.

[57] *Id.*

[58] Centers for Medicare and Medicaid Services. *Table 3 – National Health Expenditures; Aggregate and per Capita Amounts, Percent Distribution and Annual Percent Change by Source of Funds: Calendar Years 2006-2021*. Retrieved from: http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/Proj2011PDF.pdf.

Medicaid consists of taxes on health care providers. Provider taxes are an unusual type of tax since the payer of the tax tends to support the tax and sometimes even lobbies for it. The reason appears to be the explicit or implicit guarantee that states give to providers that the tax revenue will be returned to the provider through either higher payment rates or supplemental payments. These elevated payments are financed by states, largely, if not solely, from the additional federal money that the provider tax revenue enables states to obtain. The National Conference of State Legislatures has explained how states use provider taxes to inflate the Medicaid reimbursement they receive from the federal government:

> In most states, [the provider tax] is used as a mechanism to generate new in-state funds and match them with federal funds so that a state gets additional federal Medicaid dollars. In a majority of the cases, the cost of the tax is promised back to providers through an increase in the Medicaid reimbursement rate for their patient treatment and services.[59]

Provider taxes were first widely used in the early 1990s. Since provider taxes tended to increase federal spending on Medicaid without actual net state expenditures, federal policymakers made them more difficult to utilize. As a result, the use of provider taxes declined for about a decade, and states turned to other financing techniques to leverage the federal Medicaid reimbursement. However, over the last five years – in the midst of daunting budgetary challenges faced by most states – states' use of provider taxes increased significantly. By fiscal year (FY) 2012, 49 states had a least one provider

---

[59] National Conference of State Legislatures. (2012, July). *Health Care Provider and Industry Taxes*. Retrieved from: http://www.ncsl.org/issues-research/health/health-provider-and-industry-state-taxes-and-fees.aspx.

tax with 42 states having a nursing home tax and 38 states having a hospital tax (Smith et al. 2012).

Despite the important role that provider taxes play in the financing of state Medicaid programs, a scant amount of academic work exists on the effect of provider taxes on state Medicaid programs. No previous studies have attempted to quantify the effect of provider taxes on state Medicaid expenditures, and only a single study has assessed the effect of provider taxes on states' Medicaid payment rate to providers. Using Medicaid expenditure data from the CMS-64 Form and provider tax information from Kaiser Family Foundation's (KFF) yearly surveys of state Medicaid programs, this paper provides the first empirical estimates of the impact of provider taxes on state Medicaid expenditures and fills a void in the health care and public choice/finance literature.

Using the KFF data, I was able to discern which states added taxes on hospitals and nursing homes, by year, between 2008 and 2011. I combined the provider tax information and the Medicaid expenditure data for the 42 states with reliable CMS-64 data between 2007 and 2011. Of these 42 states, 18 states had hospital taxes and 27 states had nursing home taxes in place in 2007. In addition, 13 states added hospital taxes and seven states added nursing home taxes between 2007 and 2011. I measured the effect of hospital taxes and nursing home taxes by contrasting per capita inflation-adjusted Medicaid spending growth across four large categories of state Medicaid expenditures – hospitals, physicians, nursing homes, and home and community based

service (HCBS) providers – based on whether states had provider taxes in place in 2007 or added taxes on hospitals or nursing homes by 2011.

Unsurprisingly, I found that inflation-adjusted per capita Medicaid spending grew faster after enactment of provider taxes, primarily in the area affected by the tax. I found that states that enacted hospital taxes had significantly larger Medicaid spending growth on hospitals during the first two years the hospital tax was in effect and that states that enacted nursing home taxes had significantly larger Medicaid spending growth on nursing homes during the first two years a nursing home tax was in effect. After controlling for many factors plausibly related to state Medicaid spending, I estimate that Medicaid spending on hospitals increased by about 14 percent in the first two years of a hospital tax being in effect and that Medicaid spending on nursing homes increased by about ten percent in the first two years of a nursing home tax all else equal.

Nursing home care and HCBS are substitutes for many individuals who can no longer care for themselves without assistance or for adult children who desire extra care for their aging parents. I found some evidence that states substitute spending away from HCBS and toward nursing homes in the year before and in the first two years after the enactment of a nursing home tax. Average real per capita state Medicaid spending on HCBS declined by about five percent in the year before states enacted nursing home taxes and by about three percent in the first two years nursing home taxes are in effect all else equal.

This paper also presents evidence that states with provider taxes, particularly hospital taxes, in place before 2008 increased Medicaid expenditures to a greater degree

than states without provider taxes. While the impact of a hospital tax on the growth in

state Medicaid hospital expenditures was greatest in the first two years the tax was in

place, the impact of a hospital tax on the growth in total state Medicaid expenditures was

similar in the first two years the tax was in place and the rest of the time periods when the

tax was in place all else equal. The presence of a hospital tax, irrespective of the timing

of its enactment, was associated with about 2.5 percent higher total Medicaid spending

growth. During this time period, hospital taxes were weakly correlated with greater

Medicaid expenditure growth for nursing homes, physicians, and HCBS. Although these

results may not be generalizable outside of the time period under study because of the

major economic recession and dramatic policy response to the recession that included the

federal government significantly increasing the federal share of Medicaid expenditures,

this paper provides evidence that provider taxes enabled states to maintain or grow

Medicaid expenditures to a greater degree than states without provider taxes during the

recession and recovery period.

II. Medicaid Provider Tax Background

Although states are not required to participate in Medicaid, all states, as well as

the District of Columbia and five American territories, have participated since 1982.[60] A

key reason for universal state participation is because the federal government reimburses

a substantial share of state Medicaid expenditures. While there are several exceptions,[61]

---

[60] In 1982, Arizona became the last state to participate in the Medicaid program.
[61] Exceptions to the regular FMAP rate have been made for certain states (e.g., the District of Columbia and
the territories), situations (e.g., during economic downturns), populations (e.g., certain women with breast
or cervical cancer and individuals in the Qualifying Individuals program), providers (e.g., primary care

the federal share of most Medicaid expenditures is equal to the Federal Medical

Assistance Percentage (FMAP).

A state's FMAP is typically determined by a formula that compares state per

capita income with national per capita income,[62] so that poorer states receive a higher

share of their Medicaid expenditures reimbursed. FMAP rates generally have a statutory

minimum of 50 percent and a statutory maximum of 83 percent.[63] Twice over the past

two decades, Congress raised state FMAPs as a way to alleviate state budget shortfalls

during economic contractions.[64] States received a slight FMAP increase of about 2

percentage points for two quarters in 2003 as a way to deal with falling state revenue.

States received a much larger FMAP increase for eleven quarters from fiscal year 2009

through three quarters of fiscal year 2011 as a way to alleviate state budget shortfalls in

the aftermath of the financial crisis.

While the federal reimbursement of state Medicaid spending is open-ended, states

must meet specific requirements in order to receive federal funds. First, federal statute

and regulations require states to enroll certain groups in Medicaid, including

Supplemental Security Income recipients, children under the age of six and pregnant

women whose family income is at or below 133 percent of the federal poverty level,

---

physicians and Indian Health Service facilities), and services (e.g., family planning and home health services). In addition, the federal share for most Medicaid administrative costs does not vary by state and is generally 50 percent.

[62] $\text{FMAP}_{state} = 1 - ((\text{Per capita income }_{state})^2 / (\text{Per capita income }_{U.S.})^2 * 0.45)$. The 0.45 factor in the formula is designed to ensure that a state with per capita income equal to the U.S. average has an FMAP of 55 percent with a state share of 45 percent.

[63] Section 1905(b) of the Social Security Act.

[64] There was a small increase in state FMAPs of about two percent in 2003 as a way to deal with falling state revenues.

infants born to Medicaid-eligible pregnant women, and certain people with Medicare.[65] Second, federal statute and regulations require states to provide a specified benefit package.[66] Third, federal guidelines govern the non-federal share of Medicaid expenditures. For example, while states primarily finance the non-federal share of Medicaid expenditures from state general funds (i.e., funds derived from the state tax base), federal statute allows up to 60 percent of the non-federal share to come from local government sources. Once these three requirements are met, states have significant discretion over decisions regarding provider pay, managed care contracting, and benefit packages.

According to the Congressional Research Service (CRS), states began using provider taxes and provider donations in the 1980s and "[i]n some cases, Medicaid providers initiated these provider tax and donation arrangements because states would often use the provider tax and donation revenue to raise Medicaid payment rates (CRS 2012)." Provider donations are any voluntary payment made to a state or unit of local government by a health care provider.[67] Provider taxes are defined in the law as taxes in which at least 85 percent of the resulting revenue comes from health care providers. An example from the CRS report details the mechanics of how states use provider taxes to increase state revenue:

> [For] example, a state with a 60% FMAP imposes a provider tax on all
> nursing homes in the state, and the state collects $10 million in tax

---

[65] Center for Medicare and Medicaid Services. *Eligibility*. Retrieved from:
http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Eligibility/Eligibility.html.
[66] Center for Medicare and Medicaid Services. *Medicaid Benefits*. Retrieved from:
http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Benefits/Medicaid-Benefits.html.
[67] Section 1903(w)(2) of the Social Security Act.

revenue through this provider tax. The state then increases Medicaid reimbursement rates to nursing homes, which means nursing homes with Medicaid enrollees receive an additional $8 million. With these Medicaid expenditures, the state draws down $4.8 million (60% of $8 million) in federal Medicaid matching funds. In this example, the state was able to increase Medicaid payment rates to nursing homes without the use of any state general funds, and the state is left with $6.8 million to use for other Medicaid or non-Medicaid purposes.

In 1984, Florida became the first state to establish a provider tax program and in 1985 West Virginia became the first state to establish a donation program. Although the period from 1984 through 1990 consisted of rapid Medicaid expansion with inflation-adjusted national Medicaid expenditures increasing 53 percent,[68] states were slow to adopt provider taxes. By 1990, just six states had tax or donation programs (Ku and Coughlin 1995).

In the mid-1980s, Congress offered states options to expand Medicaid eligibility and within a few years many of the options were converted into mandates on states, largely through the Medicare Catastrophic Coverage Act of 1988.[69] The recession of 1991, along with growing Medicaid rolls and increased coverage requirements, strained state budgets, most of which were running deficits by 1991 or 1992. This increased budgetary pressure led many states to use provider donations or provider-specific taxes to finance the state share of Medicaid spending. By 1992, 39 states had provider taxes (Ku and Coughlin 1995), and tax and donation programs were accounting for about $8 billion in State revenues (Coughlin et al., 1994).

---

[68] In 1984, national Medicaid spending was $38.23 billion. In 1990, national Medicaid spending was $73.66 billion. In 1984, the CPI averaged 103.9. In 1990, the CPI averaged 130.7.
[69] Congressional Budget Office. (1988, October). *The Medicare Catastrophic Coverage Act of 1988*. Retrieved from: http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/84xx/doc8430/88doc14.pdf.

States' use of provider taxes and donations became a source of tension between policymakers in Washington and policymakers in state capitols. In response to the increased use of provider taxes and other techniques that brought federal money into state coffers without net state expenditures on their Medicaid programs, Congress passed and President Bush signed the Medicaid Voluntary Contribution and Provider-Specific Tax Amendments (MVCPSTA) in 1991.[70] The MVCPSTA outlawed the use of most provider donations and made provider taxes more costly for health care providers that treat few, if any, Medicaid enrollees.[71]

The MVCPSTA required that provider taxes be uniform (i.e., the tax rate must be uniform across all providers in the class) and broad-based (i.e., imposed on all providers in whichever of 19 specified classes of providers is subject to the tax).[72] The MVCPSTA also attempted to limit the extent to which providers could be held harmless by the tax (i.e. providers who receive at least as much money back from the state in higher Medicaid payments as they paid through the tax). The Secretary of Health and Human Services may waive the broad-based and uniform requirements under certain conditions,

---

[70] Section 1903(w)(5)(A) of the Social Security Act, added by Medicaid Voluntary Contribution and Provider-Specific Tax Amendments (P.L. 102-234).

[71] Many researchers and academics have incorrectly reported that federal law requires that provider tax revenue not exceed 25 percent of the non-federal share of Medicaid expenditures (Miller and Wong 2004; Congressional Research Service 2012). However, the 25 percent limitation, which was added by MVCPSTA (Section 1903(w)(1)(A)(iv)), was only in effect between January 1, 1992 and September 30, 1995. Further, the regulation at 42 CFR 433.70 is consistent with this time period as it says "Beginning October 1, 1995, there is no limitation on the amount of health care-related taxes that a State may receive without a reduction in FFP, as long as the health care-related taxes meet the requirements specified in §433.68."

[72] The specified 19 classes of providers are those that provide the following: inpatient hospital services, outpatient hospital services, nursing facility services, services of intermediate care facilities for the mentally retarded, physicians' services, home health care services, outpatient prescription drugs, services of Medicaid managed care organizations, ambulatory surgical centers, dental services, podiatric services, chiropractic services, optometric/optician services, psychological services, therapist services, nursing services, laboratory and X-ray services, emergency ambulance services, and other health care items or services for which the state has enacted a licensing or certification fee.

however. According to the Medicaid and CHIP Payment and Access Commission, states commonly seek waivers of the broad-based and uniform requirements to exempt certain providers or revenue sources from taxation.[73] Moreover, under a 'safe harbor' provision in regulation, states can hold providers harmless so long as the tax rate does not exceed six percent of net patient service revenue. According to CRS, as of January 2013, no state has imposed a provider tax higher than six percent.

The restrictions on provider taxes contained in MVCPSTA made it more difficult for states to use provider taxes to finance the state share of Medicaid expenditures (Coughlin and Zuckerman 2002). Since the MVCPSTA made provider taxes less appealing, states increasingly sought to maximize federal Medicaid money through intergovernmental transfers (IGTs) in the decade after MVCPSTA. IGTs generally involve the transfer of funds from county-owned or city-owned facilities to the state (Coughlin, Bruen, and King 2004). In a 2002 regulation, the U.S. Department of Health and Human Services explained how states combined IGTs with Medicaid Upper Payment Limits (UPLs), federal requirements that limit Medicaid reimbursements to no more than what Medicare would have paid for identical services, to increase federal funding of state Medicaid programs:

> [B]y developing a payment methodology that set rates for proprietary and nonprofit facilities at lower levels, states were able to set rates for county or city facilities at substantially higher levels and still comply with the existing aggregate upper payment limits. The federal government matched these higher payment rates to public facilities. Because these facilities are public entities, funds to cover the state share were transferred from those facilities (or the government units that operate them) to the

---

[73] Email exchange between Medicaid and CHIP Payment and Access Commission staff and author.

state, thus generating increased federal funding with no net increase in state expenditures.[74]

Similar to the federal restrictions that resulted from the growth of provider taxes in the early 1990s, Congress instructed CMS to issue regulations limiting the use of IGT/UPL arrangements in 2000 (GAO 2004).[75] These regulations led many states to reconsider provider taxes, which had declined significantly – from 39 states with at least one provider tax in 1992 to 24 states with at least one provider tax in 2003.

Beginning in 2008, many states were confronting much lower state revenue because of the recession. A large part of the American Recovery and Reinvestment Act, better known as the federal stimulus law, signed into law on February 17, 2009, poured billions of dollars into state treasuries through FMAP increases (Smith et al. 2010). In addition to the larger FMAPs, several states implemented new provider taxes or increased existing provider taxes in order to bring in more federal dollars to alleviate budget shortfalls. Between 2007 and 2011, four states that did not have any provider tax added one, 14 states added taxes on hospitals, and seven states added taxes on nursing homes (Smith et al. 2007 and Smith et al. 2011). By 2011, 47 states had at least one provider

---

[74] 66 Fed. Reg 3149-3150 (2002).

[75] As the UPL financing schemes came to light, Congress and the Health Care Financing Administration (HCFA), the federal agency administering the Medicaid program at the time, took action through statute and regulation to curtail states' ability to claim excessive federal funds through these UPL financing schemes. HCFA initiated policy changes to restrict states' UPL arrangements in an October 2000 proposed regulation. The Medicare, Medicaid, and SCHIP Benefits Improvement and Protection Act of 2000 (BIPA) directed HCFA to issue a final regulation to limit states' ability to claim excessive federal matching funds through UPL arrangements. BIPA also required that HCFA's final regulation – established in January 2001 – allow for transition periods as long as 8 years, during which time excessive UPL payments would be phased out. Because some states may have come to rely on these excessive federal funds, the length of a state's transition period was based in part on how long the state had in place a UPL arrangement meeting certain specified criteria.

tax; of these 47 states, 34 states had a hospital tax and 39 states had a nursing home tax (Smith et al. 2012).[76]

According to the annual Medicaid surveys conducted by the Kaiser Family Foundation (KFF), in addition to many states instituting new provider taxes, many states with provider taxes increased the tax rate in fiscal years 2010 and 2011. In fiscal year 2010, 27 states reported increasing provider tax rates on at least one provider class and only two states reported reducing rates (Smith et al. 2010). In fiscal year 2011, 13 states reported increasing hospital tax rates and 11 states reported increasing nursing home tax rates compared to only two states that reported reducing hospital tax rates and one state that reported reducing its nursing home tax rate (Smith et al. 2011).

According to the Medicaid and CHIP Payment and Access Commission (MACPAC), policymakers have a limited understanding of the effect of Medicaid provider taxes since a large amount of information related to provider taxes is not readily available (MACPAC 2012). While the federal government does not have reliable data on the amount of revenue states raise through provider taxes, there is evidence that the revenue that states raise is considerable and has increased over time. According to survey data collected by the National Association of State Budget Officers, the share of the non-federal component of Medicaid spending derived from state general funds declined from 80 percent to 72 percent between 2008 and 2012 (NASBO 2012). While provider taxes are not the only state source of Medicaid spending other than state general funds, they are a large component.

---

[76] The three states without any provider taxes in FY 2012 were Alaska, Delaware, and Hawaii.

Although state expenditure data is subject to audit by CMS, states are not required to report provider tax revenue to the federal government. As a result, provider tax information is often incomplete and likely underreported. For example, in fiscal year 2010, 13 states did not report any provider tax revenue to CMS, even though 45 states reported having at least one provider tax (Congressional Research Service 2012). In fiscal year 2011, of the 47 states with provider taxes, 39 reported raising $18.04 billion from provider taxes.[77] Since eight states with provider taxes did not report provider tax revenue to CMS and states that did report revenue were probably more likely to underreport revenue than overreport revenue to the federal government, it is likely that states raised well in excess of $20 billion through provider taxes in fiscal year 2011.

III. Political Economy of Medicaid Provider Taxes

Medicaid provider taxes cannot be analyzed using traditional tax models because provider taxes lack the characteristics of typical taxes. Black's Law Dictionary defines a tax as a "burden laid upon individuals or property owners to support the government . . . not a voluntary payment or donation, but an enforced contribution, exacted pursuant to legislative authority."[78] Medicaid provider taxes, however, are not a burden on the majority of entities that must pay them; in fact, new or increased provider taxes are often advocated by the providers who would be subject to the tax.

Medicaid provider taxes are a result of the open-ended federal reimbursement of state Medicaid spending. Consider a simple example in which a provider gives the state

---

[77] Center for Medicare and Medicaid Services. *CMS-64.11 data as of February 2012*.
[78] Black's Law Dictionary, 5th edition. (1979).

collection agency $1,000 and the state Medicaid program spends $1,000 on the provider.

Those transactions, minus transaction costs, cancel each other out for both the state and

the provider. In the absence of the federal Medicaid reimbursement, this type of financial

arrangement, which has transaction costs, would not make sense. However, since

provider taxes are commonplace, this type of financial arrangement clearly has benefits

that outweigh the costs for the parties involved. Stoil, who equates provider taxes with a

Ponzi scheme, argues that provider taxes allow states to obtain interest-free loans from

the health care industry with the proceeds of the tax returned to the industry in the form

of higher levels of Medicaid reimbursements (Stoli 2006).

Providers who serve a significant number of Medicaid enrollees will tend to

benefit from the provider tax mechanism because they will likely receive at least as much

state spending through a combination of higher Medicaid reimbursement rates or

supplemental payments than they would have received without the provider tax

mechanism. Supplemental payments are payments states make to certain health care

providers beyond the normal payment rate schedule. On the other hand, providers who

do not serve a significant number of Medicaid enrollees will tend to be worse off from

the provider tax mechanism since the tax must be broad-based.

The political calculus related to provider taxes is somewhat different for nursing

homes compared to hospitals. Nursing homes derive a much larger share of revenue

from Medicaid than hospitals. In 2010, nursing homes received 32 percent of their

revenue from Medicaid and hospitals received 19 percent of their revenue from

Medicaid.[79] During 2009, 94 percent of nursing homes were Medicaid-certified[80] and nearly two-thirds of nursing home residents relied on Medicaid to pay for all, or part, of their care.[81] Therefore, provider taxes on nursing homes should be more broadly supported by industry groups as states can return the revenue to the nursing home by raising payment rates. Since federal law requires that provider taxes be broad-based and uniform and many hospitals treat a relatively small number of Medicaid recipients, opinions of hospital taxes among hospitals should not be as uniformly supportive as opinions of nursing home taxes among nursing homes..

The number of provider taxes in place prior to the recession supports this interest group claim. Prior to the recession, nursing home taxes were much more prevalent than hospital taxes. In 2007, 20 states had hospital taxes compared to 33 states with taxes on nursing homes. In the aftermath of the financial crisis and resulting state budget shortfalls, many states looked to maximize federal funding of Medicaid. Since most states already had taxes on nursing homes, hospital taxes were more likely to be added by

---

[79] In 2010, hospitals earned $814.0 billion in revenue, of which $152.5 billion was paid by Medicaid, and nursing homes earned $143.1 billion in revenue, of which $45.1 billion was paid by Medicaid.
Center for Medicare and Medicaid Services. *Table 6 - Hospital Care Expenditures; Aggregate and per Capita Amounts, Percent Distribution and Annual Percent Change by Source of Funds: Calendar Years 2006-2021.* Center for Medicare and Medicaid Services. *Table 13 – Nursing Care Facilities and Continuing Care Retirement Communities; Aggregate and per Capita Amounts, Percent Distribution and Annual Percent Change by Source of Funds: Calendar Years 2006-2021.* Retrieved from: http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/Proj2011PDF.pdf.
[80] Center for Medicare and Medicaid Services. *Nursing Home Data Compendium 2010 Edition.* Retrieved from: http://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandComplianc/downloads/nursinghomedatacompendium_508.pdf.
[81] AARP. *Across the States 2012: Profiles of Long-Term Services and Supports.* (2012, September). Retrieved from: http://www.aarp.org/home-garden/livable-communities/info-09-2012/across-the-states-2012-profiles-oflong-term-services-supports-AARP-ppi-ltc.html.

states. As a result, the number of states with hospital taxes nearly doubled between 2007 and 2012.

Since provider taxes allow states to receive increased federal money without increased net state Medicaid expenditures, state taxpayers and state politicians benefit. The greater the amount states raise through provider taxes, the less burden the state tax base faces for financing Medicaid. State politicians are likely rewarded by the state electorate for providing the same level of benefits with a lower burden on the state tax base all else equal. Therefore, provider taxes are an appealing revenue option for state policymakers.

Miller and Wang (2009) assessed the factors that led states to adopt nursing home taxes between 2000 and 2004. During this period, eighteen states added a tax on nursing homes.[82] Miller and Wang found that the strongest predictors of nursing home tax adoption were greater nursing home industry lobbying strength, a greater percentage of nursing home residents receiving services paid by Medicaid or Medicare, broader Medicaid eligibility, worse state fiscal conditions, and nursing home supply restrictions. Since provider taxes shift a sizeable burden for financing Medicaid from the state base to the federal tax base, federal politicians and policymakers should be less supportive of them.

The use of provider taxes was discussed among politicians at the highest levels of the federal government during deficit reduction negotiations in 2011. According to Bob Woodward's book, *Price of Politics*, which centered on the 2011 budget and debt ceiling

---

[82] The number of states with nursing home taxes increased from 13 to 31 between 2000 and 2004.

negotiations, congressional Republicans proposed reforming the Medicaid provider tax as a way to reduce future federal budget deficits. Vice-President Joe Biden agreed that provider taxes needed reform, referring to provider taxes as a scam. However, several congressional Democrats as well as senior White House staff were opposed to provider tax reform, since they believed reforming provider taxes would harm states' budget situations and states' ability to provide health care and long-term care services. Although federal policymakers have agreed to modest deficit reduction since 2011, provider taxes were not part of the agreements.

IV. Previous Research on the Impact of Provider Taxes on Medicaid Spending

Impact on Payments to Providers

While there are several articles and reports that provide qualitative discussions of the general role that provider taxes play in the financing of state Medicaid programs (Coughlin, Bruen, and King 2004; MACPAC 2012; GAO 2004), there is only a single research article (Grabowski et al. 2008) that attempts to estimate the economic effect of provider taxes and a single research article (Miller and Wang 2009) that attempts to estimate the factors that contribute to state adoption of provider taxes. The absence of prior research in this area has two likely explanations. First, the federal government has historically failed to collect provider tax data so the data is not easily accessible for researchers. Second, Medicaid financing, and particularly state methods to finance the state share of Medicaid expenditures, is an arcane subject area that state policymakers who are the most familiar with generally do not want to highlight.

Grabowski et al. compiled survey data of the contiguous 48 states for the period

from 1999 through 2004 in order to estimate the effect of nursing home taxes,

particularly state adoption of a nursing home taxes, on the change in the Medicaid

payment rate for nursing homes. Grabowski et al. found that the average annual

inflation-adjusted change was 3.7 percent in the 16 states that lacked a nursing home tax

over the entire time period and 3.1 percent in the 13 states that had a nursing home tax in

place for the entire time period. In the 17 states that adopted a nursing home tax during

the time period and maintained the tax through 2004, payment rates increased 7.8 percent

in the year the tax was adopted and another 6.7 percent in subsequent years.

Interestingly, annual payment growth was only 2.4 percent in the years preceding states'

adoption of a nursing home tax, suggesting states may have restricted payments in the

year prior to the tax's enactment in anticipation of future federal revenue that would

result from the enactment of the tax.

Using a myriad of standard controls, Grabowski et al. estimated that states

increased annual Medicaid daily payment rates by nearly 6 percent following the

adoption of a provider tax. The impact of a nursing home tax on increasing state

Medicaid spending on nursing homes should dissipate over time, but the short time

period of Grabowski et al.'s study precludes measuring this effect. One possible

weakness with using Grabowski et al.'s approach to measure the impact of provider taxes

on net Medicaid payments received by providers is that states are increasingly using

supplemental payments to pay providers. Therefore, replicating Grabowski et al.'s

methodology would likely lead to an underestimate of the true impact of nursing home

taxes on payments received by nursing homes if the provider tax revenue is used to

finance supplemental payments to nursing homes in the state.

While the Grabowski et al. study is the only study in the academic literature that

assesses the impact of provider taxes on Medicaid payment rates, there are numerous

government and industry reports on the subject. The nursing home industry has

historically been the provider group most interested in provider taxes. Consultants for the

American Health Care Association (AHCA), the main nursing home lobbying group,

estimated that state nursing home provider taxes generated about $3.8 billion in federal

matching funds in 2007.[83] According to the estimates, these extra funds increased

Medicaid's average payment rates for nursing home patients by over $14 per day. The

AHCA report also found that most states with nursing home taxes (19 of the 32 states

with nursing home taxes in 2007) were at or near the safe harbor maximum of 6 percent.

A December 2011 report commissioned by the AHCA found that nursing home taxes

generated $6 billion in federal matching funds in 2011, a 58 percent increase from four

years earlier.[84] According to the report, "[s]tates continue to rely heavily upon provider

taxes to fund nursing home reimbursement. New or expanded provider tax programs, for

the most part, continue to mitigate rate reductions. In some states, provider taxes have

---

[83] BDO Seidman, LLP Accountants and Consultants and Eljay, LLC for the American Health Care
Association. (2007, September). *A Report on Shortfalls in Medicaid Funding for Nursing Home Care*.
Retrieved from:
http://www.ahcancal.org/research_data/funding/Documents/2007%20Medicaid%20Shortfall%20Report.pdf.
[84] Eljay, LLC for the American Health Care Association. (2011, December). *A Report on Shortfalls in
Medicaid Funding for Nursing Home Care*. Retrieved from:
http://www.ahcancal.org/research_data/funding/Documents/2011%20Report%20on%20Shortfalls%20in%
20Medicaid%20Funding%20for%20Nursing%20Home%20Care.pdf.

helped to fund inflationary increases that states otherwise would be unable to provide as a result of budget deficits."[85]

Several Government Accountability Office (GAO) reports over the past decade have discussed the impact of provider taxes. In October 2003, GAO released a report based on its interviews with state and nursing home industry officials in 19 states and documentation about nursing home payment rates and methods (GAO 2003). States reported to GAO that they generally relied on nursing home provider taxes to fund nursing home payments or to avert service reductions. For example, Massachusetts reported that it increased payment rates in June 2003 by about 6.3 percent because of provider tax revenue.

In a September 2010 GAO report that assessed the impact of the federal stimulus law in 16 states, many states reported to GAO that they had implemented both new provider taxes as well as payment rate reductions to providers (GAO 2010). According to GAO's report, at least half of the states that implemented new or increased taxes for inpatient hospitals, nursing facilities, or outpatient hospitals also reduced or froze payments to those same providers. From surveys of state officials conducted in 2012, GAO found that states most frequently reported that the purpose of increased or new provider taxes was to avoid cuts in services or payment rates and not to expand services or increase provider payment rates (GAO 2012). However, according to the KFF surveys, several states that increased tax rates also significantly increased payment rates for providers (Smith et al. 2010 and Smith et al. 2011) in 2010 and 2011.

---

[85] *Id.*

Similar to GAO and KFF, MACPAC has provided a general description of the effect of provider taxes without any discussion of relevant magnitudes. According to MACPAC's analysis, nursing home taxes have generally financed increased Medicaid payment rates while hospital taxes have generally financed increased supplemental payments directed toward hospitals (MACPAC 2012). Since nursing homes receive more of their total revenue from Medicaid than hospitals, increased payment rates were an adequate way for policymakers to increase Medicaid money received by nursing homes. Since the percent of revenue derived from Medicaid across hospitals varies to a greater degree than the percent of revenue derived from Medicaid across nursing homes, states have used supplemental payments to better target hospitals that serve a higher proportion of Medicaid enrollees.

Impact on Overall Spending

Analysts at the Congressional Budget Office (CBO) acknowledge that the lack of empirical research makes it difficult to estimate the budgetary impact of changes to federal law that governs provider taxes.[86] When estimating the impact of changes to the safe harbor (the maximum provider tax rate states can assess without being subjected to the hold harmless requirement), CBO's experts assume that half of the money that the state raised through the provider tax would have been spent even if the state had to raise the revenue from the state tax base.[87] According to CBO's assumption, reducing the provider tax threshold would reduce state Medicaid expenditures by an amount equal to

---

[86] Phone conversation between Congressional Budget Office staff and author.
[87] *Id.*

half the amount that the state raised between the new safe harbor threshold and the previous safe harbor threshold.

Both the George W. Bush Administration and the Obama Administration have proposed reducing the safe harbor threshold. In 2006, the Bush Administration announced plans to issue regulations that would have reduced the allowable provider tax rate from 6 percent to 3 percent.[88] At the time, the Bush proposal was estimated to lower total Medicaid spending by $10 billion over ten years relative to baseline projections, with a federal savings of $6 billion.[89] An analysis sponsored by the nursing home industry estimated that the Bush Administration's proposed reduction in the safe harbor would have cost the nursing home industry an estimated $1.5 billion in federal funds in 2006.[90] States, provider groups, and beneficiary advocates lobbied aggressively against the regulation, and their efforts proved successful. Section 403 of the Tax Relief and Health Care Act, signed into law on December 20, 2006, codified the maximum provider tax rate at 6 percent, except for the period from January 1, 2008 through September 30, 2011.[91] During this nearly four year period, the rate was temporarily reduced to 5.5 percent; CBO projected this reduction would save the federal government $200 million.[92]

---

[88] Kaiser Family Foundation. *The President's FY 2007 Budget Proposal: Overview and Briefing Charts.* Retrieved from: http://www.kff.org/uninsured/upload/7472.pdf.

[89] The Piper Report. (2006, October 17). *Medicaid Provider Taxes: Battle Over Bush Proposal to Further Limit State Provider Taxes.* Retrieved from: http://www.piperreport.com/blog/2006/10/17/post/.

[90] BDO Seidman, LLP Accountants and Consultants for the American Health Care Association. (2006, June). *A Report on Shortfalls in Medicaid Funding for Nursing Home Care.* Retrieved from: http://infoassist.panpha.org/docushare/dsweb/Get/Document-14525/2006%20June%20Report%20on%20Shortfalls%20in.pdf.

[91] Library of Congress, Bill Summary & Status – 109th Congress (2005-2006) H.R. 6111 CRS Summary. *Retrieved from*: http://www.thomas.gov/cgi-bin/bdquery/z?d109:HR06111:@@@D&summ2=m&.

[92] Congressional Budget Office. (2006). *CBO's Estimate of the Effects on Direct Spending of the Medicare Improvements and Extension Act of 2006.* Retrieved from: http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/77xx/doc7702/hr6408thom.pdf.

President Obama's fiscal year 2013 budget proposed reducing the safe harbor threshold from 6 percent to 3.5 percent between fiscal year 2015 and fiscal year 2017 and then keeping it at 3.5 percent.[93] The Obama Administration estimated that this reduction would reduce federal Medicaid expenditures by $22 billion over the next decade relative to baseline expenditure projections.[94] CBO estimated this budget option would reduce federal Medicaid expenditures relative to baseline expenditure projections by $48 billion from fiscal year 2013 through fiscal year 2022.[95] More recently, CBO estimated that federal Medicaid expenditures would decline by $11.3 billion over the 2012-2022 period relative to baseline expenditure projections if the provider tax threshold was lowered from 6 percent to 5.5 percent starting in 2013, an indication that a large number of state provider taxes are at or near the 6 percent threshold.[96]

The large differences between CBO's estimate and the Administration's estimate, which was prepared by the Office of the Actuary at CMS and approved by the Office of Management and Budget, indicate a large degree of uncertainty among federal budget and program analysts of the budgetary impact of changing allowable provider tax rates. However, it is worth noting that last year's CBO estimate of the budget impact from reducing the provider tax threshold shows much larger federal savings than CBO's 2006

---

[93] White House Office of Management and Budget. *Cutting Waste, Reducing the Deficit, And Asking All To Pay Their Fair Share,* Page 36. Retrieved from: http://www.whitehouse.gov/sites/default/files/omb/budget/fy2013/assets/cutting.pdf.
[94] *Id.*
[95] Congressional Budget Office. *CBO Estimate of the Effects of Medicare, Medicaid, and Other Mandatory Health Provisions Included in the President's Budget Request for Fiscal Year 2013*. Retrieved from: http://www.cbo.gov/sites/default/files/cbofiles/attachments/FY2013ReestimateofthePresidentsBudget-Health.pdf.
[96] Congressional Budget Office. *Reconciliation Recommendations of the House Committee on Energy and Commerce*. Retrieved from: http://www.cbo.gov/sites/default/files/cbofiles/attachments/EnergyandCommerceReconciliation.pdf

estimate, an indication that provider taxes are increasing federal Medicaid expenditures to a far greater degree over the past few years as more states use provider taxes and set rates near the 6 percent threshold.

V. Data and Model

At the beginning of each fiscal quarter, states submit a form – the CMS-64 – to CMS that indicates their expected Medicaid expenditures for the quarter. CMS then instructs the U.S. Department of Treasury to send a check to states for the federal share of the states' expected Medicaid expenditures. After the end of the fiscal quarter, states submit their actual expenditures to CMS and the amount Treasury sent to the state at the beginning of the fiscal quarter is reconciled with actual expenditures. I utilized CMS-64 data for Medicaid expenditures by state by year.

CMS-64 data consists of expenditures in 41 categories, such as inpatient hospitals, nursing facilities, prescription drugs, and HCBS. Additionally, many of the 41 separate categories are broken down into subcategories. For example, inpatient hospital expenditures contain subcategories for regular payments, disproportionate share hospital payments, supplemental payments, and graduate medical education payments. According to experts at the Congressional Research Service, CMS-64 data has a few drawbacks. One of the main drawbacks is that managed care expenditures are not broken down into ultimate expenditure areas. I reviewed the CMS-64 data for clear anomalies or problems,

such as a large expansion of managed care between years. My review of the data led to the exclusion of eight states from the study.[97]

The best resource for information on state provider taxes is the Kaiser Family Foundation (KFF). KFF surveys every state once a year about the changes states made during the past year to their Medicaid programs and about the changes states intend for the coming year. Although KFF has conducted these surveys for over a decade, KFF's provider tax data is reliable only since 2007.[98] Beginning in 2007, the yearly KFF surveys show the number of states with provider taxes on hospitals and nursing homes. Therefore, from Kaiser's surveys, I know which states have had hospital taxes and nursing home taxes since 2007 and the states which added these provider taxes, by year, beginning in 2008.

I selected four categories of Medicaid expenditures – hospitals, physicians, nursing homes, and HCBS– for the purposes of this paper. In 2011, these four categories plus managed care represented about 68.1 percent of total Medicaid expenditures, up slightly from 2007 when they represented 66.7 percent of total Medicaid expenditures. In both years, the largest portion of average state Medicaid expenditures, about 19 percent of total expenditures, went to hospitals. Payments to nursing homes, HCBS providers, and managed care organizations each averaged around 15 percent of total expenditures during this time period with the share allocated to nursing homes declining modestly over time and the share allocated to managed care organizations increasing modestly over

---

[97] The eight states excluded from the study were: Arizona, Delaware, Hawaii, Indiana, Minnesota, New Mexico, Tennessee and Wisconsin.
[98] This information was provided by Kaiser Family Foundation staff.

time. Payments to physicians averaged slightly less than five percent of average state Medicaid expenditures during this time period.

The dependent variables in the study are the annual percentage change in Medicaid expenditures for each of the four categories as well as for overall state Medicaid expenditures. Since, the dataset only contains the years from 2007 through 2011, there are four years of data which contain growth rates. The growth rates represent the yearly growth in Medicaid expenditures adjusting all expenditures using the average consumer price index in 2011. The two provider taxes which are the most common and which raise the most revenue are the hospital tax and the nursing home tax. The central question addressed in this paper is how hospital taxes and nursing home taxes, and particularly states' enactment of these taxes, effect growth in states' Medicaid expenditures (including the federal share).

The first central hypothesis is that state adoption of hospital taxes increases the growth rate of the Medicaid payments received by hospitals. The second central hypothesis is that state adoption of nursing home taxes increases the growth rate of the Medicaid payments received by nursing homes. The third central hypothesis is that state adoption of provider taxes, either hospital taxes or nursing home taxes, increases the growth rate of the states' total Medicaid expenditures.

Beyond the three central hypotheses, there are several additional issues I address in the paper. The first is whether state adoption of provider taxes impacts state Medicaid expenditures in categories other than the particular provider group where the tax was statutorily placed. For example, nursing home care and HCBS may be substitutes for a

relatively large subset of Medicaid eligible individuals. Therefore, nursing homes taxes may affect state expenditures on HCBS. This paper will also address the point in time when provider taxes have the largest impact on Medicaid spending growth as well as whether there is support for the Grabowski et al. finding (discussed in Section IV) that states which enacted nursing home taxes had smaller increases in payment rates the year before enactment of the tax.

I first calculated summary statistics by three provider tax groupings – states with taxes the entire period, states without taxes during the entire period, and states that added taxes during the period. For both hospital taxes and nursing home taxes, I computed mean Medicaid expenditures for each expenditure category for 2007 and 2011 using constant dollars. For each expenditure category, I computed the difference in real per capita Medicaid spending over this four-year period. To estimate the impact of new provider taxes on state Medicaid expenditures, I then computed a second difference by subtracting the expenditure change in states without a provider tax from the expenditure change in states that added a provider tax during the time period.

For the difference-in-difference estimates, I used states without a provider tax as the control group rather than states with a provider tax during the entire time period for three reasons. First, states that enacted a provider tax prior to 2007 probably have different political dynamics relating to Medicaid than states without provider taxes prior to 2007. Second, many states with hospital taxes or nursing home taxes in place in 2007 raised the tax rate between 2007 and 2011 and in some cases this increase might have been larger than the rate in states that added taxes. Third, the effect of provider taxes on

Medicaid spending may be endogenous. For example, states with higher spending might

be more likely to adopt provider taxes to lessen the burden of Medicaid spending on the

state tax base as opposed to the provider taxes leading to additional Medicaid spending.

Excluding states with provider taxes in 2007 removes this possible source of

endogeneity.

After calculating difference-in-difference estimates, I address the issue of whether

provider taxes are correlated with higher Medicaid expenditure growth rates after

controlling for a variety of factors that also impact state Medicaid spending by estimating

equation (1):

(1) $G_{st} = \beta_1 H_{st} + \beta_2 NF_{st} + X_{st} + \zeta_t + \varepsilon_{st}$

G_{st} represents the growth rate in Medicaid expenditures for state s between year t

and year t-1 for each of the four categories of state Medicaid expenditures in the analysis

as well as for overall Medicaid spending growth. H_{st} is a dummy variable for whether the

state has a tax on hospitals, and NF_{st} is a dummy variable for whether the state has a tax

on nursing homes. The equation has separate dummies for hospital taxes and nursing

home taxes in order to estimate their separate, marginal effects on Medicaid spending

growth. X_{st} is a matrix of control variables that consists of the state poverty rate, the prior

year change in the state poverty rate, the state unemployment rate, the prior year change

in the state unemployment rate, real per capita state income, the prior year percentage

change in real per capita state, lagged real per capita Medicaid spending, and lagged per

capita Medicaid spending for each of the five categories of expenditures: hospitals,

physicians, nursing homes, HCBS providers, and managed care companies. Finally, ζ_t is

a matrix of dummy variables for the years of the study. In addition to equation (1), I also

performed the same regressions after adding state fixed effects.

It is more likely that Medicaid provider taxes in place in years other than years

near the enactment of the tax are correlated with higher levels of Medicaid spending than

with higher Medicaid spending growth. The reason is that provider taxes likely produce

an *initial* effect through higher spending growth for a few years, and therefore, change

the level of Medicaid expenditures in a particular expenditure category. The initial effect

likely dissipates within a few years as states with provider taxes fail to maintain

consistently higher Medicaid spending growth. The possibility of a level effect (i.e. a

change in the intercept rather than a long-lasting change in the slope) in the period after

the enactment of the tax is thus more likely than a state with a provider tax having

consistently higher Medicaid spending growth in that category or in overall state

Medicaid spending.

In order to account for the possibility that Medicaid spending growth is greater in

the years closest to the state's decision to enact a provider tax, I estimated equation (2):

(2) $G_{st} = \beta_1 H_{st1} + \beta_2 H_{st2} + \beta_3 H_{st0} + \beta_4 H_{st\#} + \beta_5 NF_{st1} + \beta_6 NF_{st2} + \beta_7 NF_{st0} + \beta_8 NF_{st\#} + X_{st} + \zeta_t + \varepsilon_{st}$

G_{st}, X_{st}, and ζ_t take on the same values as in equation (1). Rather than having just

one explanatory variable for hospital taxes and nursing home taxes, equation (2) contains

four dummy variables for both hospital taxes and nursing homes taxes. H_{st1} is a dummy

variable equal to 1 if the state enacted a hospital tax in that year. H_{st2} is a dummy

variable equal to 1 if the state enacted a hospital tax the year before. H_{st0} is a dummy variable equal to 1 if the state enacted a hospital tax in the following year. $H_{st\#}$ is a dummy variable equal to 1 if the state had a provider tax in place that was not enacted the year before, the year of, or the year after the observation.

The nursing home dummy variables have the same meaning, except they pertain to taxes on nursing homes. Ideally, I would have had additional dummy variables beyond the year after the provider tax was put in place to test whether the effect of a provider tax on Medicaid expenditure growth dissipated over time as would be expected. However, since the majority of provider taxes enacted in this time period were enacted in 2010 or 2011, there would have been very few observations to use for measuring the effect of provider taxes beyond the year after the enactment of the tax.

I estimated a third equation that combines H_{st1} and H_{st2} in a single dummy variable: H_{st1-2}.

$$(3) \qquad G_{st} = \beta_1 H_{st1-2} + \beta_2 H_{st0} + \beta_3 H_{st\#} + \beta_4 NF_{st1-2} + \beta_5 NF_{st0} + \beta_6 NF_{st\#} + X_{st} + \zeta_t + \varepsilon_{st}$$

There are two reasons why creating a dummy variable that counts observations in the year of the enactment of the tax and the year after the enactment of the tax makes sense. The first reason is that doing so causes the number of observations where the dummy variable equals one to nearly double. For example, only 13 of the 151 growth rates for Medicaid expenditures on hospitals occurred in years when a hospital tax was enacted. The second reason combining H_{st1} and H_{st2} in a single dummy variable makes sense is because a tax can be enacted at any point in the year. For example, if a state enacts a

hospital tax late in the year, then the year after the state's enactment of the tax may be a more appropriate time period to measure the impact of the tax on state Medicaid programs.

I included Medicaid managed care spending in the analysis for measuring the four-year trend in spending between 2007 and 2011, but not for measuring the year-to-year percent changes in state Medicaid expenditures. The growth in Medicaid managed care has been an important trend in Medicaid policy over the past decade or so. However, I excluded managed care expenditures from the regression analysis because many states had very large percent changes in Medicaid managed care expenditures from year to year, even if the spending amounts increased from one relatively small amount to another relatively small amount. Moreover, there were many year-to-year changes in which managed care expenditures increased from zero. These changes would significantly complicate calculations that tried to measure the percentage increase in Medicaid spending over time.

VI. Results

Table 3 shows the change in per capita inflation-adjusted Medicaid expenditures by category between 2007 and 2011 for the 40 states in the dataset which have reliable Medicaid expenditure data for the entire time period. The mean increase in total real per capita Medicaid expenditures was 14.0 percent between 2007 (using 2011 dollars) and 2011 for these 40 states. On average, state Medicaid expenditures on hospitals (up 16.7 percent) and physicians (up 16.6 percent) grew at a similar rate as overall Medicaid

spending. However, real per capita Medicaid expenditures on nursing homes actually declined (down 1.0 percent) over this four-year period, while real per capita Medicaid spending on HCBS increased by 21.1 percent.[99]

Hospital Tax Impact on Overall Medicaid Spending

By state grouping of hospital tax, Table 4 shows the amount of real per capita Medicaid spending in both 2007 and 2011 as well as the change in spending amounts over this four-year period. Figure 1 shows the trends in average per capita Medicaid spending between 2007 and 2011 for each of the three groupings, and Table 5 shows the changes in spending between 2007 and 2011 in percentage terms. In 2007, the average per capita Medicaid spending of states without hospital taxes during the time period was $992 and the average per capita Medicaid spending of states that added hospital taxes between 2007 and 2011 was $940. The 13 states that added hospital taxes between 2007 and 2011 had an average increase in Medicaid expenditures of $149 (a corresponding 15.7 percent increase) compared to an average increase of $121 (a corresponding 12.2 percent increase) for the 11 states without a hospital tax between 2007 and 2011. The 16 states that had a hospital tax during the entire period began the time period with more than $200 in higher average per capita Medicaid spending, and these states increased per capita Medicaid spending by $155 (a corresponding 13.8 percent increase) between 2007 and 2011.

---

[99] All of these averages, as are the remainder of averages in the paper, are not weighted by state population.

Table 4 and Table 5a show the difference-in-difference estimates, by category of hospital tax. The first difference is the change over time. The second difference is the difference in spending between states that added hospital taxes and states without hospital taxes during the entire period. The similar initial per capita spending levels in 2007 provide further support to the reasons given in the previous section that states without hospital taxes between 2007 and 2011 are a more appropriate control group to measure the average impact of the new hospital taxes in the 13 states. According to the difference-in-difference estimates, states that added hospital taxes increased real Medicaid spending relative to the increase in states without hospital taxes by $28 per capita, or by 3.5 percent.

The information in Table 6 is similar to the information in Table 5a, except for two key differences. First, Table 6 shows mean *annual* growth rates in per capita inflation-adjusted Medicaid expenditures by expenditure category. Second, Table 6 shows more categories related to the timing of the enactment of the provider tax. Table 6 shows an average increase in state Medicaid spending of 6.57 percent in the year that the 13 states added a hospital tax, an average that is at least 3 percent higher than every other category.

Table 10 shows the coefficients of the dummy variables for the presence of a hospital tax and a nursing home tax from equation (1). The estimates indicate that a hospital tax increased annual state per capita inflation-adjusted Medicaid expenditures by about 3 percent (p-value of 0.003) all else equal. Table 11 shows the estimates from

equation (1) with state fixed effects, and the coefficient is nearly identical to the one in Table 10.

I did not expect this result, since I did not expect that states with provider taxes would have consistently higher Medicaid growth rates. I considered that the significance might largely result from a burst of Medicaid expenditure growth in the 13 states that added hospital taxes during the time. The results from Table 12 and Table 13 suggest that this was not the case, however. The impact of hospital taxes on annual Medicaid expenditure growth was virtually identical – increasing state Medicaid expenditure roughly 2.5 percent – all else equal in the first two years after the hospital tax was enacted and all the other years a state hospital tax was in place other than in the first two years.

Hospital Tax Impact on Hospital Spending

Table 4 shows that the 16 states with hospital taxes in place by 2007 spent an average of $251 per capita on hospitals through Medicaid in 2007, substantially more than the $199 average per capita spending by states without hospital taxes for the entire time period and the $157 average per capita spending by states that added a hospital tax between 2007 and 2011. Table 4 shows that states that added hospital taxes had an average inflation-adjusted increase in per capita Medicaid hospital spending of $52 (a corresponding 33.5 percent increase) between 2007 and 2011, nearly double the $29 increase (a corresponding 13.8 percent increase) in states without hospital taxes. The difference-in-difference estimates from Table 4 and Table 5a indicate that state adoption

of a hospital tax led to hospitals receiving $23 per capita more, or about a 19.7 percent increase, in state Medicaid spending between 2007 and 2011.

Figure 2 shows the trends in average per capita Medicaid spending on hospitals between 2007 and 2011 for each of the three groupings. From Figure 2, it is clear that differences in average per capita Medicaid spending on hospitals across the three states groupings narrowed between 2007 and 2011. Moreover, most of the narrowing occurred in the second half of the period, which was the period when ten of the 13 hospital taxes were added.

The per capita Medicaid spending increase received by hospitals in states with hospital taxes during the entire time period was only $7 (a corresponding increase of 5.1 percent). The small increase appears to result from these states greatly increasing Medicaid spending on managed care. Since hospitals undoubtedly receive a substantial share of Medicaid payments states make to managed care companies, the average per capita Medicaid payments received by hospitals in these states was likely considerably more than $7.

In addition to the evidence that hospital taxes increased state Medicaid spending received by hospitals, Table 6 indicates that the timing of the hospital tax affected Medicaid expenditures received by hospitals. For the 13 states that added a hospital tax between 2007 and 2011, real per capita Medicaid expenditures on hospitals decreased by 3.66 percent in the year before the hospital tax was enacted. This modest decline was followed by large average increases in real per capita Medicaid expenditures received by hospitals in the year of hospital tax enactment (18.21 percent) and in the year after

hospital tax enactment (14.68 percent).[100] As a point of comparison, the average annual

increase in Medicaid spending received by hospitals was 3.14 percent in states with

hospital taxes, other than the first two years a hospital tax is in effect, and 1.64 percent in

states without hospital taxes.

The regression coefficients from Table 10 through Table 13 indicate hospital

taxes increased real per capita state Medicaid hospital spending growth, particularly in

the first two years that the hospital tax was in effect. Table 10 shows that states with

hospital taxes had higher annual real per capita Medicaid hospital spending by about 12

percent all else equal.[101] Table 11, which shows the estimates from Equation (1)

including state fixed effects, indicates that annual real per capita state Medicaid hospital

spending growth was 22 percent higher after states enacted hospital taxes all else equal.

One unreported variable that is highly significant in these regressions is lagged per capita

Medicaid spending on hospitals. In the regressions shown in Table 10 and Table 11, each

$10 in prior year per capita Medicaid spending on hospitals reduced the growth rate in

Medicaid expenditures received by hospitals by 1.2 percent and 3.0 percent, respectively,

all else equal.

Table 12 shows that real per capita Medicaid spending received by hospitals

increased 11.34 percent (p-value of 0.229) in the year the tax took effect and by 16.39

percent (p-value of 0.055) in the year after the hospital tax took effect all else equal. The

---

[100] Since all hospital taxes were enacted between 2009 and 2011, there are 13 observations that have a percentage change in the year before the enactment of the hospital tax and 13 observations that have a percentage change in the year of the enactment of the hospital tax. Five states enacted the hospital tax in 2011, so there are only eight observations that have a percentage change in the year after the enactment of a hospital tax.

[101] This percentage declined to 8 percent, although still highly significant, when the only lagged spending variable included in the regression was prior year per capita Medicaid spending received by hospitals.

significance of the result increased (point estimate of 14.15 percent and p-value of 0.048) when I replace the two separate dummies for the year of enactment of the tax and the year after the enactment of the tax with a single dummy.[102]

The total evidence suggests that state enactment of a hospital tax substantially increases Medicaid expenditures, at least in the short run, received by hospitals. Moreover, during this period, hospitals in states with hospital taxes, excluding the first two years the taxes were in effect, received higher Medicaid spending of about 7.63 percent (p-value of 0.119 from Table 12) all else equal.[103]

Hospital Tax Impact on Other Areas of State Medicaid Spending

I did not find evidence that state hospital taxes significantly affected expenditures received by physicians or HCBS providers, although the results indicate that they may have affected aggregate Medicaid payments received by nursing homes. I found that states spend less on nursing homes through the Medicaid program during the first two years a hospital tax is in effect. Table 13 shows that real per capita Medicaid nursing home expenditures decreased slightly in the first two years hospital taxes were in place (point estimate of -1.92 percent and p-value of 0.364). Interestingly, the presence of a hospital tax other than during the first two years it is in place, is correlated with larger

---

[102] The coefficient is 13.08 percent (p-value of 0.067) when the only lagged spending variable included in the regression was prior year per capita Medicaid spending received by hospitals.
[103] The coefficient declined to 2.71 percent and lost significance (p-value of 0.479) when the only lagged spending variable included in the regression was prior year per capita Medicaid spending received by hospitals.

annual increases in Medicaid spending (point estimate of 4.40 percent and p-value of 0.010) received by nursing homes.[104]

Impact of a Nursing Home Tax on Overall Medicaid Spending

By state grouping of nursing home tax and expenditure category, Table 7 shows the amount of real per capita spending in both 2007 and 2011 as well as the change in spending between 2007 and 2011. In 2007, the 25 states that had nursing home taxes during the entire time period had average Medicaid spending equal to $1,150 in 2007. Like states with hospital taxes in place in 2007, states with a nursing home tax in place in 2007 had higher average per capita Medicaid expenditures of about $200 more than states without the nursing home tax. These 25 states had an average real per capita Medicaid spending increase of $145 (a corresponding increase of 11.7 percent) between 2007 and 2011.

In 2007, the average per capita Medicaid spending of the eight states without nursing home taxes between 2007 and 2011 was $957. These eight states had an average Medicaid spending increase of $127 (a corresponding increase of 13.4 percent) between 2007 and 2011. In 2007, the seven states that added nursing home taxes between 2007 and 2011 had average per capita Medicaid spending of $835. These seven states had an average increase of $158 (a corresponding increase of 19.3 percent) between 2007 and 2011. The difference-in-difference estimates, shown in Table 7 and Table 8a, which measure the difference in spending between states that added nursing home taxes and

---

[104] The coefficient is 2.57 percent (p-value of 0.058) when the only lagged spending variable included in the regression was prior year per capita Medicaid spending received by nursing homes.

states without nursing home taxes suggest that states that added nursing home taxes had increased real per capita state Medicaid spending of $31 or about 5.9 percent between 2007 and 2011.

The estimates in Table 9 through Table 12 show that nursing home taxes, unlike hospital taxes, are not correlated with larger total Medicaid spending growth although nursing home taxes seem to increase total state Medicaid expenditures in the year after the tax took effect. Table 9 shows that in the first year the nursing home tax was in effect in the seven states that enacted a nursing home tax between 2007 and 2011, average real per capita total Medicaid expenditures increased 3.37 percent, which was basically the same overall average annual increase. However, state Medicaid spending grew appreciably during the second year that states had nursing home taxes in place.

In the five states that had enacted a nursing home tax between 2007 and 2010 (two states enacted a nursing home tax in 2011 – the last year in the data set), the average increase in real per capita Medicaid expenditures was 9.58 percent in the year after the enactment of the tax. Table 12 shows that total Medicaid spending increased 4.78 percent (p-value of 0.027) all else equal the year after a state enacted a nursing home tax. Table 13 shows the estimate of the effect of the nursing home tax on total Medicaid spending growth in the first two years and shows higher Medicaid spending by about 2.08 percent (p-value of 0.164) in the first two years of the tax being in effect all else equal.

Impact of Nursing Home Tax on Medicaid Spending on Nursing Homes and HCBS

The averages presented in Table 7 show that the 25 states with nursing home taxes prior to 2007 spent $194 per capita on nursing homes through Medicaid, $35 more than average per capita spending by states without nursing home taxes and $54 more than average per capita spending by states that added a nursing home tax. As predicted, between 2007 and 2011, states that added nursing home taxes had greater increases in real per capita Medicaid spending on nursing homes (up $10 or 7.6 percent in per capita inflation-adjusted terms) relative to both states that did not have nursing home taxes (down $11 or 6.2 percent) and states that had nursing home taxes in place the entire time period (down $4 or 0.7 percent).

The difference-in-difference estimates shown in Table 7 and Table 8a suggest that states that enacted nursing home taxes between 2007 and 2011 spent about $21 more per capita on nursing homes (about 13.8 percent more than they would otherwise have spent) through Medicaid than they would have if they did not enact the nursing home tax. The estimates shown in Table 10 indicate that a nursing home tax was associated with a 3.30 percent higher (p-value of 0.033) *annual* increase in Medicaid spending received by nursing homes between 2007 and 2011 all else equal. This already significant estimate increases to 11.81 percent (p-value of 0.001) with state fixed effects.

Consistent with the results of the Grabowski et al. study discussed in Section IV, I find that states had lower real per capita Medicaid nursing home expenditure growth in the year before the enactment of a nursing home tax. As shown in Table 9, real per capita Medicaid nursing home expenditures in the six states that enacted taxes between 2009

and 2011 dropped by 3.58 percent in the year before the tax took effect.[105] In the year the

nursing home tax took effect, the average increase in real per capita Medicaid

expenditures on nursing homes was 3.58 percent with an increase of 13.96 percent in the

year after the nursing home taxes took effect.[106] These increases stand out compared to

the declines, albeit small declines, in real per capita Medicaid expenditures on nursing

homes in the states without nursing home taxes or in states with nursing home taxes in

place in years other than the first two years of tax enactment.

　　　　After controlling for many confounding factors, Table 12 and Table 13 show that

real per capita state Medicaid nursing home spending growth increased in the year the

nursing home tax was enacted by 4.57 percent (p-value of 0.330) and the year after the

nursing home tax was enacted by 17.30 percent (p-value of 0.032) all else equal. The

estimated increase was 9.91 percent (p-value of 0.039) when I replace the two separate

dummies for the year of enactment of the tax and the year after the enactment of the tax

with a single dummy. These results are evidence that state enactment of a nursing home

tax increases Medicaid expenditures received by nursing homes in the first two years of

the tax being in place.

　　　　In 2007, the ratio of state Medicaid spending on nursing homes relative to state

Medicaid spending on HCBS varied based on nursing home tax grouping. These

differences were driven by differences in nursing home expenditures since average state

---

[105] There are six observations for the change in the year of nursing home tax enactment and seven
observations for the change in the year before nursing home tax enactment because Maryland enacted its
nursing home tax in 2007.
[106] There are seven observations that have a percentage change in the year of the enactment of the nursing
home tax and five observations that have a percentage change in the year after the enactment of a nursing
home tax because two states added nursing home taxes in 2011, the last year of the data set.

Medicaid spending on HCBS in the three state groupings was nearly the same in 2007. Figure 3a and Figure 3b illustrate the differences in average per capita Medicaid spending on nursing homes and HCBS by nursing home tax grouping as well the change in spending between 2007 and 2011 by nursing home tax grouping.

States with nursing home taxes in 2007 spent about 26 percent less, on average, on HCBS than those states spent on nursing homes through Medicaid. In 2007, states without nursing home taxes for the entire period spent about 6 percent less through Medicaid on HCBS than they spent on nursing homes, and states that added nursing home taxes spent about 6 percent more through Medicaid on HCBS than they spent on nursing homes.

Medicaid spending on HCBS appears to have been significantly affected by taxes on nursing homes in the opposite direction as the effect of the tax on expenditures received by nursing homes. Table 7 and Figure 3b show that between 2007 and 2011, states without nursing home taxes experienced the largest HCBS growth (up $44 or 30.7 percent in per capita inflation-adjusted terms) and states that added nursing home taxes experienced the smallest HCBS growth (up $13 or 8.5 percent) during this time period. States with nursing home taxes the whole time experienced HCBS expenditure growth roughly half-way in between (up $31 or 16.5 percent).

The difference-in-difference estimates suggest that adding a nursing home tax resulted in states slowing the growth in per capita Medicaid expenditures on HCBS between 2007 and 2011 by about 22.2 percent or about $31. The information in Table 9 contains additional evidence that nursing home taxes lead to smaller per capita Medicaid

spending growth on HCBS. Average real per capita state Medicaid spending growth on

HCBS was only about one-third as large in the year before nursing home tax enactment,

the year of nursing home tax enactment, and the year after nursing home tax enactment

relative to real per capita Medicaid spending growth on HCBS during all the other time

periods.

The regression results in Table 12 indicate that per capita Medicaid expenditures

on HCBS declined by 4.69 percent (p-value of 0.025) in the year prior to the state

enactment of a nursing home tax and by 3.14 percent (p-value of 0.261) in the year of the

state enactment of a nursing home tax all else equal. However, the decline in Medicaid

expenditures received by HCBS providers in the year after state enactment of a nursing

home tax and in other years of the tax being in place was not statistically significant.

Therefore, although the difference-in-difference estimates lend support to the notion that

states that added nursing home taxes shifted resources into nursing homes and away from

HCBS providers – an unsurprising result given that nursing homes and HCBS providers

offer services with considerable overlap – the regression results offer weak supporting

evidence.

The three components of Figure 3, however, offer compelling visual evidence that

states that adopted nursing home taxes during this period resisted the trend of the general

shift in Medicaid spending from nursing homes to HCBS. By nursing home tax

grouping, Figure 3c shows the difference between state Medicaid spending on nursing

homes and state spending on HCBS for each of the five years in the dataset. Both states

with nursing home taxes for the entire period and states without nursing home taxes for

the entire period had a large decrease in Medicaid spending on nursing homes relative to

HCBS. As might be expected, states without nursing home taxes in place had the

greatest average shift away from Medicaid spending on nursing homes between 2007 and

2011. States that added taxes on nursing homes increased Medicaid spending on nursing

homes and HCBS by nearly identical amounts between 2007 and 2011. As a result,

between 2007 and 2011, nursing homes and HCBS both received real per capita

Medicaid spending increases of about $10 in the seven states that added nursing home

taxes, a trend that was much different from the trend in the other two state groupings of

less spending on nursing homes and much greater spending on HCB S.

Nursing Home Tax Impact on Other Areas of State Medicaid Spending

State enactment of nursing home taxes appears to have also impacted Medicaid

spending received by hospitals and physicians. On average, between 2007 and 2011,

hospitals and physicians in states that added a nursing home tax received increased

Medicaid expenditures of over three times more than the increases in the other two state

groupings. According to the difference-in-difference estimates shown in Table 7 and

Table 8a, states that added nursing home taxes increased per capita Medicaid spending on

hospitals by an average of $52, an amount $42 greater (and 31.3 percent larger on

average in percentage terms) than the average increase in Medicaid spending on hospitals

in states that did not have nursing home taxes. Additionally, states that added nursing

home taxes had larger per capita Medicaid spending on physicians of $13, an amount $11

greater (a corresponding 27.7 percent increase) than the increase in Medicaid spending on physicians in states that did not have nursing home taxes.

Table 9 and Table 12 indicate that the largest impact of nursing home taxes on Medicaid expenditures received by hospitals and physicians, similar to Medicaid expenditures received by nursing homes, occurred in the year after nursing home tax enactment. The parameter estimates in Table 12 indicate that in the year after nursing home tax enactment, Medicaid spending received by hospitals increased 22.95 percent (p-value of 0.175) and Medicaid spending received by physicians increased 23.51 percent (p-value of 0.018) all else equal.

Length Since Provider Tax Enactment

A limitation of the difference-in-difference estimates of the four-year trend in Medicaid expenditures shown in Table 4, Table 5a, Table 7, and Table 8a is that not all the provider taxes were enacted at the beginning of the time period covered in the data set. In fact, 14 of the 20 provider taxes were enacted in 2010 or 2011. So, the difference-in-difference estimates do not measure a four-year difference in spending after states enacted provider taxes. When the data allows this difference-in-difference measurement to be calculated (this data will not be available for a few more years), the estimated impact of the tax on state Medicaid spending will likely be higher. This is because provider taxes appear to have a significant stimulative effect in the second year they are in place and seven of the 20 provider taxes were enacted in 2011, precluding an observation for those states in the year after tax enactment.

97

The evidence presented in the paper indicates that provider taxes cause a burst of increased state Medicaid expenditures, particularly in the area affected by the tax. If the initial burst gradually subsides over time, then states that enacted provider taxes in early periods should have had higher expenditure growth between 2007 and 2011, particularly in the area affected by the tax. The data presented in Table 5b is consistent with this narrative. Of the 40 states in the dataset, the three states that added hospital taxes in 2009 had an average inflation-adjusted per capita Medicaid hospital spending increase of 60.7 percent between 2007 and 2011. The corresponding average increase was 38.2 percent for the five states that added the tax in 2010 and 12.5 percent for the five states that added the tax in 2011. The average increase in the remainder of the states was 8.6 percent. Table 5b shows a similar pattern after the enactment of a hospital tax for state Medicaid spending on physician spending, but not for nursing homes or HCBS.

Table 8b shows similar information based on the timing of nursing home tax enactment. The percentages in Table 8b are consistent with the above narrative for total Medicaid spending, hospital Medicaid spending, and physician Medicaid spending, but are actually not consistent for nursing home spending. The averages from Table 5b are likely more reliable than the averages in Table 8b, however, since only two states added nursing home taxes each year in 2009, 2010, and 2011.

Robustness Check

Table 14 shows the estimates that correspond to Equation (3) after the nursing home dummies are removed from the equation. The estimates in Table 14 basically serve

as a robustness check for the estimates on the hospital tax dummies from Table 13. The

coefficients and their significance are similar for the short-term effect of a hospital tax on

growth in Medicaid expenditures across expenditure categories. The coefficients and

their significance in Table 13 and Table 14 are also similar for hospital taxes in place

other than the first two years of their enactment. Therefore, excluding the effect of

nursing home taxes does not meaningfully change the size or significance of the effect of

hospital taxes on state Medicaid spending.

Table 15 shows the estimates that correspond to Equation (3) minus the hospital

tax dummies. The estimates in Table 15 essentially serve as a robustness check for the

estimates on the nursing home tax dummies from Table 13. The coefficients and their

significance are similar for the effect of nursing home tax enactment on Medicaid

expenditure growth rates.

VII. Impact of Other Factors

During the period from 2007 to 2011, the United States experienced a very deep

economic recession from the substantial decline in house prices and the resulting

financial crisis. The unemployment rate, which averaged 4.6 percent in the United States

in 2007, more than doubled to 9.3 percent in 2009. The unemployment rate climbed

slightly in 2010 before falling to 8.9 percent in 2011.[107] Not all states were impacted

equally by the recession, and states recovered to much different degrees. For example, in

---

[107] These rates are different from Table 15 because Table 15 shows the mean state unemployment rates by
year. The rates in the text are the national unemployment rates.

2011, six states had unemployment rates below six percent and eight states had unemployment rates above ten percent.

Associated with the large increase in unemployment during the recession was a drop in per capita income and an increase in the poverty rate. Table 17 shows that the mean state poverty rate was 11.7 percent for states in the dataset in 2007. Between 2007 and 2009, the mean state poverty rate would climb to 13.0 percent with the mean state poverty rate climbing another 1.1 percent between 2009 and 2011. Mean state per capita income fell by over four percent between 2007 and 2009, from $48,540 in 2007 to $46,323 in 2009, before recovering about half of the loss between 2009 and 2011.

Large economic contractions produce budget pressure on states, in part because of the state share of Medicaid spending required to receive federal matching funds. As a result of significant state budget pressure during this time, a large component of the American Recovery and Reinvestment Act (the 2009 stimulus law) consisted of enhanced federal payments to the states through large increases in state FMAPs. Between fiscal year 2008 and fiscal year 2009, the average state FMAP increased from roughly 60 percent to roughly 70 percent for states in the dataset. This increase lasted for eight quarters and was followed by a somewhat smaller FMAP increase in fiscal year 2011 through the Education, Jobs, and Medicaid Assistance Act.[108]

In a state with an FMAP of 60 percent, $1 in Medicaid expenditures from state funds brings in $1.50 of federal revenue. In a state with an FMAP of 70 percent, $1 in

---

[108] The Education, Jobs, and Medicaid Assistance Act was signed into law on August 10, 2010. It extended most of the FMAP increase from the ARRA through June 30, 2011 (the first three quarters of fiscal year 2011).

Medicaid expenditures from state funds brings in $2.33 of federal revenue. Therefore, although the FMAP increase from the ARRA appears to have been only 10 percent, the average effective increase in the federal Medicaid reimbursement was closer to 55 percent. All else equal, the effect of both the ARRA and the Education, Jobs, and Medicaid Assistance Act on raising the state FMAP almost certainly resulted in additional Medicaid spending, including both the federal share and state share, than would have occurred in the absence of the large FMAP increase.

Using a panel data of 49 states from 1992 through 2006, Blase (2013) finds that many state characteristics, such as the unemployment rate, poverty rate, average per capita income, and state FMAP are correlated to the size of state Medicaid programs. In this paper, I controlled for these four factors, year to year changes in these factors, prior year state Medicaid expenditures, and prior year state Medicaid expenditures received by hospitals, physicians, nursing homes, HCBS providers, and managed care companies.

During this time period, I found that the only state characteristic that correlates with increased overall Medicaid spending growth rates is state per capita income. All else equal, each $1,000 in additional state per capita income is associated with about an additional 0.2 percent in Medicaid spending growth. Higher state per capita income increases state Medicaid spending primarily through increased spending on HCBS. The regression results indicate that HCBS is a normal economic good as each additional $1,000 of state per capita income is associated with about 0.6 percent greater growth on HCBS all else equal. Although no other factor impacted overall state Medicaid expenditure growth, higher state poverty rates were associated with increased Medicaid

spending growth on hospitals of approximately 1.5 percent and increased Medicaid

spending growth on nursing homes by about 0.9 percent.

While prior year state Medicaid spending did not correlate to changes in state

Medicaid expenditure growth rates during this time period, prior year Medicaid spending

on hospitals and managed care did appear to influence state Medicaid growth rates for

hospitals and nursing homes. All else equal, a state that spent $100 more per capita on

hospitals through its Medicaid program had less Medicaid hospital expenditure growth by

about 10 percent and a state that spent $100 more per capita on managed care through its

Medicaid program had less Medicaid hospital expenditure growth by about 5 percent

between 2007 and 2011. There is evidence of some equalization of state Medicaid

hospital expenditures during this period as states with lower per capita Medicaid

spending on hospitals had higher Medicaid expenditure growth on hospitals during this

four-year period. Similarly, a state that spent $100 more on HCBS through its Medicaid

program had lower Medicaid HCBS expenditure growth by about 4 percent all else equal.

It is important to note, however, that states with larger prior year Medicaid spending will

also have a smaller percentage increase from an equivalent dollar increase in Medicaid

spending.

VIII. Discussion

The economic recession as well as the significant federal policy response (i.e., the

ARRA and the Education, Jobs, and Medicaid Assistance Act) certainly impacted state

Medicaid expenditures. Likely because of the recession, which caused more people to

become eligible for Medicaid, and the ARRA, which substantially reduced the state share of Medicaid expenditures, mean inflation-adjusted state per capita Medicaid expenditures increased 7.9 percent between FY 2008 and FY 2009, up considerably from the 1.3 percent increase between FY 2007 and FY 2008. As Table 17 shows, mean inflation-adjusted per capita Medicaid expenditures increased 4.0 percent between FY 2009 and FY 2010, before essentially flat growth between FY 2010 and FY 2011.

I found that states with hospital taxes in place had higher annual Medicaid spending by about 2.5 percent during the financial crisis and its aftermath all else equal. Since provider taxes significantly reduce the amount of revenue states need to raise from the state tax base in order to finance their Medicaid programs, states with hospital taxes could better afford the state share needed to leverage additional federal Medicaid funds than states without provider taxes in place. The same effect was not present for nursing home taxes as nursing home taxes only increased total Medicaid expenditure growth rates in the first two years after the nursing home tax was enacted.

Second, the results in this paper indicate that provider taxes effect state decisions about how to allocate resources within Medicaid. The evidence in this paper shows that the support given by state trade associations representing hospitals and nursing homes for provider taxes is well deserved as a central reason states appear to enact a specific provider tax is to increase Medicaid payments received by that provider group in the aggregate. I also found evidence that nursing home taxes divert Medicaid money from HCBS to nursing homes. Perhaps this is because states that enact nursing home taxes result in a state deciding to delay plans to deinstitutionalize its long-term care population.

It is also possible that nursing home associations in states that are powerful enough to cause the state to enact a nursing home tax are also powerful enough to delay or reverse a state's decision to rebalance, or deinstitutionalize, their long-term care program.

There are three main limitations to the analysis contained in this paper. First, since 14 or the 20 providers enacted their hospital tax in 2010 or 2011, it was not possible to determine how quickly the impact of provider taxes on Medicaid growth rates dissipated. For example, there are likely limits to how long hospital taxes can result in states spending more on hospitals through the Medicaid program. Second, largely because of data limitations, I did not quantify the actual tax rates for state hospital taxes or state nursing home taxes. While the maximum allowable tax rate is six percent, not all states set their tax rates at the maximum amount. Holding other factors constant, larger tax rates should have a bigger effect. Therefore, it was not possible from my analysis to assess the marginal impact of a one percentage point higher provider tax rate on state Medicaid expenditures. Third, I did not determine when during the fiscal year that the taxes took effect. If this data was easily obtainable, it would be interesting to perform the same type of analysis as in this paper using quarterly expenditure data rather than annual expenditure data in order to determine how quickly provider taxes impact state Medicaid expenditures.

IX. Conclusion

U.S. taxpayers spend a substantial amount of money financing health care services and long-term care services and supports through the Medicaid program. This

amount exceeded $400 billion in 2011 and is expected to grow to nearly $900 billion by the end of the decade. Several government reports, particularly from the Government Accountability Office and MACPAC, as well as a few academic papers have discussed methods employed by states that depress the net state contribution to the Medicaid program. However, there is only a single study in the prior literature that has attempted to quantify the impact of the provider tax technique, a technique which is now employed by 49 states,[109] on state Medicaid reimbursement rates.

Therefore, this paper begins to fill an important void in the health care and public finance/choice literature regarding an issue central to Medicaid financing and fiscal federalism. It is the first paper that has attempted to quantify the effect of provider taxes on overall state Medicaid spending as well as spending in four large expenditure categories – hospitals, physicians, nursing homes, and HCBS. The results in this paper provide strong evidence that hospital taxes significantly increase Medicaid expenditures received by hospitals and that nursing home taxes significantly increase Medicaid expenditures received by nursing homes. There is also evidence in this paper that hospital taxes allowed states to increase Medicaid spending to a greater degree during the economic downturn and aftermath and that nursing home taxes diverted money from HCBS and into nursing homes. Future research should build upon the groundwork in this paper and can address some of this paper's limitations.

It is noteworthy that many of the limitations discussed in the previous section would be much easier to address with better data. Since Medicaid is the largest program

---

[109] According to Smith et al. (2012), 49 states had provider taxes in FY 2012 and the one state without a tax was planning on enacting one in FY 2013.

for which states receive federal funding, the federal government should require states to report current provider tax rates. For example, federal policymakers have considered reducing the safe harbor threshold and other reforms of the provider tax. However, according to MACPAC, "without knowing each state's actual tax rates as a percentage of net patient revenue, federal policymakers cannot determine the potential reduction in state revenue or federal matching funds that would result, or the potential impact on provider participation and access to services (MACPAC 2012)."

Provider taxes also affect the efficiency of state spending. Blase (2013) discusses that the design of the federal Medicaid reimbursement may not promote overall social welfare because the reimbursement, which takes the form of a matching grant, distorts state behavior since states absorb only about 40 percent of the costs of Medicaid spending on average and leads to a greater excess burden of taxation. Blase argued that replacing the current Medicaid financing structure with a system of conditional block grants would likely increase the efficiency of state programs.

If this argument is correct, then the provider tax mechanism exacerbates program inefficiency. Coughlin, Zuckerman, and McFeeter (2007) found that the total federal share of *supplemental payments* was about 86 percent in fiscal year 2005 after excluding the share of expenses paid by the state through techniques like provider taxes and intergovernmental transfers. Since provider taxes allow states to raise their share of Medicaid expenditures with dollars that are simply returned to the provider, provider taxes depress the state share of Medicaid spending and decrease the incentive of states to obtain value for their Medicaid expenditures. This economic inefficiency will increase as

a result of the enhanced federal match rates contained in the Affordable Care Act, which

for the expansion Medicaid population equals 100 percent from 2014 through 2016 and

which is never set to decline below 90 percent.

Table 1: States With Provider Taxes in 2011

The states that added provider taxes since 2007 are in italics. The states excluded from the data set for poor quality data are: Arizona, Delaware, Hawaii, Indiana, Minnesota, New Mexico, Tennessee, and Wisconsin.

Hospital Tax		Nursing Home Tax		
Alabama	Mississippi	Alabama	Louisiana	New York
Arkansas	Missouri	Arkansas	Maine	North Carolina
California	Montana	California	*Maryland*	Ohio
Colorado	New Hampshire	*Colorado*	Massachusetts	Oklahoma
Florida	*New Jersey*	Connecticut	Michigan	Oregon
Georgia	New York	*Florida*	Mississippi	Pennsylvania
Idaho	Ohio	Georgia	Missouri	Rhode Island
Illinois	Oregon	*Idaho*	Montana	Utah
Iowa	*Pennsylvania*	Illinois	Nevada	West Virginia
Kansas	Rhode Island	*Iowa*	New Hampshire	*Wyoming*
Kentucky	South Carolina	*Kansas*	New Jersey	
Maine	*Utah*	Kentucky		
Maryland	*Washington*			
Massachusetts	West Virginia			
Michigan	*Wyoming*			

Table 2: Years States Added a Hospital Tax or Nursing Home Tax

This Table does not include the eight states excluded from the dataset and listed in the note below Table 1.

	Hospital Tax	Nursing Home Tax
2008	None	Maryland
2009	Idaho, Maryland, Pennsylvania	Colorado, Florida
2010	Alabama, Arkansas, Colorado, New Jersey, Washington	Idaho, Iowa
2011	California, Georgia, Iowa, Utah, Wyoming	Kansas, Wyoming

Table 3: State Medicaid Expenditure Change from 2007 and 2011

The percentages in this Table represent the inflation-adjusted change between state per capita Medicaid expenditures in 2007 and state per capita Medicaid expenditures in 2011 for the 40 states in the dataset (Rhode Island, Vermont, and the eight states referenced in Table 1 are excluded) with reliable CMS-64 data in those two years for total Medicaid expenditures and for the four separate categories of spending.

State	Total	Hospital	Physician	Nursing Home	HCBS
Alabama	0.4%	58.7%	15.3%	-6.9%	13.5%
Alaska	18.2%	22.5%	27.7%	-15.0%	31.0%
Arkansas	15.4%	29.7%	11.7%	3.6%	32.8%
California	38.0%	50.2%	-4.1%	2.8%	21.4%
Colorado	29.2%	83.5%	29.0%	-2.8%	15.3%
Connecticut	24.8%	91.0%	115.2%	-10.3%	42.7%
Florida	19.7%	20.7%	82.3%	8.9%	-3.1%
Georgia	3.5%	-12.5%	1.9%	19.2%	29.8%
Idaho	23.0%	121.0%	105.1%	15.8%	8.9%
Illinois	-6.7%	-30.1%	40.2%	-4.9%	26.1%
Iowa	21.5%	-31.8%	-0.4%	7.2%	14.3%
Kansas	12.4%	3.7%	2.2%	14.1%	11.1%
Kentucky	12.4%	12.7%	5.0%	1.5%	32.0%
Louisiana	6.6%	36.6%	31.7%	14.5%	30.6%
Maine	9.7%	19.6%	21.0%	-24.2%	-2.6%
Maryland	21.6%	14.3%	56.3%	0.7%	10.6%
Massachusetts	15.1%	-4.3%	-5.9%	-11.1%	38.9%
Michigan	22.2%	-13.7%	53.9%	8.0%	9.6%
Mississippi	22.8%	41.9%	10.8%	-2.1%	42.2%
Missouri	11.0%	1.1%	-67.2%	5.2%	25.4%
Montana	17.3%	10.6%	20.8%	-1.9%	23.4%
Nebraska	-2.3%	-15.4%	-28.3%	-15.8%	15.8%
Nevada	10.9%	-14.6%	-4.4%	-2.9%	1.5%
New Hampshire	7.2%	63.9%	28.6%	-2.6%	21.2%
New Jersey	7.5%	-19.2%	-5.9%	1.3%	7.5%
New York	7.5%	0.5%	37.9%	5.4%	6.8%
North Carolina	-5.2%	-7.9%	-4.0%	-6.6%	-15.4%
North Dakota	22.6%	-23.6%	39.4%	2.6%	64.7%
Ohio	11.2%	-13.7%	-26.6%	-8.4%	40.0%
Oklahoma	8.5%	24.9%	-36.0%	-13.6%	-4.6%
Oregon	36.3%	-26.5%	-64.9%	4.0%	38.8%
Pennsylvania	17.1%	46.7%	29.3%	-8.6%	40.0%
South Carolina	6.9%	-24.4%	-44.4%	-4.9%	28.1%
South Dakota	7.8%	22.7%	3.6%	-10.8%	11.7%
Texas	17.5%	3.9%	14.5%	3.1%	24.3%
Utah	7.9%	17.9%	22.4%	-15.4%	12.7%
Virginia	24.6%	11.7%	27.9%	2.2%	54.6%
Washington	11.8%	38.5%	46.5%	-10.6%	15.3%
West Virginia	15.7%	19.9%	9.3%	9.5%	23.5%
Wyoming	7.6%	38.8%	-4.4%	9.3%	2.7%
Mean	**14.0%**	**16.7%**	**16.6%**	**-1.0%**	**21.1%**

Table 4: Mean Medicaid Expenditure Change from 2007 and 2011, by Hospital Tax Grouping and Expenditure Category

Of the 40 states with reliable data in 2007 and 2011, 16 states had hospital taxes between 2007 and 2011, 11 states lacked hospital taxes between 2007 and 2011, and 13 states added hospital taxes between 2007 and 2011. The values in this Table show the mean of state per capita Medicaid expenditures by state grouping for each expenditure category in both 2007 and 2011 using 2011 dollars. The difference-in-difference estimates show the difference between the four-year change in the mean spending of states that added hospital taxes between 2007 and 2011 and the four-year change in the mean spending of states without hospital taxes between 2007 and 2011.

State Grouping	Total	Hospital	Physician	Nursing Home	HCBS	Managed Care
2007						
Hospital tax whole time	$1,195	$251	$47	$194	$164	$136
No hospital tax	$992	$199	$61	$178	$151	$59
Added hospital tax	$940	$157	$43	$157	$133	$117
2011						
Hospital tax whole time	$1,350	$258	$50	$193	$196	$222
No hospital tax	$1,113	$228	$71	$167	$188	$87
Added hospital tax	$1,089	$209	$51	$158	$155	$165
2007 to 2011 Change						
Hospital tax whole time	$155	$7	$3	-$1	$32	$86
No hospital tax	$121	$29	$10	-$11	$37	$28
Added hospital tax	$149	$52	$8	$1	$22	$48
Diff. in Diff.						
Estimates	$28	$23	-$2	$12	-$15	$20

Table 5a: Medicaid Expenditure Percentage Change from 2007 to 2011, by Category of Hospital Tax

The percentages in the first three rows of this Table show the mean percent change in inflation-adjusted per capita Medicaid expenditures between 2007 and 2011 by expenditure category. The values in parentheses show standard deviations. The difference-in-difference estimates are the difference between the mean percent change in states that added a hospital tax and the mean percent change in states without hospital taxes during the entire period.

State Grouping	Total	Hospital	Physician	Nursing Home	HCBS
Hospital tax	13.8%	5.1%	6.4%	-0.2%	22.6%
whole time	(9.3%)	(25.2%)	(41.2%)	(9.5%)	(14.6%)
No hospital tax	12.2%	13.8%	23.6%	-4.8%	23.4%
	(10.3%)	(32.2%)	(36.9%)	(9.6%)	(24.8%)
Added hospital	15.7%	33.5%	23.3%	1.2%	17.3%
tax	(10.8%)	(41.9%)	(31.6%)	(10.1%)	(10.8%)
Diff. in Diff.					
Estimates	3.5%	19.7%	-0.3%	6.0%	-6.1%

Table 5b: Medicaid Expenditure Percentage Change from 2007 to 2011 for States that Added a Hospital Tax, by Year the Tax was Added

The percentages in this Table show the mean change in inflation-adjusted per capita Medicaid expenditures between 2007 and 2011, by expenditure category, for the 13 states that added a hospital tax during this time period by the year the tax was added as well as for states that did not add a hospital tax during this time period.

Year Added	Total	Hospital	Physician	Nursing Home	HCBS
2009 (n=3)	20.6%	60.7%	63.6%	2.6%	19.8%
2010 (n=5)	12.9%	38.2%	19.3%	-3.1%	16.9%
2011 (n=5)	15.7%	12.5%	3.1%	4.6%	16.2%
States not adding Tax (n=27)	13.2%	8.6%	13.4%	-2.1%	22.9%

Table 6: Annual Medicaid Growth Rate Means, by Category of Hospital Tax

The values show the mean inflation-adjusted growth rate in annual per capita Medicaid expenditures based on category of hospital tax. 13 states enacted a hospital tax between 2009 and 2011. The 'Year Before Hospital Tax' category shows the mean inflation-adjusted growth rate in per capita Medicaid expenditures in the 13 states in the year before the hospital tax was enacted. The 'Year Of Hospital Tax' category shows the mean inflation-adjusted growth rate in per capita Medicaid expenditures in the 13 states in the year the hospital tax was enacted. The 'Year After Hospital Tax' category shows the mean inflation-adjusted growth rate in Medicaid per capita expenditures in the eight states that enacted a hospital tax between 2009 and 2010. The 'Hospital Tax, Other than Above' category shows the mean inflation-adjusted growth rate in per capita Medicaid expenditures in the states that had hospital taxes in place between 2007 and 2011 other than the year before, the year of, or the year after the tax's enactment. The 'No Hospital Tax' category shows the mean inflation-adjusted growth rate in per capita Medicaid expenditures for the years when states do not have a hospital tax. The values in parentheses show the number of observations that correspond to each criteria.

	Overall Expenditures	Hospital Expenditures	Physician Expenditures	Nursing Home Expenditures	HCBS Expenditures
Year Before Hospital Tax	2.61 (n=13)	-3.66 (n=13)	3.39 (n=13)	2.91 (n=13)	3.76 (n=13)
Year Of Hospital Tax	6.57 (n=13)	18.21 (n=13)	2.36 (n=13)	-0.58 (n=13)	2.66 (n=13)
Year After Hospital Tax	2.08 (n=8)	14.68 (n=8)	18.50 (n=8)	-4.84 (n=8)	1.30 (n=8)
Hospital Tax, Other than Above	3.51 (n=74)	3.14 (n=71)	0.84 (n=74)	0.67 (n=74)	5.00 (n=71)
No Hospital Tax	2.98 (n=71)	1.64 (n=71)	4.70 (n=71)	-0.40 (n=71)	6.06 (n=71)
All Observations	3.46 (n=166)	4.26 (n=163)	3.46 (n=166)	-0.15 (n=166)	5.09 (n=163)

Table 7: Mean Medicaid Expenditure Change from 2007 to 2011, by Nursing Home Tax Grouping and Expenditure Category

There were 25 states with nursing home taxes between 2007 and 2011, eight states without nursing home between 2007 and 2011, and seven states that added nursing home taxes between 2007 and 2011. The values in the table show the mean of state per capita Medicaid expenditures by state grouping for each expenditure category in both 2007 and 2011 using 2011 dollars. The difference-in-difference estimates show the difference between the four-year change in mean state per capita Medicaid expenditures of states that added nursing home taxes between 2007 and 2011 and the four-year change in mean state per capita Medicaid expenditures of states without nursing home taxes between 2007 and 2011.

State Grouping	Total	Hospital	Physician	Nursing Home	HCBS	Managed Care
2007						
Nur. home tax whole time	$1,150	$227	$47	$194	$150	$129
No nur. home tax	$957	$189	$59	$159	$150	$69
Added nur. home tax	$835	$152	$46	$140	$149	$79
2011						
Nur. home tax whole time	$1,295	$254	$53	$190	$181	$190
No nur. home tax	$1,084	$199	$61	$148	$194	$135
Added nur. home tax	$993	$204	$59	$150	$162	$117
2007 to 2011 Change						
Nur. home tax whole time	$145	$27	$6	-$4	$31	$61
No nur. home tax	$127	$10	$2	-$11	$44	$66
Added nur. home tax	$158	$52	$13	$10	$13	$38
Diff. in Diff. Estimates	$31	$42	$11	$21	-$31	-$28

Table 8a: Medicaid Expenditure Percentage Change from 2007 to 2011, by Category of Nursing Home Tax

The percentages in the first three rows of this Table show the mean percent change in inflation-adjusted per capita Medicaid expenditures between 2007 and 2011 by expenditure category. The values in parentheses show standard deviations. The difference-in-difference estimates are the difference between the mean percent change in states that added a nursing home tax and the mean percent change in states without nursing home taxes during the entire period.

State Grouping	Total	Hospital	Physician	Nursing Home	HCBS
Nursing home tax	11.7%	11.8%	10.9%	-0.7%	16.5%
whole time	(9.6%)	(33.9%)	(39.2%)	(8.6%)	(29.7%)
No nursing home tax	13.4%	4.4%	10.9%	-6.2%	30.7%
	(9.1%)	(23.7%)	(32.3%)	(8.0%)	(19.2%)
Added nursing home	19.3%	35.7%	38.6%	7.6%	8.5%
tax (n=7)	(7.1%)	(51.3%)	(43.7%)	(6.7%)	(6.6%)
Diff. in Diff. Estimates	5.9%	31.3%	27.7%	13.8%	-22.2%

Table 8b: Medicaid Expenditure Percentage Change from 2007 to 2011 for States that Added a Nursing Home Tax, by Year the Tax was Added

The percentages in this table show the mean change in inflation-adjusted per capita Medicaid expenditures between 2007 and 2011, by expenditure category, for the seven states that added a nursing home tax during this time period by the year the tax was added as well as for states that did not add a nursing home tax during this time period.

Year Added	Total	Hospital	Physician	Nursing Home	HCBS
2008 & 2009 (n=3)	23.5%	39.5%	55.9%	2.3%	7.6%
2010 (n=2)	22.3%	44.6%	52.4%	11.5%	11.6%
2011 (n=2)	10.0%	21.3%	-1.1%	11.7%	6.9%
States not adding Tax (n=33)	12.9%	12.7%	11.9%	-2.8%	23.8%

Table 9: Annual Medicaid Growth Rate Means, by Category of Nursing Home Tax

The values show the mean inflation-adjusted growth rate in annual per capita Medicaid expenditures based on category of nursing home tax. Seven states enacted a nursing home tax between 2008 and 2011. The 'Year Before Nursing Home Tax' category shows the mean inflation-adjusted growth rate in per capita Medicaid expenditures in the seven states in the year before the nursing home tax was enacted. The 'Year Of Nursing Home Tax" category shows the mean inflation-adjusted growth rate in per capita Medicaid expenditures in the nine states in the year the nursing home tax was enacted. The 'Year After Nursing Home Tax' category shows the mean inflation-adjusted growth rate in Medicaid per capita expenditures in the seven states that enacted a nursing home tax between 2008 and 2010. The 'Nursing Home Tax, Other than Above' category shows the mean inflation-adjusted growth rate in per capita Medicaid expenditures in the states that had nursing home taxes in place between 2007 and 2011 other than the year before, the year of, or the year after the tax's enactment. The 'No Nursing Home Tax' category shows the mean inflation-adjusted growth rate in per capita Medicaid expenditures for the years when states do not have a nursing home tax. The values in parentheses show the number of observations that correspond to each criteria.

	Total Expenditures	Hospital Expenditures	Physician Expenditures	Nursing Home Expenditures	HCBS Expenditures
Year Before Nursing Home Tax	1.85 (n=6)	4.48 (n=6)	6.28 (n=6)	-3.58 (n=6)	1.75 (n=6)
Year Of Nursing Home Tax	3.37 (n=7)	-5.40 (n=7)	4.62 (n=7)	3.58 (n=7)	1.29 (n=7)
Year After Nursing Home Tax	9.58 (n=5)	30.07 (n=5)	17.32 (n=5)	13.96 (n=5)	2.09 (n=5)
Nursing Home Tax, Other than above	3.19 (n=111)	4.19 (n=108)	2.94 (n=111)	-0.49 (n=111)	5.06 (n=108)
No Nursing Home Tax	3.44 (n=43)	2.99 (n=43)	2.98 (n=43)	-1.54 (n=43)	6.16 (n=43)
All Observations	3.46 (n=166)	4.26 (n=163)	3.46 (n=166)	-0.15 (n=166)	5.09 (n=163)

Table 10: Estimated Impact of Provider Taxes on Medicaid Spending Growth Rates

The dependent variable is annual growth in inflation-adjusted per capita Medicaid expenditures. The parameter estimates in this Table, which correspond to Equation 1, show the estimated effect of the presence of a hospital tax and a nursing home tax on the annual growth in inflation-adjusted per capita Medicaid expenditures, by expenditure category. Robust standard errors are shown in parentheses. Estimates for control variables as well as for year dummies are not reported.

	Total Expenditures	Hospital Expenditures	Physician Expenditures	Nursing Home Expenditures	HCBS Expenditures
Hospital Tax	3.30	12.09	-0.57	1.91	2.77
	(1.10)**	(4.17)**	(3.75)	(1.39)	(2.07)
Nursing	0.51	4.49	4.41	3.30	-1.51
Home Tax	(1.04)	(3.53)	(3.54)	(1.54)**	(1.54)
R-squared	0.32	0.21	0.06	0.12	0.29

** p <0.05, * p < 0.10

Table 11: Estimated Impact of Provider Taxes on Medicaid Spending Growth Rates, Including State Dummies

The dependent variable is annual growth in inflation-adjusted per capita Medicaid expenditures. The parameter estimates in this Table, which correspond to Equation 1 with state fixed effects, show the estimated effect of the presence of a hospital tax and a nursing home tax on the annual growth in inflation-adjusted per capita Medicaid expenditures, by expenditure category. Robust standard errors are shown in parentheses. Estimates for control variables as well as for year dummies are not reported.

	Total Expenditures	Hospital Expenditures	Physician Expenditures	Nursing Home Expenditures	HCBS Expenditures
Hospital Tax	3.30	22.26	1.23	0.05	0.68
	(1.77)*	(5.80)**	(5.97)	(2.60)	(3.01)
Nursing	-0.39	-13.60	5.80	11.86	-1.76
Home Tax	(2.38)	(7.80)*	(8.06)	(3.51)**	(4.06)
Adj. R-squared	0.41	0.37	0.10	0.08	0.35

** p <0.05, * p < 0.10

Table 12: Estimated Impact of the Timing of Provider Tax Enactment on Medicaid Spending Growth Rates I

The categories related to the timing of provider tax enactment are explained in Table 6 and Table 9. The dependent variable is annual growth in inflation-adjusted per capita Medicaid expenditures. The parameter estimates in this Table, which correspond to Equation 2, show the estimated effect of timing of hospital tax enactment and nursing home tax enactment on the annual growth in inflation-adjusted per capita Medicaid expenditures, by expenditure category. Robust standard errors are reported. Estimates for control variables as well as for year dummies are not reported.

	Total Expenditures	Hospital Expenditures	Physician Expenditures	Nursing Home Expenditures	HCBS Expenditures
Year Before Hospital Tax Enacted	-1.53 (1.49)	-2.33 (5.19)	-3.07 (4.12)	3.77 (1.86)**	-1.59 (3.16)
Year Hospital Tax Enacted	2.65 (2.52)	11.34 (9.38)	-7.98 (4.21)*	-2.23 (2.89)	0.02 (3.05)
Year After Hospital Tax Enacted	1.87 (1.65)	16.39 (8.47)*	15.55 (11.81)	-2.45 (2.97)	2.63 (3.08)
Hospital Tax, Other than Above	2.57 (1.49)*	7.63 (4.86)	-5.51 (4.71)	4.36 (1.63)**	3.94 (2.92)
Year Before Nursing Home Tax Enacted	-2.74 (1.91)	1.57 (5.53)	5.67 (6.19)	-2.53 (2.21)	-4.69 (2.08)**
Year Nursing Home Tax Enacted	-0.00 (2.13)	-7.80 (6.43)	3.99 (5.39)	4.57 (4.68)	-3.14 (2.78)
Year After Nursing Home Tax Enacted	4.78 (2.13)**	22.95 (16.83)	23.64 (9.85)**	17.30 (7.97)**	-1.37 (2.59)
Nursing Home Tax, Other than Above	-0.15 (1.15)	5.19 (3.78)	3.94 (3.69)	1.75 (1.64)	-1.52 (1.82)
R-squared	0.35	0.26	0.14	0.30	0.31

** $p < 0.05$, * $p < 0.10$

Table 13: Estimated Impact of the Timing of Provider Tax Enactment on Medicaid Spending Growth Rates II

The difference between this Table and Table 12 is that this Table combines the dummy variables shown in Table 12 for year of tax enactment and year after tax enactment. The categories related to the timing of provider tax enactment are explained in Table 6 and Table 9. The dependent variable is annual growth in inflation-adjusted per capita Medicaid expenditures. The parameter estimates in this Table, which correspond to Equation 3, show the estimated effect of timing of hospital tax enactment and nursing home tax enactment on the annual growth in inflation-adjusted per capita Medicaid expenditures, by expenditure category. Robust standard errors are reported. Estimates for control variables as well as for year dummies are not reported.

	Total Expenditures	Hospital Expenditures	Physician Expenditures	Nursing Home Expenditures	HCBS Expenditures
Year Before Hospital Tax Enacted	-2.06 (1.44)	-5.67 (5.56)	-4.95 (4.24)	2.36 (1.95)	-1.76 (3.07)
Year Of and After Hospital Tax Enacted	2.51 (1.79)	14.15 (7.09)**	1.39 (6.35)	-1.92 (2.11)	1.03 (2.71)
Hospital Tax, Other than Above	2.61 (1.48)*	7.55 (4.96)	-6.18 (4.71)	4.40 (1.68)**	3.87 (2.91)
Year Before Nursing Home Tax Enacted	-2.65 (1.87)	1.36 (5.73)	3.91 (5.89)	-2.44 (2.19)	-4.88 (1.98)**
Year Of and After Nursing Home Tax Enacted	2.08 (1.81)	4.45 (9.67)	9.44 (7.18)	9.91 (4.75)**	-2.70 (2.32)
Nursing Home Tax, Other than Above	-0.22 (1.17)	4.60 (3.91)	3.28 (3.88)	1.54 (1.63)	-1.60 (1.80)
R-squared	0.34	0.22	0.08	0.25	0.31

** $p < 0.05$, * $p < 0.10$

Table 14: Estimated Impact of the Timing of Hospital Tax Enactment on Medicaid Spending Growth Rates

The estimates shown in this Table are for regressions that exclude nursing home tax dummies. The categories related to the timing of provider tax enactment are explained in Table 6 and Table 9. The dependent variable is annual growth in inflation-adjusted per capita Medicaid expenditures. The parameter estimates in this Table, which correspond to Equation 3, minus the nursing home tax dummy variables, show the estimated effect of timing of hospital tax enactment on the annual growth in inflation-adjusted per capita Medicaid expenditures, by expenditure category. Robust standard errors are reported. Estimates for control variables as well as for year dummies are not reported.

	Total Expenditures	Hospital Expenditures	Physician Expenditures	Nursing Home Expenditures	HCBS Expenditures
Year Before Hospital Tax Enacted	-1.67 (1.37)	-4.86 (4.94)	-2.75 (3.89)	4.52 (1.47)**	-2.52 (2.82)
Year Of and After Hospital Tax Enacted	2.94 (1.61)*	15.13 (6.38)**	3.92 (5.28)	0.52 (1.90)	0.14 (2.32)
Hospital Tax, Other than Above	2.80 (1.49)*	7.86 (5.26)	-4.86 (4.79)	5.61 (2.20)**	3.36 (2.72)
R-squared	0.32	0.22	0.07	0.15	0.30

** $p < 0.05$, * $p < 0.10$

Table 15: Estimated Impact of the Timing of Nursing Home Tax Enactment on Medicaid Spending Growth Rates

The estimates shown in this Table are for regressions that exclude hospital tax dummies. The categories related to the timing of provider tax enactment are explained in Table 6 and Table 9. The dependent variable is annual growth in inflation-adjusted per capita Medicaid expenditures. The parameter estimates in this Table, which correspond to Equation 3, minus the hospital tax dummy variables, show the estimated effect of timing of nursing home tax enactment on the annual growth in inflation-adjusted per capita Medicaid expenditures, by expenditure category. Robust standard errors are reported. Estimates for control variables as well as for year dummies are not reported.

	Total Expenditures	Hospital Expenditures	Physician Expenditures	Nursing Home Expenditures	HCBS Expenditures
Year Before Nursing Home Tax Enacted	-2.30 (1.79)	3.39 (5.33)	3.27 (5.82)	-2.21 (1.90)	-4.67 (1.64)**
Year Of and After Nursing Home Tax Enacted	2.43 (1.57)	7.75 (8.65)	9.10 (6.10)	9.62 (4.56)**	-2.80 (1.89)
Nursing Home Tax, Other than Above	-0.22 (1.16)	5.29 (3.87)	3.61 (3.90)	1.17 (1.61)	-1.76 (1.83)
R-squared	0.30	0.17	0.06	0.19	0.29

** $p < 0.05$, * $p < 0.10$

Table 16: Medicaid Expenditure Growth Rates, by Year

The values in this Table show the mean growth rate in inflation-adjusted per capita Medicaid expenditures, by expenditure category, for each of the four time periods for all of the observations in the dataset.

Period	Total	Hospital	Physician	Nursing Home	HCBS
2007 to 2008	1.3%	-2.0%	2.2%	-0.9%	6.1%
	(n=41)	(n=40)	(n=41)	(n=41)	(n=41)
2008 to 2009	7.9%	10.3%	5.9%	1.9%	11.5%
	(n=42)	(n=41)	(n=42)	(n=42)	(n=42)
2009 to 2010	4.0%	1.3%	5.0%	-1.3%	2.7%
	(n=42)	(n=41)	(n=42)	(n=42)	(n=40)
2010 to 2011	0.5%	7.3%	0.6%	-0.3%	-0.3%
	(n=41)	(n=41)	(n=41)	(n=41)	(n=40)

Table 17: Means of Key Control Variables, by Year

The values in this Table show the means of key control variables, by year, for all of the observations in the dataset.

Year	FMAP	Poverty Rate	Unemploy-ment Rate	Per Capita Income
2007	59.9%	11.7%	4.4%	$48,540
	(8.1%)	(3.0%)	(1.0%)	($8,936)
2008	59.8%	12.2%	5.3%	$47,058
	(8.4%)	(2.7%)	(1.3%)	($8,577)
2009	69.9%	13.0%	8.4%	$46,323
	(7.4%)	(3.0%)	(2.0%)	($8,444)
2010	70.4%	13.9%	8.8%	$47,190
	(7.5%)	(3.3%)	(2.2%)	($8,720)
2011	66.0%	14.1%	8.2%	$47,519
	(7.8%)	(3.1%)	(2.1%)	($9,082)

Figure 1: Average Per Capita Medicaid Spending, by Hospital Tax Grouping
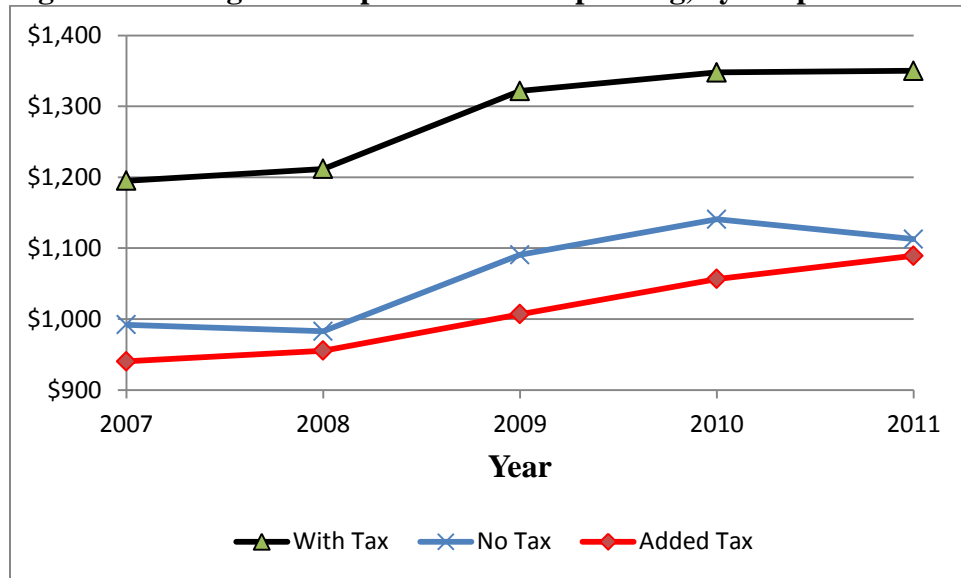
The 16 states with hospital taxes in place between 2007 and 2011 had an average increase in Medicaid spending of $155 between 2007 in 2011 in inflation-adjusted per capita expenditures. The corresponding average increase for the 11 states without hospital taxes was $121, and the corresponding average increase for the 13 states that added hospital taxes was $149.

Figure 2: Average Per Capita Medicaid Spending on Hospitals, by Hospital Tax Grouping
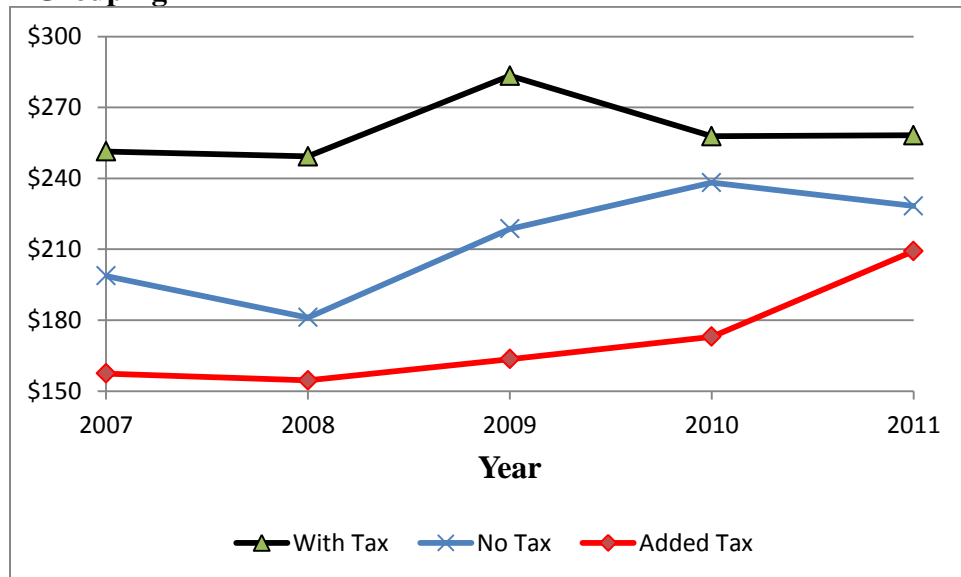
The 16 states with hospital taxes in place between 2007 and 2011 had an average increase in Medicaid spending of $7 between 2007 in 2011 in inflation-adjusted per capita expenditures. The corresponding average increase for the 11 states without hospital taxes was $29, and the corresponding average increase for the 13 states that added hospital taxes was $52.

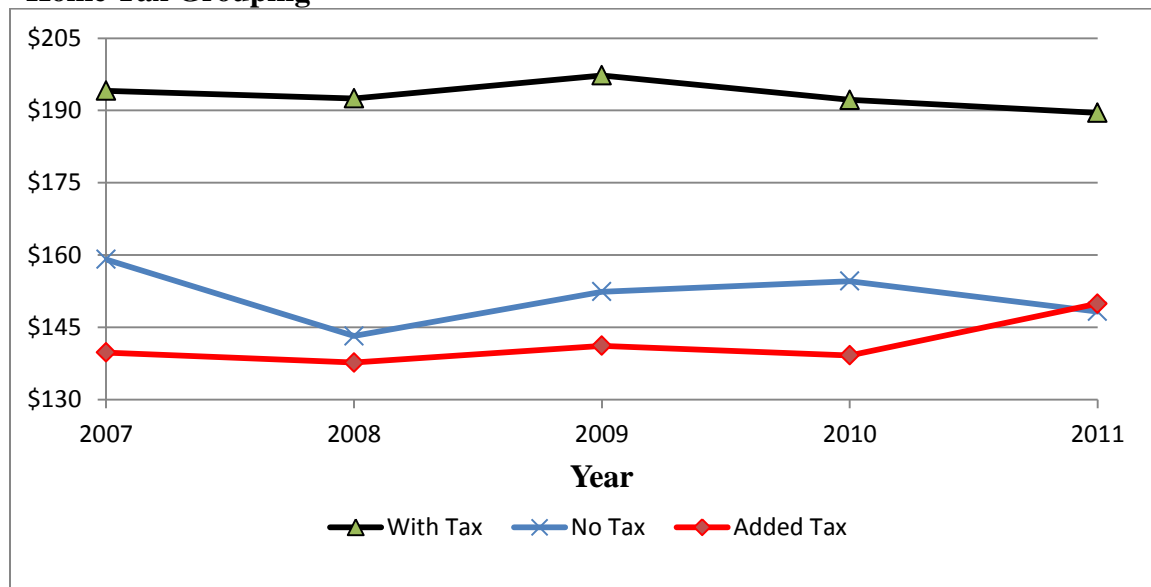**Figure 3a: Average Per Capita Medicaid Spending on Nursing Homes, by Nursing Home Tax Grouping**

The 25 states with nursing home taxes in place between 2007 and 2011 had an average decrease in Medicaid spending on nursing homes of $4 between 2007 in 2011 in inflation-adjusted per capita expenditures. The corresponding average decrease for the eight states without nursing home taxes was $11. The seven states that added nursing home taxes had an average increase in corresponding spending of $10.

Figure 3b: Average Per Capita Medicaid Spending on HCBS, by Nursing Home Tax Grouping

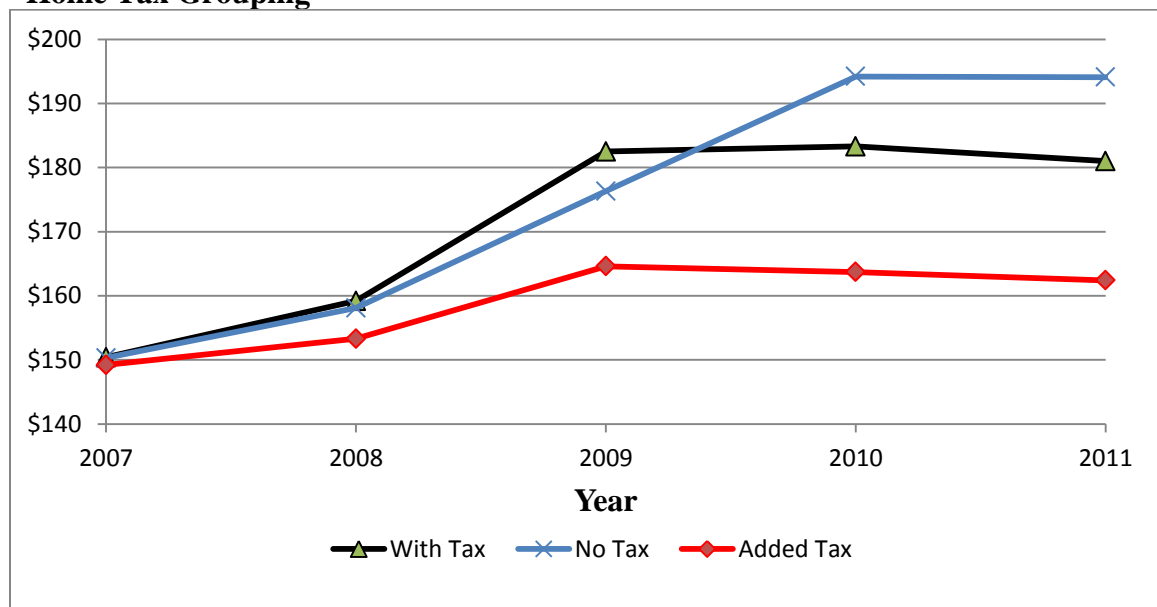The 25 states with nursing home taxes in place between 2007 and 2011 had an average increase in Medicaid spending on HCBS of $31 between 2007 in 2011 in inflation-adjusted per capita expenditures. The corresponding average increase for the eight states without nursing home taxes was $44. The seven states that added nursing home taxes had an average increase in spending of $13.

122

Figure 3c: Differences Between Per Capita Medicaid Nursing Home Spending and Per Capita Medicaid HCBS Spending, by Nursing Home Tax Grouping
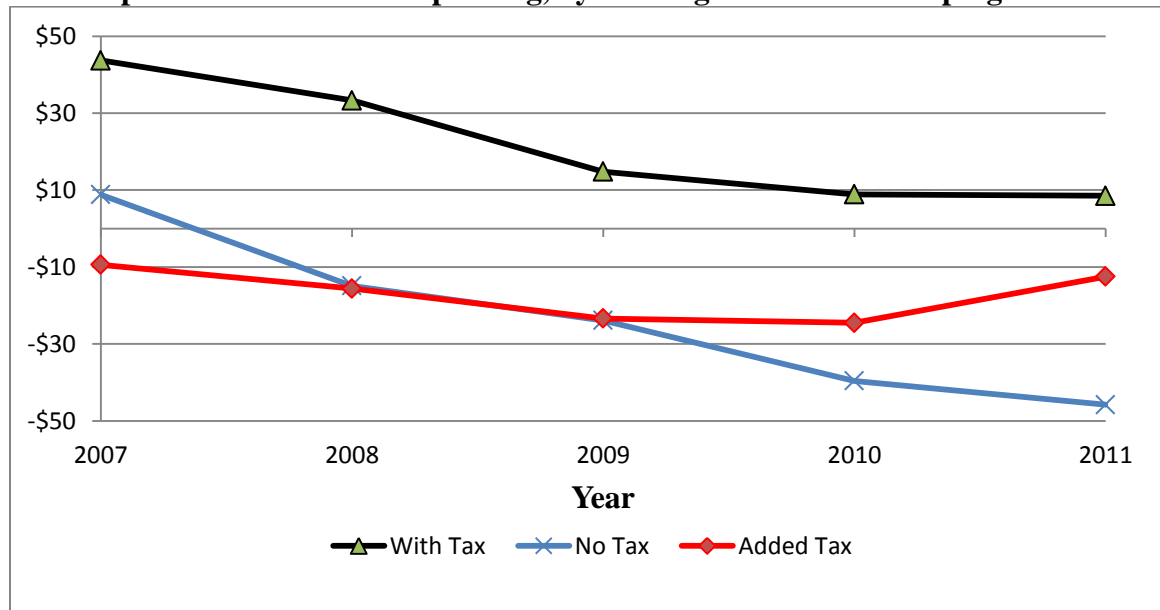
The lines in this Figure show the difference between the values in Figure 3a and the values in Figure 3b. The 25 states with nursing home taxes in place between 2007 and 2011 had an average decline in nursing home expenditures in excess of HCBS expenditures by $35. The corresponding average decrease for the eight states without nursing home taxes was $55, and the corresponding average decrease in the seven states that added nursing home taxes was $3.

PAPER 3: STATEWIDE HEALTH IMPACT OF TENNESSEE'S MEDICAID EXPANSION

I.   Introduction

The creation of TennCare in 1994 was Tennessee's attempt to significantly reduce the number of Tennesseans without health insurance and was also the most substantial state public health insurance expansion in the United States in the past several decades.[110] Within a year of TennCare's enactment, more than half a million additional Tennesseans (10.1 percent of the state population) became enrolled in Medicaid.[111] Individuals below 400 percent of the federal poverty level (FPL) received subsidies – poorer individuals received more generous ones – to buy into TennCare, and the traditional Medicaid program was replaced with a managed care model. These core aspects of TennCare (Medicaid expansion, subsidies to purchase health insurance, and an emphasis on managed care organizations) are central components of the Patient Protection and Affordable Care Act (PPACA), so the results of TennCare may be instructive as policymakers move ahead with implementation of PPACA.

---

[110] Although not quite as large in relative size as TennCare, Massachusetts' health care reform of 2006 was probably largely responsible for reducing the uninsurance rate in Massachusetts from 8.6 percent to 5.0 percent. Most of the decrease in the uninsurance rate was because enrollment in Medicaid increased from 13.9 percent of the population to 17.2 percent of the population. U.S. Census Bureau. *Health Insurance Coverage Status and Type of Coverage by State – All Persons: 1999 to 2010.*

[111] Centers for Medicare and Medicaid Services, Office of the Actuary, National Health Statistics Group. *United States Personal Health Care Expenditures, 1991-2004.*

This paper utilizes a difference-in-difference approach to compare several measures of health care utilization and health outcomes between individuals in Tennessee and individuals in states that border Tennessee before and after TennCare. Using Behavioral Risk Factor Surveillance System data, I examine trends in insurance coverage, regular doctor check-ups, prohibitively high medical costs, blood pressure and cholesterol checks, flu shots, self-reported health, and mortality rates. The assumption underlying this approach is that health care trends in Tennessee should be similar to the trends in the surrounding region. Since TennCare represented a large change to the health care system in Tennessee, trends in Tennessee that significantly diverge from trends in the surrounding region in the period after TennCare can plausibly be attributed to TennCare.

I found some small, but significant changes in health care utilization by Tennesseans and health outcomes of Tennesseans after TennCare. Surprisingly, fewer individuals in Tennessee, particular women, received regular check-ups with physicians after TennCare. However, the number of Tennesseans having their blood pressure checked and the number of women having their cholesterol checked did show a relative increase after TennCare. While TennCare's enactment was correlated with an increase in some aspects of preventive care, self-reported health among Tennesseans worsened after TennCare. On likely the most important indicator of health – mortality rates – Tennessee performed worse than each of its eight neighboring states after the enactment of TennCare. Overall, the first few years after TennCare's enactment suggest that

125

increasing health insurance coverage through a large public insurance expansion is unlikely to result in significant *population* health improvements, at least in the short run.

II.   Description of TennCare

TennCare was enacted in 1994 to expand Medicaid coverage to all uninsured and uninsurable[112] Tennesseans with annual family incomes below 400 percent of the FPL. Individuals in households with incomes above 400 percent of the FPL could buy unsubsidized TennCare coverage (Moreno and Hoag 2001). According to data from the Centers for Medicare and Medicaid Services, the number of Tennesseans receiving Medicaid services increased from 909,000 (17.5 percent of the state population) in fiscal year 1993 to 1,466,000 (28.2 percent of the state population) in fiscal year 1995.[113] The number of individuals in TennCare remained near the 1995 level for the remainder of the decade. Of the more than half a million people added to Tennessee's Medicaid program, approximately 55 percent were previously uninsured (Kronick and Gilmer 2002). Consequently, between 1993 and 1995, TennCare increased the number of Tennesseans with health insurance by approximately 307,000 people (5.8 percent of the state population). An estimated 557,000 individuals (10.7 percent of the state population)

---

[112] Uninsurable individuals are those whose application for health insurance has been rejected because of a health condition.

[113] U.S. Census Bureau. *1996 Statistical Abstract of the United States – Table No. 167 Medicaid – Summary, by State and Other Areas: 1993 and 1994.* Retrieved from: http://www.census.gov/prod/2/gen/96statab/health.pdf; U.S. Census Bureau, *1997 Statistical Abstract of the United States – Table No. 165 Medicaid – Summary, by State and Other Areas: 1994 and 1995.* Retrieved from: http://www.census.gov/prod/2/gen/96statab/health.pdf.

gained Medicaid coverage with about 250,000 (4.8 percent of the state population) of

these individuals replacing private insurance with Medicaid.[114]

The expansion was meant to be paid, in part, from anticipated efficiency savings

achieved from moving individuals from a fee-for-service payment structure into managed

care organizations (MCOs). Each enrollee was assigned a MCO for both primary care

and medical/surgical services and a behavioral health organization for mental health and

substance abuse services. To emphasize primary care and prevention, financial

incentives were provided for private managed care organizations to keep enrollees

healthy and to avoid more expensive inpatient care (Chang 2007). In spite of these

measures, however, Tennessee closed enrollment in late 1994 to uninsured persons,

mostly adults, because of cost over-runs (Moreno and Hoag 2001). While several studies

have analyzed the fiscal impact of TennCare, the central aim of this paper is to analyze

the impact that TennCare had on the health of Tennesseans.

III.   Previous Research about Health Impact of Insurance Expansions

Health insurance, health care, and health outcomes are three different, yet related

concepts. Determining the mechanism through which health insurance impacts health is

difficult as many factors affect health insurance status and health simultaneously. And

---

[114] TennCare was probably not responsible for this entire increase since Medicaid enrollment tends to grow over time. Between fiscal year 1993 and fiscal year 1995, the number of Medicaid recipients (at any point during the year) increased from 32.664 million to 35.210 million. Of the 2.546 million national increase, 21.9 percent was from TennCare. Between fiscal year 1993 and fiscal year 1995, the number of Medicaid beneficiaries in Tennessee increased 61.3 percent compared to a 6.3 percent increase in the rest of the country. If Medicaid growth in Tennessee would have mirrored growth in the rest of the country, then the number of Medicaid recipients in 1995 would have been about 966,000. Using these estimates, TennCare resulted in about 500,000 additional people gaining Medicaid coverage than would have otherwise.

many personal characteristics that influence both health insurance coverage and health are either unobservable or difficult to measure. Levy and Meltzer (2004) performed an exhaustive search of the literature to gather evidence of the *causal* impact of health insurance on health. They reached the following conclusions from their literature review.

> First, many of the studies claiming to show a causal effect of health insurance on health do not do so convincingly. Second, convincing evidence demonstrates that health insurance can improve some health measures of some population subgroups, some of which, though not all, are the same subgroups that would be the likely targets of coverage expansion policies. Third, for policy purposes we need to know whether the results of these studies generalize; we need more precise estimates of the effects of health insurance on health in broader populations.

Because of the limitations of observational studies in establishing causation, health economists prefer to utilize quasi-experiments to determine the impact of health insurance on health. A quasi-experiment is generally a policy change which impacts a certain subgroup of the population, but leaves other subgroups unaffected. This technique avoids some of the empirical difficulties of determining cause and effect. There is a control group – which was not impacted by the policy change – that can be used for measuring the impact of the change on the affected group.

In a 2008 follow-up to their 2004 paper, Levy and Meltzer scrutinized 15 quasi-experiments, which examined the impact of changes in insurance coverage on health (Levy and Meltzer 2008). Generally the studies analyzed policy changes that impacted specific groups, such as low-income pregnant women, HIV-positive individuals, or seniors. Most, but not all, of the studies found that expansions of health insurance resulted in health improvements. Furthermore, the RAND Health Experiment – the

largest and most complete randomized experiment relating health insurance to health –

found that there were some beneficial impacts of more generous coverage for individuals

who were most sick, although the increased insurance generosity did not improve the

health status of the average adult (Newhouse 1993).

While quasi-experiments lead researchers to more reliable insights than

observational studies, they are limited for understanding the broader impact of insurance

expansions in two primary ways. First, since the insurance expansions generally only

impact a small sub-group of the population, the results are not generalizable to broader

populations. And second, quasi-experiments generally fail to measure the effects of the

expansion on other subgroups in the population even though large expansions may have

significant secondary effects.

IV.   Previous Research about Medicaid's Impact on Health

Many studies have linked health outcomes to insurance status – focusing on the

differences between privately insured individuals and individuals with either Medicaid or

no insurance. University of Virginia researchers recently completed an analysis relating

insurance coverage and surgical outcomes for nearly 900,000 major operations in the

United States (LaPar et al. 2010). The study controlled for individual characteristics and

co-morbidities, factors such as whether the surgery was elective, and hospital

characteristics. The authors found that Medicaid patients were 13 percent more likely to

suffer in-hospital mortality than the uninsured and twice as likely to die in the hospital as

individuals with private insurance. Since proper compliance with post-operative

instructions is generally a key factor in recovery and compliance is likely correlated with type of insurance coverage, looking at in-hospital mortality rates following surgery allows researchers to control for differences in compliance that would otherwise be impossible to control. LaPar et al. also found that Medicaid patients were also more likely to suffer complications as they stayed in the hospital an average of 10.5 days, compared to 7 days for the uninsured and 7.4 days for the privately insured.

Kelz et al. found that individuals with Medicaid were more likely to experience complications and in-hospital mortality after surgery for colorectal cancer than both privately insured and uninsured patients (Kelz et al. 2004). Medicaid patients had a 22 percent greater chance of complications and a 57 percent greater chance of dying in the hospital than the privately insured all else equal with the corresponding risk for the uninsured in the middle. McDavid et al. found lower cancer survival rates for Medicaid enrollees (McDavid et al. 2003). The three-year mortality rate for individuals with Medicaid was higher than the mortality rate for the privately insured by 56 percent for colorectal cancer, 14 percent for lung cancer, 66 percent for female breast cancer, and 149 percent for prostate cancer. Of three of the four measures, Medicaid recipients had a higher risk of mortality than the uninsured.

Shen and Washington found similar results as patients with Medicaid as well as the uninsured were more likely to have worse outcomes after a stroke than individuals with private coverage. Medicaid enrollees stayed in the hospital 11.4 days for intra-cerebral hemorrhages (a type of stroke) compared to 8.5 days for the uninsured, and 6.9

days for individuals with private coverage. These results were similar for patients who experienced other strokes, such as cerebral artery occlusions or carotid artery occlusions. The weight of the evidence from the observational studies with appropriate demographic and clinical controls suggests Medicaid patients have worse health outcomes than privately insured individuals and may have worse health outcomes than uninsured individuals.

The results of these studies can be interpreted in either of two main ways. The first explanation is that these studies fail to account for important ways that individuals with Medicaid are different from individuals with private coverage and individuals without health insurance, and it is these differences that are responsible for the relatively poor health outcomes of Medicaid patients. The second explanation is that individuals on Medicaid receive a lower quality of care than other similar patients. It is also possible that both explanations are relevant to some extent. Without random assignment of individuals into Medicaid, it is difficult to determine which explanation is most appropriate.

There is evidence from several studies, however, that Medicaid patients receive a lower quality of care than privately insured patients. One study found that Medicaid patients who suffered a heart attack were significantly less likely than patients with other forms of insurance to receive important clinical interventions (Philibin et al. 2001). Calvin et al. found that Medicaid patients received fewer evidence-based therapies than patients with private insurance coverage (Calvin et al. 2006). Medicaid recipients were much less likely to be offered discharge medications, such as aspirin and beta-blockers,

or interventions, such as smoking-cessation counseling and rehabilitation. Calvin et al. suggest several explanations for why Medicaid recipients receive fewer guideline-recommended therapies. For example, cardiologists are more prone to use evidence-based therapies to treat heart attacks than non-cardiologists, and Medicaid patients are much less likely to be treated by cardiologists. There is also evidence that the uninsured and Medicaid populations are often assigned to less experienced and less skilled surgeons, and it is well established that there is a strong positive association between higher surgeon volume and better outcomes (Halm et al. 2002).

Ortega et al. found that children with Medicaid receive significantly different health care services than children with private insurance (Ortega et al. 2001). For example, a child with asthma was five times more likely to see an asthma specialist if she had private coverage than if she was insured by Medicaid. Moreover, children with Medicaid were 50 percent more likely to be seen by a doctor in the emergency room in the past year. Finally, after adjusting for primary provider type, use of asthma specialist, age, sex, and other treatment factors, children with Medicaid were 40 percent less likely to have had three or more routine primary care visits for their asthma condition.

Several news outlets have recently reported of the widespread access problems faced by Medicaid recipients.[115] Children with Medicaid are more likely to have a primary provider who works in an emergency room or ambulatory care center. In Texas, where Medicaid pays low rates relative to private insurance, less than one-third of

---

[115] Robert Pear. (2011, April 1). *Cuts Leave Patients With Medicaid Cards, but No Specialist to See.* New York Times. Pear quoted one woman as saying that "My Medicaid card is useless for me right now. It's a useless piece of plastic. I can't find an orthopedic surgeon or a pain management doctor who will accept Medicaid."

practicing doctors accept Medicaid and many doctors limit the number of Medicaid patients they treat.[116] According to a 2004–2005 survey, only about half of American physicians accept all new Medicaid patients and of physicians accepting new Medicaid patients, 51 percent receive more than 30 percent of their revenue from Medicaid (Cunningham and May 2006). This means Medicaid enrollees are increasingly served by a subset of providers.

In 2008, Oregon decided to expand its Medicaid program to some able-bodied uninsured adults with income below 100 percent of the FPL. However, Oregon only had enough money in its budget for about 10,000 new enrollees, so it decided to allocate the spots using a lottery. Since Oregon determined Medicaid eligibility randomly, it allowed researchers an opportunity to determine the effect of enrollment into Medicaid on health care utilization and health. Several health economists have begun to collect data and analyze the impact of Oregon's Medicaid experiment.

During the first year of the expansion, the researchers found that Medicaid enrollment led to significantly greater health care utilization, including a 30 percent increase in the probability of a hospital admission, a 15 percent increase in the probability of taking a prescription drug, and a 35 percent increase in the probability of having an outpatient visit. Compared to individuals in the control group, the new Medicaid enrollees reported higher self-reported health (although about two-thirds of the effect occurred after the individual learned they won the lottery) and greater use of several preventive care services, including blood cholesterol checks, diabetes test, and

---

[116] Associated Press. (2010, July 12). *Doctors Threaten to Pull Out of Texas Medicaid*. Retrieved from: *http://www.nbcdfw.com/news/health/Doctors-Threaten-to-Pull-Out-of-Texas-Medicaid-98202569.html.*

mammograms. There were no differences in mortality rates, however. One of the

limitations of the Oregon Medicaid experiment is that the people selected for the study

were very sick (28 percent had asthma, 30 percent had high blood pressure, and 56

percent had depression) so the results are not generalizable to the broader population and

likely not even the broader Medicaid population.

V.   Data and Model

In this paper, I utilize a difference-in-difference approach to measure the impact

of TennCare and its large Medicaid expansion on the statewide utilization of health care

services and health outcomes. TennCare significantly impacted the health care system in

Tennessee with its large Medicaid expansion and the change from fee-for-service

medicine to managed care. No other state health care system in the region experienced

such a dramatic change during this period. TennCare fits the quasi-experimental model

because there is both a treatment group – Tennesseans – and a control group – individuals

in the neighboring states. In the absence of the policy-induced change, health care

utilization and health outcome trends in Tennessee should mirror the corresponding

trends in the surrounding states. Therefore, deviations in health care utilization and

health outcomes for individuals in Tennessee from individuals in the surrounding region

can plausibly be attributed to TennCare.

I used seven questions from the Behavioral Risk Factor Surveillance System

(BRFSS) survey to measure health care access, utilization of health care services, and

health outcomes. In order to measure health care access, I used individuals' self-reported

health insurance status and their responses to whether they needed to see a doctor in the past year but did not because of cost. In order to measure utilization of health care services, I used individuals' responses about the length of time since they last saw a doctor for a routine check-up, the length of time since they last had their blood pressure checked, the length of time since they last had their cholesterol checked, and whether they received a flu shot during the past year. Finally, in order to measure health outcomes, I used individuals' responses about their self-reported health. One of the limitations of the study is that the only variable in the BRFSS that proxies health is self-reported health.

The BRFSS data – compiled by the Centers for Disease Control – is the world's largest telephone health survey system with a new sample of individuals selected each year. A core set of questions is asked annually or biennially in each state. The BRFSS collects information on health risk behaviors, preventive health practices, and health care utilization. Since TennCare was enacted in 1994, I compiled data for several years before and after 1994. In order to ensure consistency in the questions over time, I limited the study to data after 1990. I collected data through 1998 in order to have an equal number of years before and after TennCare's enactment. Moreover, the more time that passes after TennCare's enactment, the more other factors are responsible for health care utilization and health care trends across those states.

I excluded observations from 1994 because people signed up for TennCare over the course of the year, and there was quite a bit of confusion during its early implementation (Aizer et al. 1999). The data set consists of nearly 110,000 observations

– about 16,000 per year – which represent the responses of non-elderly adults from nine states. The nine states are Tennessee and the eight states that border Tennessee: Alabama, Arkansas, Georgia, Kentucky, Mississippi, Missouri, North Carolina, and Virginia.

To get a first approximation of TennCare's impact on access, utilization, and health, I calculated several simple difference-in-difference estimates. The first differences were the change over time in the average of the seven measures for both Tennesseans and individuals in the control region. Specifically, this difference is calculated by subtracting the pre-TennCare period estimate (means for each of the seven measures using 1991 to 1993 data) from the post-TennCare period (means for each of the seven measures using 1995 to 1998 data). These two calculations yield an underlying trend for both the state of Tennessee and the control states. The second difference is the trend in Tennessee subtracted by the trend in the control states. This second difference is a rough indicator of the impact of TennCare.

After calculating simple difference-in-difference estimates, I ran regressions to control for additional factors that likely impact the dependent variables. The dependent variable in Equation (1) is one of the seven measures of health care access, utilization of health care services, or health status for individual i in state s at time t. The key explanatory variable is the TNCARE variable which takes a value of one for individuals living in the state of Tennessee in the years after 1994 and zero otherwise. β is the estimated impact of TennCare on the particular health care utilization or outcome measure, and it is the coefficient that is reported in Table 6a and Table 6b.

(1) $H_{ist} = \beta TNCARE + \delta X_i + \zeta_t + \nu_s + \varepsilon_{st}$

X_i consists of a set of control variables that are likely to impact health insurance

status, health utilization, and health outcomes. The data set allowed me to control for an

individual's age, sex, race, and body mass index as well as dichotomous variables for

whether the individual is married, self-employed, retired, a home-maker, unemployed, a

current student, completed high school, and completed college. I also included state

unemployment and state poverty rates. Additionally, a dummy variable for the presence

of health insurance was a used as a regressor for all of the utilization and health outcome

regressions. Since a new sample of respondents is selected each year, an individual fixed

effect is not possible. However, I included state (ν_s) and year (ζ_t) fixed effects in order to

control for differences between states and years in health care utilization and outcome

variables. In the estimates provided in Table 6b, the control variables other than age, sex,

and race are removed from the equation since all of them are potentially endogenous.

Gruber and Currie and later Goldman showed that concentrated Medicaid

expansions can have positive health impacts for the targeted expansion group (Currie and

Gruber 1996; Currie and Gruber 1996; Currie and Gruber 1997; Goldman et al. 2001).

The study in this paper goes beyond the scope of existing literature which has focused on

the health impact of Medicaid expansion on narrow population subgroups, such as HIV-

positive individuals or pregnant women. Because the BRFSS data does not track

individuals through time, I am not able to assess TennCare's impact on health care

utilization and health outcomes of those individuals who were enrolled in Medicaid through TennCare.

In this paper, I assess the statewide impact from TennCare's Medicaid expansion and the corresponding replacement of Medicaid fee-for-service with managed care, private sector insurance crowd-out, and increased demand on the health care system driven by the additional subsidization of health insurance coverage. Although these effects will be present to varying degrees with any public health insurance expansion, most quasi-experimental papers only measure the impact on the subgroup directly impacted by the expansion. This paper, on the other hand, includes these important secondary effects.

VI.   Results

Table 1 shows the simple difference-in-difference estimates of TennCare's impact. Table 2 shows the same estimates for males, Table 3 shows the same estimates for females, Table 4 shows the same estimates for high school graduates, and Table 5 shows the same estimates for high school dropouts. Table 6 contains two panels of regression estimates; Table 6a contains all the control variables while Table 6b removes variables that are potentially endogenous.

As shown in Table 1, the average number of Tennesseans who stated they had health insurance between 1991 and 1993 was 83.2 percent; the average number between 1995 and 1998 climbed to 86.9 percent. This 3.7 percent increase is less than the estimate of 5.5 percent, calculated from CMS data and discussed in Section II. It is

likely, however, that the increase in health insurance coverage was greater in Tennessee than the measured effect from the BRFSS sample because of the tendency of individuals on Medicaid to fail to report being a program participant when asked (Pascale et al. 2009). Forty-three percent of Current Population Survey respondents enrolled in Medicaid did not indicate their participation in the program, and 17 percent of Medicaid enrollees reported being uninsured (Davern et al. 2009). Given the large Medicaid expansion in Tennessee, the number of Tennesseans under-reporting Medicaid likely would have increased.

The key assumption with difference-in-difference analysis is that Tennessee would have had the same change that was observed in the rest of the region without TennCare. The difference attributable to TennCare is the gain in coverage in Tennessee (3.7 percent) minus the gain in coverage in the control states (0.5 percent). Therefore, from the difference-in-difference estimates, I find that TennCare caused an additional 3.1 percent of the state's population to report having health insurance coverage. The estimated regression coefficient from Table 6a and Table 6b indicates that TennCare produced about a 2 to 3 percent increase (p=0.002 with all controls; p <0.001without possible endogenous controls) in self-reported insurance coverage in Tennessee all else equal.

TennCare appears to have impacted several measures of statewide utilization of health care services. The results suggest that TennCare increased certain aspects of preventive care in Tennessee. In the years after TennCare's enactment, a greater number of Tennesseans received regular blood pressure checks (p=0.010; p<0.001) and

cholesterol checks (p=0.142; p=0.044) relative to individuals in the surrounding region.

The results do suggest, however, that fewer Tennesseans received a regular doctor check-up within the most recent two-year period relative to individuals in the control states after TennCare's enactment (p=0.079; p=0.192). There was little, if any, change in the number of Tennesseans who did not see a doctor because of cost reasons after TennCare.

On the single indicator of health outcomes, self-reported health became worse in Tennessee after TennCare (p=0.064; p=0.177). This unexpected result may partially be attributed to individuals finding out they had high blood pressure or cholesterol as these types of checks increased in Tennessee after TennCare.

TennCare's Impact on Men and Women

As Table 2 and Table 3 indicate, TennCare appears to have impacted women more substantially than it did men. Women were about twice as likely as men to have gained insurance coverage because of TennCare, and the change in utilization between women in Tennessee and those in the control states was more significant than the corresponding change for men. The number of women in Tennessee receiving both blood pressure checks (p=0.436; p=0.084) and cholesterol checks (p= 0.023; p=0.016) increased after TennCare relative to the control states. On the other hand, the number of women receiving routine check-ups in Tennessee appears to have declined by around 1.5 percent (p=0.017; p=0.156) in the years following the enactment of TennCare. It seems possible to reconcile these two effects if women in Tennessee utilized more informal care after TennCare's passage. On the sole measure of actual health status, self-reported

140

health among Tennessee woman declined relative to women outside of Tennessee (p=0.149; p=0.408), although not significantly. For most of the variables, there was not any discernible impact of TennCare for men in Tennessee. The only apparent impact of TennCare on men was a relative increase in the percentage of men in Tennessee who received annual blood pressure checks (p=0.001; p=0.001).

TennCare Impact on High School Drop Outs

TennCare should have had a greater impact for high school dropouts than for high school graduates since dropouts are less likely to have private health insurance and much more likely to be below 400 percent of the FPL. According to national data from the 1996 Survey of Income and Program Participants, 23 percent of individuals who failed to complete high school were uninsured compared to 14 percent of high school graduates. As expected, high school dropouts[117] were more likely than high school graduates to gain insurance coverage because of TennCare. There was an 8 percent increase in self-reported coverage among high school dropouts in Tennessee after TennCare, which was about eight times greater than the increase in self-reported coverage among high school dropouts in the neighboring states in the first few years after TennCare.

Although TennCare significantly increased the number of Tennessee's high school dropouts with insurance coverage, the number of high school dropouts in Tennessee who said they did not see the doctor for a needed appointment actually increased after TennCare by about 2 to 3 percent (p=0.435; p=0.063). Unlike high school

---

[117] High school drop-outs refer to any individual who failed to graduate high school or attain an equivalent status.

graduates in Tennessee, high school dropouts did not receive significantly more cholesterol checks after TennCare. Furthermore, in the aggregate, high school dropouts in Tennessee reported larger declines in health status than high school dropouts in the control states after TennCare (p=0.052; p=0.410). The overall evidence indicates that TennCare did not have a beneficial impact on a subgroup that it was more likely to directly impact – individuals who failed to graduate high school.

VII.   TennCare, Health Insurance, and Mortality

Mortality rates are often useful to assess health status because it is both easily obtainable and an objective measure. While the mortality rate does not capture the full meaning of health status, it is likely that healthy individuals have lower mortality rates at a given age. While one might expect that a health insurance expansion will result in lower mortality rates, the evidence is inconclusive. Franks et al. (1993) found that individuals who lacked insurance at baseline were 25 percent more likely to die within a 16-year period. Although this study controlled for demographic, economic, and behavioral factors that are correlated with health status, the study only considered health insurance status at baseline despite the fact that most people are only uninsured for brief periods of time and the study excluded everyone with public health insurance. Using a similar methodology, Sorlie et al. (1994) obtained a comparable estimate to the Franks et al. study using a five-year mortality rate.

In 2002, the Institute of Medicine (IOM) – relying on the Franks and Sorlie studies – estimated that 18,000 Americans died in 2000 because they were uninsured.

Dorn (2008) utilized the methodology from the IOM study and calculated separate

estimates of 22,000 and 27,000 Americans between the ages of 25 and 64 who died in

2006 because of a lack of health insurance. Other estimates suggest that the number of

annual deaths from uninsurance may be as high as 45,000 individuals between the ages of

18 and 64 (Wilper et al. 2009).

Research by Kronick (2009) – which contained more individuals and followed

them over many more years than either of the two original studies – controlled for these

factors, and the effect of uninsurance on mortality disappeared. According to Kronick's

research, lacking health insurance at baseline was not independently associated with an

increased risk of mortality. Thus, the estimated risk of mortality from uninsurance

originally derived from the Franks/Gold, Sorlie et. al., and IOM studies is likely

exaggerated. The uncertainty of the effect of uninsurance on mortality is demonstrated

by McWilliams (2009), who found that two of four quasi-experimental approaches used

to determine the impact of health insurance on mortality showed a reduction in mortality

risk attributable to having health insurance while two did not.

Sommers et al. (2012) used difference-in-difference quasi-experimental design to

assess the impact of state Medicaid expansions that covered childless non-elderly adults

between 2000 and 2005. During this period, Maine, New York, and Arizona expanded

Medicaid eligibility. Using county-level data, Sommers et al. compared these states with

New Hampshire, Pennsylvania, and Nevada and New Mexico, respectively. Using

BRFSS data, Sommers et al. found that these Medicaid expansions decreased rates of

delayed care because of costs, increased positive rates of self-reported health, and

decreased unadjusted mortality rates. Mortality reductions were greatest among non-whites and older adults, although there were only significant effects in one state, New York.

Mortality trends before and after TennCare

The trend in Tennessee's mortality rates relative to the corresponding trend for the surrounding region following TennCare can shed some light on the discussion of the impact of insurance on mortality. Throughout the 1990's, there were around 40 million Americans without insurance at any given time. Since Dorn estimates that 22,000 to 27,000 Americans die per year because of a lack of health insurance, an increase in health insurance coverage of between 1,481 and 1,818 individuals result in one fewer death. Since TennCare resulted in 307,000 additional people gaining health insurance coverage, using Dorn's estimates, between 170 and 205 lives would have been saved because of TennCare's Medicaid expansion. This decrease would correspond to about a 1.5 percent to 2 percent reduction in the number of non-accidental, non-intentional deaths for non-elderly adults in Tennessee.

I used CDC WONDER data to calculate state mortality rates by year. I only included deaths resulting from diseases and medical conditions, complications, or disorders. I excluded deaths resulting from accidents, homicides, suicides, and the like since medical care is less likely to matter in these situations.[118] Since this data is at the aggregate level, it is not possible to draw definitive conclusions about the changes in the

---

[118] Including these deaths does not significantly change the results, however.

mortality rate for individuals who gained coverage through TennCare. However, the results provide evidence of whether a robust expansion of health insurance coverage correlates to changes in population mortality rates.

Figure 1 contrasts trends in the mortality rates in Tennessee before and after TennCare with the eight states that border Tennessee.   As the figure shows, the change in Tennessee's mortality rate between 1990 and 1994 approximated what was going on in the region with relatively minor fluctuations across the states. However, the mortality rate trends in Tennessee compared much less favorably to the surrounding states after the enactment of TennCare.

After 1994, Tennessee's neighboring states experienced robust declines in their mortality rates, but the decline in Tennessee was much more modest. In the four years following TennCare's enactment, the average decline in mortality rates in the surrounding states was 5.2 percent compared to a 2.1 percent decline in Tennessee. The decline in mortality rates in Tennessee was actually the smallest of all the states in the region.[119] While not definitive, these findings increase doubt on the estimates provided by Dorn and others about the magnitude of the impact of health insurance on mortality, particularly when the increased coverage is the result of a public insurance expansion.

---

[119] The following are the percentage declines in state mortality rates between 1994 and 1998: Alabama: -2.8 percent, Arkansas: -4.0 percent, Georgia: -6.0 percent, Kentucky: -6.0 percent, Mississippi: -3.8 percent, Missouri: -6.3 percent, North Carolina: -7.5 percent, Tennessee: -2.1 percent, and Virginia: - 5.5 percent.

VIII. Conclusion

The central provisions of TennCare – large Medicaid expansion, health insurance

subsidies, and an emphasis on managed care – are key components of the Patient

Protection and Affordable Care Act (PPACA). At the time it was enacted, PPACA made

it federal law that by 2014 states enroll all uninsured individuals with incomes below 133

percent of the federal poverty level (FPL) into their Medicaid programs. States that did

not expand Medicaid program eligibility would lose all their federal Medicaid funding.

In June 2012, the Supreme Court ruled that this provision was unduly coercive on

states and effectively made the Medicaid expansion optional. Although the expansion is

optional, the federal government incentivized state participation by agreeing to pay 100

percent of the costs of the expansion population, which will vary by state based upon how

generous state eligibility was when PPACA was enacted, from 2014 through 2016 and at

least 90 percent of the costs thereafter. The Congressional Budget Office projects this

will result in 11 million non-elderly individuals being newly enrolled in Medicaid by

2015.[120]

PPACA also establishes state-based health insurance exchanges that offer

government subsidies for the purchase of health insurance for individuals in certain

households between 133 percent and 400 percent of the FPL.[121] CBO estimates that by

2015 roughly 13 million individuals will receive health insurance through these state

exchanges and by 2016 roughly 24 million individuals will receive health insurance

---

[120] Congressional Budget Office. (2013). *February 2013 Estimate of the Affordable Care Act on Health Insurance Coverage.* Available at:
http://cbo.gov/sites/default/files/cbofiles/attachments/43900_ACAInsuranceCoverageEffects.pdf.
[121] Individuals in households who do not have an offer of employer-sponsored insurance that meets certain conditions of the law are not eligible for the subsidies.

through these state exchanges. Most of the individuals purchasing coverage in an exchange will receive government subsidies to purchase coverage. PPACA is projected to increase the number of Americans with health insurance by 7 percent by 2015 and by 9 percent by 2016.[122] If these estimates are accurate, PPACA's effect on health insurance coverage will be nearly two-thirds greater than the relative size of the TennCare expansion. Moreover, PPACA emphasizes managed care with the creation of 'Accountable Care Organizations.' The significant similarities between the two reforms indicate that TennCare's outcomes can provide some insight into the impact of PPACA.

The expansion of Medicaid through TennCare greatly increased public outlays in Tennessee. Between 1993 and 1998, Medicaid spending in Tennessee increased 66 percent compared to a national increase of 36 percent.[123] The increased public spending eventually led to a downsizing of TennCare in 2005 (Chang 2007). However, to determine the overall impact of TennCare, it is also necessary to weigh the resulting change in population health.

The evidence suggests that utilization of some aspects of preventive care increased in Tennessee after TennCare as more Tennesseans received blood pressure checks and cholesterol checks relative to the surrounding region. However, after TennCare, fewer women reported having seen a doctor for a routine checkup within the past two years. And more high school dropouts reported not seeing a doctor because of cost. Furthermore, because of both the relatively small decline in mortality rates and

---

[122] Congressional Budget Office. (2013). *February 2013 Estimate of the Affordable Care Act on Health Insurance Coverage.* Available at:
http://cbo.gov/sites/default/files/cbofiles/attachments/43900_ACAInsuranceCoverageEffects.pdf.
[123] Centers for Medicare and Medicaid Services, Office of the Actuary, National Health Statistics Group, *United States Personal Health Care Expenditures, 1991-2004*.

worse self-reported health in Tennessee after TennCare, it is possible that TennCare adversely impacted the Tennessee health care system.

There are several explanations for why TennCare might have resulted in a negative overall health impact for people in the state. For instance, an expansion of public health insurance programs will have many secondary effects. One effect, and perhaps the best documented, is the crowd out of private insurance coverage. Crowd out is a significant feature of public insurance expansions, as Gruber and Simon estimated a 60 percent crowd-out rate for Medicaid and the Children's Health Insurance Program (CHIP) expansions (Gruber and Simon 2008). Crowding out private health insurance may have a negative overall health impact if individuals with private insurance receive superior health care treatment compared to individuals with public insurance.

In addition, there are many unintended and even difficult to foresee health effects associated with the impact of an expansion of public health insurance on the health care infrastructure. By increasing the demand for medical care, relative to supply, the average quality of care received by patients may decline if medical providers reallocate their time and services to more patients. Additionally, expanding health insurance coverage may cause some individuals with more pressing health care needs to be crowded out by newly covered individuals with less pressing needs. If individuals with less pressing health care needs had remained uninsured, they might not have sought medical care, freeing providers to treat individuals with more pressing health care needs. One other possible reason for an adverse outcome in population health from an insurance expansion is the

possibility that fewer people receive routine checkups because the insurance reduces the risk of a financial loss from a preventable condition.

One reason to expect that health insurance expansions might not have large impacts on health, one way or the other, is because a substantial amount of research has shown that medical care contributes relatively little, on average, to an individual's overall health. According to a study by McGinnis et al. (2002), only about 10 percent of early deaths are attributable to shortfalls in medicine. The study estimated that behavioral patterns, genetic predispositions, and social circumstances account for about 85 percent of early deaths.

This paper provides evidence that large public health insurance expansions do not lead to significant increases in utilization of health care services or health outcomes as measured in the population. There are important secondary effects associated with public insurance expansions that may offset, at least partially, the goal of the reform. Overall, the lack of an improvement in the health of Tennesseans in the years following TennCare suggests that there are likely more cost-effective ways to improve overall population health than through a large public insurance expansion.

Table 1: Impact of TennCare

The data come from the Behavioral Risk Factor Surveillance System. The control states are Alabama, Arkansas, Georgia, Kentucky, Mississippi, Missouri, North Carolina, and Virginia. HLTHCOV refers to the percentage of individuals in the state who self-report that they have insurance coverage. GENHLTH is a self-reported measure of health with a range of excellent (a score of four) to poor (a score of zero). COST refers to the percentage of individuals in the state who 'needed' to see a doctor in the last 12 months, but did not because of cost. CHECKUP measures the percentage of individuals who have had a routine doctor checkup in the last two years. FLUSHOT measures the percentage of individuals who have had a flu shot in the past year. BPRCHECK measures the percentage of individuals who have had their blood pressure checked within the past year. CHCHECK measures the percentage of individuals who have had their cholesterol checked within the past two years. The 1991 to 1993 average is the average of the variables in either Tennessee or the control states for individual observations between 1991 and 1993. The 1995 to 1998 average is the same average, except for the years between 1995 and 1998. The first difference is the underlying trend in Tennessee and the control states. The difference-in-difference is the trend in the control states subtracted by the trend in Tennessee. Appendix A includes the exact questions and available responses.

Tennessee	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
91-93 avg	83.21%	2.67	15.41%	85.95%	16.18%	90.28%	61.94%
95-98 avg	86.87%	2.58	13.66%	85.85%	23.11%	90.25%	63.24%
DIFF	3.66%	-0.09	-1.75%	-0.10%	6.93%	-0.03%	1.30%
Control States	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
91-93 avg	83.50%	2.69	16.23%	82.37%	13.97%	89.76%	58.35%
95-98 avg	84.03%	2.63	14.65%	82.30%	19.94%	86.73%	56.79%
DIFF	0.53%	-0.06	-1.58%	-0.07%	5.97%	-3.03%	-1.56%
	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
DIFF-in-DIFF	3.13%	-0.03	-0.17%	-0.03%	0.96%	3.00%	2.86%

Table 2: Impact of TennCare on Males

See the remarks in Table 1.							
Tennessee	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
91-93 avg	82.35%	2.74	11.85%	79.45%	18.34%	86.40%	59.71%
95-98 avg	85.12%	2.63	10.81%	77.75%	22.44%	85.93%	57.78%
DIFF	2.77%	-0.11	-1.04%	-1.70%	4.10%	-0.47%	-1.93%
Control States	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
91-93 avg	84.31%	2.74	11.54%	75.51%	15.16%	86.25%	56.01%
95-98 avg	84.92%	2.67	10.52%	73.69%	20.84%	81.42%	53.58%
DIFF	0.61%	-0.07	-1.02%	-1.82%	5.68%	-4.83%	-2.43%
	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
DIFF-in-DIFF	2.16%	-0.04	-0.02%	0.12%	-1.58%	4.36%	0.50%

Table 3: Impact of TennCare on Females

See the remarks in Table 1.							
Tennessee	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
91-93 avg	83.87%	2.61	18.17%	90.96%	14.41%	93.29%	63.68%
95-98 avg	87.98%	2.55	15.47%	90.95%	23.54%	93.07%	66.79%
DIFF	4.11%	-0.06	-3.30%	-0.01%	9.13%	-0.22%	3.11%
Control States	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
91-93 avg	82.88%	2.66	19.77%	87.51%	13.07%	92.41%	60.11%
95-98 avg	83.43%	2.61	17.47%	88.11%	19.32%	90.40%	59.00%
DIFF	0.55%	-0.05	-2.30%	0.60%	6.25%	-1.99%	-1.11%
	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
DIFF-in-DIFF	3.56%	-0.01	-1.00%	-0.61%	2.88%	1.77%	4.22%

Table 4: Impact of TennCare on High School Graduates

See the remarks in Table 1.

Tennessee	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
91-93 avg	86.11%	2.80	13.83%	86.09%	16.33%	90.75%	63.13%
95-98 avg	88.42%	2.70	11.98%	85.98%	23.16%	90.46%	64.26%
DIFF	2.31%	-0.10	-1.85%	-0.11%	6.83%	-0.29%	1.13%
Control States	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
91-93 avg	86.36%	2.82	14.13%	82.83%	13.83%	90.28%	59.46%
95-98 avg	86.45%	2.75	12.72%	82.82%	20.03%	87.32%	57.73%
DIFF	0.09%	-0.07	-1.41%	-0.01%	6.20%	-2.96%	-1.73%
	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
DIFF-in-DIFF	2.22%	-0.03	-0.44%	-0.10%	0.63%	2.65%	2.86%

Table 5: Impact of TennCare on High School Dropouts

See the remarks in Table 1.

Tennessee	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
91-93 avg	68.97%	1.92	23.33%	85.22%	15.03%	87.97%	56.10%
95-98 avg	76.96%	1.81	24.47%	84.94%	22.71%	88.89%	56.73%
DIFF	7.99%	-0.11	1.14%	-0.28%	7.68%	0.92%	0.63%
Control States	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
91-93 avg	67.36%	1.96	28.01%	79.73%	14.71%	86.79%	51.95%
95-98 avg	68.32%	1.91	27.25%	78.93%	19.40%	83.29%	51.05%
DIFF	0.96%	-0.05	-0.76%	-0.80%	4.69%	-3.50%	-0.90%
Control States	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
DIFF-in-DIFF	7.03%	-0.06	1.90%	0.52%	2.99%	4.42%	1.53%

Table 6a: Estimated Impact of TennCare

The coefficients represented in the table are from the TENNCARE variable and the data comes from the Behavioral Risk Factor Surveillance System. The controls in Table 6a are: age and body mass index as well as dummy variables for high school graduates, college graduates, married, gender, race, self-employed, retired, home-maker, unemployed, and current students.
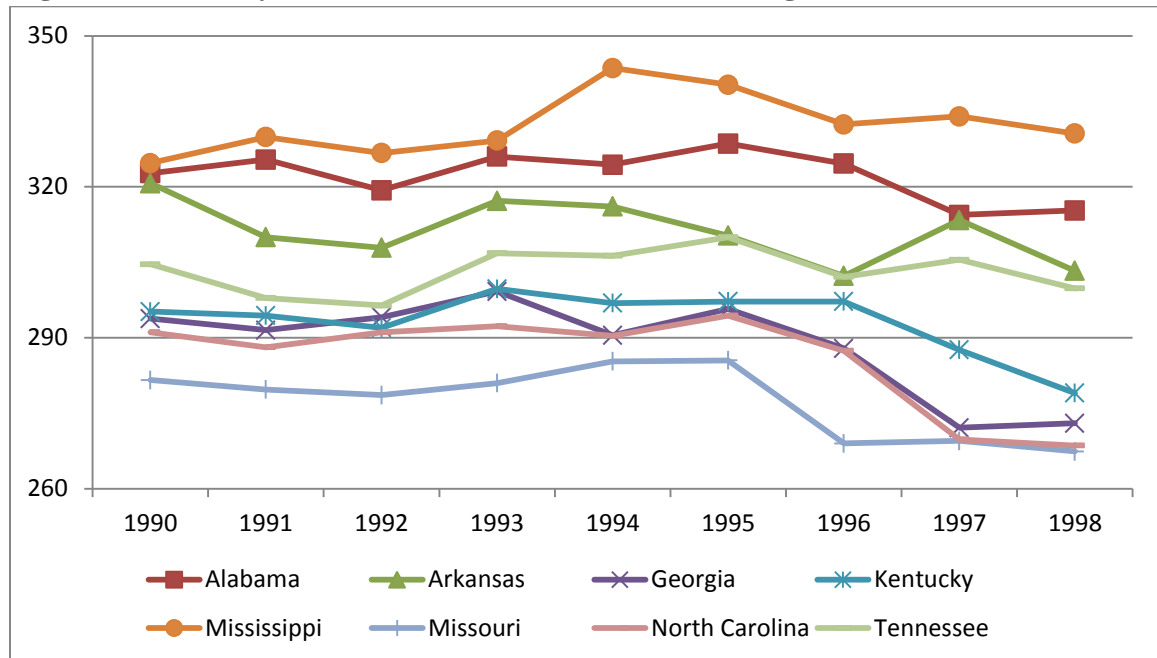
	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
All	0.0214	-0.0515	-0.0025	-0.0130	0.0097	0.0186	0.0160
	(0.0070)**	(0.0278)*	(0.0068)	(0.0074)*	(0.0123)	(0.0072)**	(0.0109)
	n=103,405	n=78,386	n=102,074	n=102,704	n=45,589	n=70,653	n=70,657
Males	0.0118	-0.0472	-0.0001	0.0007	0.0004	0.0356	-0.0074
	(0.0105)	(0.0421)	(0.0092)	(0.0133)	(0.0191)	(0.0127)**	(0.0167)
	n=43,761	n=32,813	n=43,664	n=43,009	n=19,382	n=30,345	n=30,346
Females	0.0258	-0.0533	-0.0026	-0.0201	0.0174	0.0065	0.0324
	(0.0094)**	(0.0370)	(0.0096)	(0.0084)*	(0.0161)	(0.0083)	(0.0143)**
	n=59,644	n=45,573	n=59,537	n=59,065	n=26,207	n=40,308	n=40,311
HS Grad	0.0225	-0.0332	-0.0073	-0.0138	-0.0014	0.0172	0.0201
	(0.0068)**	(0.0292)	(0.0070)	(0.0080)*	(0.0134)	(0.0077)**	(0.0118)*
	n=88,958	n=67,881	n=88,800	n=87,881	n=39,153	n=60,296	n=60,298
Non-HS Grad	0.0475	-0.1620	0.0174	0.0008	-0.0125	0.0290	-0.0078
	(0.0237)**	(0.0835)*	(0.0223)	(0.0206)	(0.0336)	(0.0206)	(0.0283)
	n=14,447	n=10,505	n=14,401	n=14,193	n=6,436	n=10,357	n=10,359

Table 6b: Estimated Impact of TennCare Estimate, Excluding Possible Endogenous Controls

The coefficients represented in the table are from the TENNCARE variable and the data comes from the Behavioral Risk Factor Surveillance System. Because many of the controls listed in Table 6a could be endogenous, the estimates in Table 6b only include controls for age, gender, and race.

	HLTHCOV	GENHLTH	COST	CHECKUP	FLUSHOT	BPRCHECK	CHCHECK
All	0.0285	-0.0350	0.0067	-0.0085	0.0077	0.0238	0.0205
	(0.0064)**	(0.0259)	(0.0060)	(0.0065)	(0.0107)	(0.0067)**	(0.0102)**
	n=109,431	n=83,662	n=109,201	n=107,982	n=47,109	n=72,965	n=72,970
Males	0.0201	-0.0393	0.0061	-0.0026	-0.0136	0.0395	0.0036
	(0.0098)**	(0.0392)	(0.0082)	(0.0118)	(0.0168)	(0.0121)**	(0.0160)
	n=45,207	n=34,156	n=45,101	n=44,413	n=19,576	n=30,665	n=30,667
Females	0.0321	-0.0285	0.085	-0.0104	0.0226	0.0133	0.0319
	(0.0085)**	(0.0345)	(0.0084)	(0.0073)	(0.0138)	(0.0077)*	(0.0133)**
	n=64,224	n=49,506	n=64,100	n=63,569	n=27,533	n=42,300	n=42,303
HS Grad	0.0196	-0.0298	0.0013	-0.0080	0.0044	0.0217	0.0220
	(0.0065)**	(0.0267)	(0.0062)	(0.0070)	(.0116)	(0.0072)**	(0.0110)**
	n=93,910	n=72,238	n=93,734	n=92,747	n=40,387	n=62,154	n=62,156
Non-HS Grad	0.0616	-0.0615	0.0357	-0.0082	0.0277	0.0327	-0.0032
	(0.0208)**	(0.0746)	(0.0192)*	(0.0177)	(0.0276)	(0.0192)*	(0.0265)
	n=15,377	n=11,302	n=15,326	n=15,101	n=6,677	n=10,730	n=10,733

Figure 1: Mortality Rates for Tennessee and Surrounding States

The measure on the vertical axis is the crude mortality rate for people aged 15-64. The crude mortality rate is the number of deaths per 100,000 people per year. The figures exclude accidental or intentional deaths and are from the Centers for Disease Control and Prevention, CDC Wonder database of compressed mortality, 1979-1998. Between 1994 and 1998, mortality rates fell in all eight states but they fell the least in Tennessee. The following are the percentage declines in state mortality rates between 1994 and 1998: Alabama: -2.8 percent, Arkansas: -4.0 percent, Georgia: -6.0 percent, Kentucky: -6.0 percent, Mississippi: -3.8 percent, Missouri: -6.3 percent, North Carolina: -7.5 percent, Tennessee: -2.1 percent, and Virginia: -5.5 percent. Virginia is not shown in the graph because it has a significantly lower mortality rate throughout the period to the rest of the states. Virginia's crude adjusted mortality rate went from 252.1 in 1990 to 250.7 in 1994 to 237 in 1998.

PAPER 4: CONCLUSIONS

While there are many different federal programs and policies that subsidize health care consumption, the three largest are the tax exclusion for employer-sponsored health insurance, the Medicare program, and the Medicaid program. The largest tax deduction in the tax code is the exclusion of the price of employer-sponsored health insurance from federal income taxes and federal payroll taxes. The Medicare program subsidizes health care consumption for seniors and certain individuals enrolled in the Social Security Disability Insurance program, and the Medicaid program subsidizes the provision of health care and long-term care services and supports for lower-income individuals, seniors, and individuals with disabilities. These programs and policies, as well as many others, cause the health care sector to be larger than it would be otherwise.

My dissertation focused on the economics of the Medicaid program. According to the statutory formula, the federal government typically reimburses 50 percent of Medicaid spending in the wealthiest states and about 75 percent in the poorest states. In the aggregate, the federal government has historically reimbursed slightly less than 60 percent of state Medicaid spending. The growth in Medicaid over the past two decades has been substantial. In 1990, the United States expended about 1.27 percent of Gross Domestic Product through Medicaid. By 2011, this percentage increased to 2.70 percent and the percentage is expected to increase to 3.80 percent by 2020.

A key finding from my first paper, *Subsidizing Medicaid Growth – The Impact of the Federal Reimbursement on State Medicaid Programs*, was the high correlation between the number of Medicaid recipients in a state's program as well as state Medicaid spending with the percentage of state Medicaid spending reimbursed by the federal government (the state FMAP) after controlling for many confounding factors. I found that a one percentage point higher FMAP was associated with between $5 and $16 in greater per capita state Medicaid spending[124] and between 0.04 percent and 0.29 percent more program recipients depending on the functional specification. The results from the Alaska case study showed Alaska's Medicaid spending and enrollment increased substantially after its 50 percent effective FMAP increase between 1998 and 1999. Moreover, I found that the FMAP increase stimulated Alaska's Medicaid spending with state-raised revenue. My findings in the first dissertation paper bolster previous economic studies that found that lower-level government size tends to increase when lower-level government programs are funded by intergovernmental matching grants from upper-level government.

The uncapped federal Medicaid reimbursement, which is essentially a matching grant, produces both a substitution effect and an income effect. The substitution effect significantly decreases the price of Medicaid relative to other categories of state expenditures.[125] Basic economic theory shows that consumers who only bear a fraction of the price of items will tend to consume these items beyond the optimal point. As such,

---

[124] These values, which are in 2012 dollars, adjust the monetary values in the first dissertation paper which were presented in 2000 dollars.

[125] In the first dissertation paper, I showed that a ten percent increase in a state FMAP from 50 percent to 60 percent actually increases the effective federal reimbursement by 50 percent and not ten percent.

economists and policymakers should be concerned about the distortionary effect of the federal Medicaid reimbursement which directs resources into the health care and long-term care sectors that would likely be better directed elsewhere.

In my second dissertation paper, *Impact of Hospital and Nursing Home Taxes on State Medicaid Spending,* I discuss many of the methods, such as provider donations, provider taxes, and intergovernmental transfers, used by states over the past two decades to depress the state share of Medicaid expenditures. In this paper, I explain how the provider tax mechanism allows states to increase federal funding received by the state without net state expenditures from state revenue sources. As a result of heightened state budget pressure from the recession and weak recovery as well as increased Medicaid rolls, many states enacted provider taxes during the last five years.

I found that states that added provider taxes used the increased federal funds primarily to increase spending on the provider class subject to the tax. Specifically, I found that states increased average annual Medicaid spending received by hospitals by 14 percent in the first two years that states enacted hospital taxes and that states increased average annual Medicaid spending received by nursing homes by 10 percent in the first two years that states enacted nursing home taxes all else equal. I also found evidence that states with hospital taxes increased total Medicaid spending more than states without hospital taxes during the economic downturn and initial recovery period and that states that enacted nursing home taxes during this period diverted Medicaid spending from home and community based services to nursing homes.

The Government Accountability Office (GAO) and the Medicaid Payment and Access Commission have both written about the substantial complexity of the rules governing Medicaid financing (GAO 2004; MACPAC 2012). Much of the complexity stems from federal regulations promulgated in response to state techniques, like provider taxes, which effectively subvert the federal requirements that states spend state-raised tax revenue as a condition of receiving federal matching funds. The complexity of the rules has led to widespread state use of contingency-fee consultants for the purpose of maximizing federal funds coming in through the Medicaid program (GAO 2004). One problem, in particular, that has been highlighted by GAO are large Medicaid payments, often supplemental payments, to state or local government-operated facilities, that are made with the purpose of increasing federal funds coming to the state.

In 2004, GAO reported that the federal government has failed to adequately monitor schemes developed by states even though the schemes may be inconsistent with federal requirements (GAO 2004). As an extreme example of the problem, in 2012, the Inspector General for the Department of Health and Human Services released a report about excessive payment rates received by State-operated institutions for the developmentally disabled in the State of New York (HHS OIG 2012). In fiscal year 2011, about a dozen of these institutions were receiving daily payments exceeding $5,000 per patient. These payment rates were four times the reported costs of housing and treating the individuals residing in these facilities. A congressional Committee estimated that the *federal* share of the payments in excess of allowable costs under federal law

equaled about $15 billion over the past two decades (Committee on Oversight and Government Reform 2012).

It is important for policymakers to understand that the financing techniques employed by states, such as provider taxes and large supplemental payments to public providers, do not simply transfer costs from state taxpayers to federal taxpayers. The resources employed by states to maximize the federal Medicaid reimbursement, including the work of contingency fee consultants, is almost pure deadweight loss as those resources are involved with redistribution and not production. Moreover since the uncapped federal Medicaid reimbursement incentivizes states to game the federal Medicaid reimbursement, a federal bureaucracy has formed with the task of reducing inappropriate state Medicaid spending. A large part of the federal bureaucracy would be unnecessary if the incentives at the core of the Medicaid program were better aligned.

Probably more important than the deadweight loss of individuals engaging in socially unproductive activities for economic efficiency considerations, creative financing techniques, like provider taxes and supplemental payments, reduce the transparency of the cost of the Medicaid program to state policymakers. As a result, these techniques reduce the incentive of states to ensure that Medicaid expenditures obtain adequate value to justify the spending and lead to a reduction in the efficiency of state Medicaid programs. The root cause of the problem is the uncapped federal Medicaid reimbursement. The financing techniques discussed in the second dissertation paper would be counterproductive if the federal financing of state Medicaid programs did not take the form of an uncapped matching grant.

159

My final dissertation paper, *Statewide Health Impact of Tennessee's Medicaid Expansion*, assessed the health impact of the largest increase in the size of a state Medicaid program over the past two decades. I found evidence that TennCare, Tennessee's Medicaid expansion in 1994, was largely unsuccessful in the first four years of its enactment. While the paper did not directly assess the impact of TennCare on individuals who gained Medicaid coverage, I assessed the trends in several indicators of health care utilization, access to care, and health status for Tennessee's population versus the population in surrounding states. Assessing the trends in the population allowed me to account for important secondary factors, such as the impact of the expansion on individuals who were already insured. I found evidence that – relative to the surrounding states – some measures of utilization (blood pressure checks and cholesterol checks) increased in Tennessee after TennCare but self-reported health and mortality rates were less favorable in Tennessee after TennCare. I also found that TennCare did not have a beneficial impact on individuals who failed to graduate high school, a subgroup that Tennessee's Medicaid expansion was more likely to directly impact.

Finally, the results from my dissertation enable me to make several predictions about the impact of the Medicaid expansion contained in the Patient Protection and Affordable Care Act. The federal government has enticed states to expand Medicaid by offering a 100 percent FMAP for the expansion population for the years 2014 through 2016. While the FMAP for the expansion population gradually declines to 90 percent by 2020, current law maintains the 90 percent FMAP indefinitely. States with provider taxes in place in 2014, particularly hospital taxes and nursing home taxes, will result in

states receiving a windfall from the expansion population as adding individuals to the Medicaid program at a 100 percent federal match will increase federal funding to state Medicaid programs by an amount in excess of 100 percent of the cost of the expansion population because of the provider tax mechanism.

I predict that in many states the Medicaid expansion will cause states to spend additional state resources on Medicaid since the high FMAP makes the Medicaid expansion very lucrative for states. If left unchanged, I predict that the ideological opposition to the Medicaid expansion will weaken over time and nearly every state will expand their program as interest group pressure intensifies. However, given the projected strain on the federal budget as the retirement of baby boomers intensifies and Medicaid's sizeable and growing share of federal spending, I predict intensified fights over Medicaid policy in future years and that federal policymakers will realize that the easiest types of program reforms will be making perverse financing mechanisms, such as provider taxes, more difficult to utilize.

I believe economic theory indicates that PPACA's Medicaid expansion will increase the inefficiency of state Medicaid programs as states will have less incentive to be wise stewards of taxpayer dollars. If the results I found for Tennessee after TennCare apply more broadly, then the national Medicaid expansion is unlikely to produce measurable gains in population health although as the Oregon Medicaid experiment shows there will certainly be gains that result from individuals feeling less prone to severe financial loss from an adverse health event. However, I believe the weight of the current evidence, which does not indicate significant positive health benefits from

expanded public health insurance, indicates that the rising share of Medicaid spending

will not make the United States better off on the whole.

APPENDIX:
DEPENDENT VARIABLES UTILIZED FROM THE BRFSS

Would you say that in general your health is: (GENHLTH)	4 = Excellent 3 = Very good 2 = Good 1 = Fair 0 = Poor
Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare? (HLTHPLAN)	1 = Yes 0 = No
Was there a time during the last 12 months when you needed to see a doctor, but could not because of the cost? (MEDCOST)	1 = Yes 0 = No
About how long has it been since you last visited a doctor for a routine checkup? (CHECKUP)	1 = Within the past 2 years 0 = Longer than 2 years
Q1: About how long has it been since you last had your blood pressure taken by a doctor, nurse, or other health professional? (BPTAKE)	1 = Within the past year 0 = Longer than a year
Q2: About how long has it been since you last had your blood cholesterol checked? (CHOLCHK)	1 = Within the past 2 years 0 = Longer than 2 years
Q1: During the past 12 months, have you had a flu shot? (FLUSHOT)	1= Yes 0= No

REFERENCES

Paper 1: Subsidizing Medicaid Growth – The Impact of the Federal Reimbursement on State Medicaid Programs

Adams, E. Kathleen and Martcia Wade. (2001). Fiscal Response to a Matching Grant: Medicaid Expenditures and Enrollments, 1984-1992. *Public Finance Review* 29, 26-48.

Alesina, Alberto, Glaeser, Edward, and Sacerdote, Bruce. (2001). Why Doesn't the United States Have a European-Style Welfare State? *Brookings Papers on Economic Activity*, Vol. 2, 187-254.

Baughman, Reagan and Milyo, Jeffrey. (2008). How Do States Formulate Medicaid and SCHIP Policy? Economic and Political Determinants of State Eligibility Levels (Working Paper 08-13). Retrieved from: http://economics.missouri.edu/working-papers/2008/WP0813_milyo.pdf.

Bradford, David F. and Oates, Wallace E. (1971). Towards a Predictive Theory of Intergovernmental Grants. *The American Economic Review* 61, 440-448.

Buchanan, James. (1977). Why Does Government Grow? In *Budgets and Bureaucrats*, edited by Thomas Borcherding, 3-18. Durham, N.C.: Duke University Press.

Buchanan, Robert J., et al. (1991). The Social Environment and Medicaid Expenditures: Factors Influencing the Level of State Medicaid Spending. *Public Administration Review* 51: 67-73.

Careaga, Maite and Barry R. Weingast. (2000). The Fiscal Pact with the Devil: A Positive Approach to Fiscal Federalism, Revenue Sharing, and Good Governance. Paper presented at the Conference on Political Institutions and Economic Growth in Latin America, April, Stanford, Calif.

Coughlin, Teresa A. and Stephen Zuckerman. (2002). States' Use of Medicaid Maximization Strategies to Tap Federal Revenues: Program Implications and Consequences (Urban Institute Discussion Papers). Retrieved from: http://www.urban.org/UploadedPDF/310525_DP0209.pdf.

Courant, Paul N., Edward M. Gramlich, and Daniel L. Rubinfeld. (1979). Intergovernmental Grants: Or Why Money Sticks Where It Hits. The Urban Institute.

Currie, Janet and Jonathan Gruber. (1996). Saving Babies: The Efficacy and Cost of Recent Changes in Medicaid Eligibility of Pregnant Women. *Journal of Political Economy*, 104: 1263-96

Grogan, Colleen M. (1994). Political-Economic Factors Influencing State Medicaid Policy. *Political Research Quarterly* 47: 589-622.

Grossman, Philip J. (1989). Fiscal Decentralization and Government Size: An Extension. *Public Choice,* 62: 63– 69

Grossman, Philip J. and Edwin G. West. (1994). Federalism and the Growth of Government Revisited. *Public Choice,* 79: 19–32

Gruber, Jonathan and Kosali Simon. (2007). Crowd-out 10 years later: Have recent public insurance expansions crowded out private health insurance? *Journal of Health Economics,* 27 (2008) 201-217.

Hanson, Russell L. (1984). Medicaid and the Politics of Redistribution. *American Journal of Political Science* 28(2): 313-39.

Hines, James R. and Thaler, Richard. (1995). The Flypaper Effect. *The Journal of Economic Perspectives*, Vol. 9, No. 4, pp. 217-226

Holahan, John F. (2007). State Variation in Medicaid Spending: Hard to Justify. *Health Affairs* 26: w667–669.

Holahan, John F. and Cohen, Joel W. (1986). *Medicaid: The Trade-Off between Cost Containment and Access to Care.* The Urban Institute

Inman, Robert P. (2008). The Flypaper Effect. National Bureau of Economic Research Working Paper 14579.

Kronebusch, K. (1993). Medicaid Politics: Policymaking Contexts and the Politics of Group Differences in the American States. Ph.D. dissertation, Harvard University.

Kousser, Thad. (2002). The Politics of Discretionary Medicaid Spending, 1980-1993. *Journal of Health Politics, Policy and Law*, Vol. 27, No. 4: 639-71.

McGinnis J. Michael, Williams-Russo P., Knickman, JR. (2002). "The case for more active policy attention to health promotion," Health Affairs 21, no. 2: 78-93.

Oates, Wallace E. (1991). On the Nature and Measurement of Fiscal Illusion: A Survey. In *Studies in Fiscal Federalism*, edited by Wallace Oates, 431-48. Brookfield, Vt.: Edward Elgar.

Oates, Wallace E. (1999). An Essay on Fiscal Federalism. *Journal of Economic Literature* 37, 1120-1149

Rodden, Jonathan. (2003). Reviving Leviathan: Fiscal Federalism and the Growth of Government. *International Organization* 57, 695-729.

Weingast, Barry, Shepsle, Kenneth and Johnsen, Christopher. (1981). The Political Economy of Benefits and Costs: A Neoclassical Approach to Distributive Politics. *Journal of Political Economy* 89, 642-664.

Paper 2: Impact of Hospital and Nursing Home Taxes on State Medicaid Spending

Blase, Brian C. (2013). Subsidizing Medicaid Growth: The Impact of the Federal Reimbursement on State Medicaid Programs, Dissertation for PhD at George Mason University.

Congressional Research Service, Medicaid Provider Taxes, March 15, 2012.

Coughlin, Teresa A., Bruen, Brian K. and King, Jennifer. (2004) States' Use of Medicaid UPL And DSH Financing Mechanisms, *Health Affairs* 23 no. 2: 245-57.

Coughlin, Teresa A., and Ku, Lexington. (1994). *Medicaid: Disproportionate Share and Other Special Financing Programs – A Fiscal Dilemma for States and the Federal Government*, Urban Institute.

Coughlin, Teresa A., Zuckerman, Stephen and McFeeters, Joshua. (2007). Restoring Fiscal Integrity to Medicaid Financing? *Health Affairs* 26 no. 5: 1469-1480

U.S. Government Accountability Office. (2003, October). Medicaid Nursing Home Payments: States' Payment Rates Largely Unaffected by Recent Fiscal Pressures. (Publication No. GAO-04-143).

U.S. Government Accountability Office. (2004, February). Medicaid – Improved Federal Oversight of State Financing Schemes Is Needed. (Publication No. GAO-04-228).

U.S. Government Accountability Office. (2010, September). Recovery Act:
Opportunities to Improve Management and Strengthen Accountability over States'
and Localities' Use of Funds. (Publication No. GAO-10-999).

U.S. Government Accountability Office. (2012, November). States Made Multiple
Program Changes, and Beneficiaries Generally Reported Access Comparable to
Private Insurance. (Publication No. GAO-13-55).

Grabowski, David C., Feng, Zhanlian and Mor, Vincent. (2008). Medicaid Nursing
Home Payment and the Role of Provider Taxes. *Medical Care Research and
Review*.

Ku, Lexington and Coughlin, Teresa A. (1995). Medicaid disproportionate share and
other special financing programs. *Health Care Financing Review* 16 no. 3: 27-54.

Medicaid and CHIP Payment and Access Commission. Report to the Congress on
Medicaid and CHIP, March 2012.

Miller, Edward Alan and Wang, Lili. (2009). Maximizing Federal Medicaid Dollars:
Nursing Home Provider Tax Adoption, 2000-2004. *Journal of Health Politics,
Policy and Law*, Vol. 34 no. 6.

National Association of State Budget Officers. (2011, December). Fiscal Year 2010
State Expenditure Report: Examining Fiscal 2009-2011 State spending.

National Association of State Budget Officers. (2012, December). State Expenditure
Report: Examining Fiscal 2010-2012 State Spending.

Smith, Vernon K., Gifford, Kathleen, Ellis, Eileen, Rudowitz, Robin, O'Malley, Molly
and Marks, Caryn. (2007, October). As Tough Times Wane, States Act to Improve
Medicaid Coverage and Quality: Results from a 50-State Medicaid Budget Survey
for State Fiscal Years 2007 and 2008, Kaiser Commission on Medicaid and the
Uninsured.

Smith, Vernon K., Gifford, Kathleen, Ellis, Eileen, Rudowitz, Robin, and Snyder, Laura.
(2010, September). Hoping for Economic Recovery, Preparing for Health Reform:
A Look at Medicaid Spending, Coverage and Policy Trends, Results from a 50-State
Medicaid Budget Survey for State Fiscal Years 2010 and 2011, Kaiser Commission
on Medicaid and the Uninsured.

Smith, Vernon K., Gifford, Kathleen, Ellis, Eileen, Rudowitz, Robin, and Snyder, Laura. (2011, October). Moving Ahead Amid Fiscal Challenges: A Look at Medicaid Spending, Coverage and Policy Trends, Results from a 50-State Medicaid Budget Survey for State Fiscal Years 2011 and 2012. Kaiser Commission on Medicaid and the Uninsured.

Smith, Vernon K., Gifford, Kathleen, Ellis, Eileen, Rudowitz, Robin, and Snyder, Laura. (2012, October). Medicaid Today; Preparing for Tomorrow: A Look at State Medicaid Program Spending, Enrollment and Policy Trends, Results from a 50-State Medicaid Budget Survey for State Fiscal Years 2012 and 2013. Kaiser Commission on Medicaid and the Uninsured.

Stoil, Michael J. (2006) When nursing homes want to be taxed. *Nursing Homes: Long Term Care Management*, Vol. 55 Issue 9: 12-13.

Woodward, Bob. (2012). *Price of Politics*. New York: Simon and Schuster.

Paper 3: Statewide Health Impact of Tennessee's Medicaid Expansion

Calvin JE, Roe MT, Chen AY, Mehta RH, Brogan GX Jr., Delong ER, Fintel DJ, Gibler WB, Ohman EM, Smith SC Jr., Peterson ED. (2006). Insurance Coverage and Care of Patients with Non-ST-Segment Elevation Acute Coronary Syndromes. *Annals of Internal Medicine*, Vol. 145, No. 10: 739-48.

Chang, C.F. (2007) Evolution of TennCare Yields Valuable Lessons. *Managed Care*: 45-9.

Cunningham, Peter J. and May, Jessica H. (2006). Medicaid Patients Increasingly Concentrated Among Physicians. *Center for Studying Health System Change Tracking Report* No. 16.

Currie, Janet and Gruber, Jonathan. (1996). Health insurance eligibility, utilization of medical care and child health. *Quarterly Journal of Economics*, Vol. 111, Issue 2: 431-66.

Currie, Janet and Gruber, Jonathan Gruber. (1996). Saving babies the efficacy and cost of recent changes in the Medicaid eligibility of pregnant women. *Journal of Political Economy*, Vol. 104, Issue 6: 1263-96.

Currie, Janet and Gruber, Jonathan. (1997). The technology of birth: health insurance, medical interventions and infant health. (National Bureau Economic Research Working Paper 5985).

Davern M, Klerman JA, Baugh DK, Callt KT, Greenberg GD. (2009). An Examination of the Medicaid Undercount in the CPS: Preliminary Results from Record Linking. *Health Services Research*, Vol. 44, Issue 3: 965-987.

Dorn, Stan. (2008). Uninsured and dying because of it: updating the Institute of Medicine analysis on the impact of uninsurance on mortality. Urban Institute

Franks P, Clancy CM, and Gold MR. (1993) Health Insurance and Mortality: Evidence from a National Cohort. *Journal of American Medical Association*, Vol. 270, No. 6: 737-41.

Goldman Dana P., Bhattacharya, Jayanta, McCaffrey, Daniel F., Duan, Naihua, Leibowitz, Arleen A., Joyce, Geoffrey F., and Morton, Sally C. (2001). The effect of insurance on mortality in an HIV+ population in care. *Journal American Statistical Association*, Vol. 96, Issue 455:883-94.

Gruber, Jonathan and Simon, Kosali. (2008). Crowd-Out 10 Years Later: Have Recent Public Insurance Expansions Crowded Out Private Health Insurance?" *Journal of Health Economics*, Vol. 27: 201–17.

Halm, Ethan A., Lee, Clara, and Chassin, Mark R. (2002). Is Volume Related to Outcome in Health Care? A Systematic Review and Methodological Critique of the Literature. *Annals of Internal Medicine*, Vol. 137: 511–20.

Kelz RR, Gimotty PA, Polsky D, Norman S, Fraker D, and DeMichele A. (2004). Morbidity and mortality of colorectal carcinoma surgery differs by insurance status. *Cancer*, Vol. 101, Issue 10: 2187-94.

Kronick, Richard. (2009) Health Insurance Coverage and Mortality Revisited. *Health Services Research,* Vol. 44, Issue 4: 1211-31.

Kronick, Richard and Gilmer, Todd. (2002). Insuring Low-Income Adults: Does Public Coverage Crowd Out Private? *Health Affairs*, Vol. 21: 225-39.

LaPar, Damien J., Bhamidipati, Castigliano M., Mery, Carlos M., Stukenborg, George J., Jones, David R., Schirmer, Bruce D., Kron, Irving L., Ailawadi, Gorav. (2010). Primary Payer Status Affects Mortality for Major Surgical Operations. *Annals of Surgery*, Vol. 252, Issue 3: 544–51.

Lucian LL, Brennan TA, Laird N, Lawthers AG, Localio AR, Barnes BA, Herbert L, Newhouse JP, Weiler PC, Hiatt H. (1991). The Nature of Adverse Events in Hospitalized Patients: Results of the Harvard Medical Practice Study II, *New England Journal of Medicine*, Vol. 324, No. 6: 377–84.

Levy, Helen and Meltzer, David. (2004). What do we really know about whether health insurance affects health? *Health Policy and the Uninsured: Setting the Agenda,* ed. C. McLaughlin: 179-204. Washington, DC: Urban Inst. Press

Levy, Helen and Meltzer, David. (2008) The Impact of Health Insurance on Health. *Annual Review of Public Health*, Vol. 29: 399-409.

McDavid K, Tucker TC, Sloggett A, Coleman MP. (2003). Cancer Survival in Kentucky and Health Insurance Coverage. *Archives of Internal Medicine,* Vol. 163: 2135–44.

McGinnis J. Michael, Williams-Russo P., Knickman, JR. (2002). The case for more active policy attention to health promotion. *Health Affairs* 21, no. 2: 78-93.

McWilliams M. (2009) Health Consequences of Uninsurance among Adults in the United States: Recent Evidence and Implications. *The Milbank Quarterly*, Vol. 87, No. 2: 443-94.

Moreno, Lorenzo and Hoag, S.D. (2001). Covering the uninsured through TennCare: Does it make a difference? *Health Affairs* 20, no.1: 231-39.

Newhouse, JP. Insurance Exp. Group, *Free for All? Lessons from the RAND Health Insurance Experiment.* Cambridge, MA: Harvard Univ. Press

Ortega AN, Belanger KD, Paltiel AD, Horwitz SM, Bracken MB, and Leaderer BP. (2001). Use of Health Services by Insurance Status Among Children With Asthma. *Medical Care*, Vol. 39, Issue 10: 1065–74.

Pascale, Joanne, Roemer Marc I., Resnick, Dean Michael. (2009) Medicaid Underreporting in the CPS: Results from a Record Check Study. *Public Opinion Quarterly*, Vol. 73, Issue 3: 497-520.

Philibin, EF, McCullough PA, DiSalvo TG, Dec GW, Jenkins PL, and Weaver WD. (2001). Underuse of Invasive Procedures Among Medicaid Patients With Acute Myocardial Infarction. *American Journal of Public Health*, Vol. 91, No. 7: 1082-88.

Shen, Jay J. and Washington, Elmer L. (2007). Disparities in Outcomes Among Patients with Stroke Associated With Insurance Status. *Stroke*: 1010–16.

Wilper, AP, Woolhandler S, Lasser KE, McCormick D, Bor DH, Himmelstein DU. (2009). Health Insurance and Mortality in US Adults. *American Journal of Public Health*, Vol. 99, No. 12: 2289-95.

Paper 4: Conclusions

U.S. Government Accountability Office. (2004, February). Medicaid – Improved Federal Oversight of State Financing Schemes Is Needed. (Publication No. GAO-04-228).

U.S. Government Accountability Office. (2004, June). States' Use of Contingency-Fee Consultants to Maximize Federal Reimbursements Highlights Need for Improved Federal Oversight. (Publication No. GAO-05-748).

U.S. House Committee on Oversight and Government Reform. (2012, April). Uncovering Waste, Fraud, and Abuse in the Medicaid Program.

Medicaid and CHIP Payment and Access Commission. (2012, March). Report to the Congress on Medicaid and CHIP.

U.S. Department of Health and Human Services Office of the Inspector General. (2012, May). Medicaid Rates for NY State-Operated Developmental Centers May Be Excessive (Publication No. A-02-11-01029).

CURRICULUM VITAE

Brian C. Blase grew up in Northeastern Pennsylvania. He attended Pennsylvania State University, where he received a Bachelor of Science in Mathematics and a Bachelor of Arts in Political Science in 2003. While a graduate student at George Mason University, he taught courses in microeconomics, macroeconomics, managerial economics, and the economics of public issues at George Mason and Georgetown University. He has specialized in health economics, and worked as a health policy analyst at The Heritage Foundation in Washington, DC while in graduate school. He has written numerous commentaries about health care that have appeared in publications such as the *Philadelphia Inquirer*, the *Atlanta Journal Constitution*, and the *Washington Times*. He received his Doctorate in Economics from George Mason University in 2013. He is currently a senior professional staff member working on health care and entitlement issues for the House Committee on Oversight and Government Reform, and he lives in Reston, Virginia with his wife and three sons.