FEDERAL AID OR FISCAL BURDEN? ESTIMATING THE IMPACT OF FEDERAL INTERGOVERNMENTAL GRANTS ON THE STATE OF NORTH DAKOTA

by

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ABSTRACT

Federal grants to states have grown rapidly in recent decades, reaching record levels following the 2009 federal stimulus bill. We examine the fiscal and regulatory impact of growing federal aid on states with an emphasis on North Dakota. Using a 30-year panel of grants and taxes we provide new econometric estimates of the impact of federal aid on state budgets. We find strong evidence federal aid results in upward "ratcheting" of state spending and taxes. Each $1 of grants predicts state tax increases of between $0.221 and $0.274 in the long run, primarily state personal and corporate income taxes and general sales taxes. These findings are robust to a variety of econometric specifications. We also provide four detailed case studies of the impact of accompanying federal grant regulations on local control of North Dakota policy: transportation policy; education; Medicaid; and land and resource use. States considering whether to increase their reliance on federal intergovernmental aid should be aware of these long-term fiscal and regulatory consequences of federal grants-in-aid.

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I. INTRODUCTION

Federal intergovernmental grants or "grants-in-aid" play a central role in state and local finances. In 2010, the U.S. federal government distributed $630 billion in grants to states, comprising 21 cents of every dollar spent at the state and local level. In North Dakota, federal grants amounted to $2.17 billion in that year, more than one-third of total state and local expenditures. At over $3,200 in federal aid per resident, North Dakota today ranks as the 6th highest recipient of federal grants in the nation. This flow of dollars from Washington leaves virtually no area of state policy unaffected, influencing health and welfare programs, roads and transportation, public safety, education, environmental and natural resource policy and more.

The traditional view among state lawmakers is that federal grants represent a "free lunch" from Washington. Federal aid allows states to expand popular government programs without relying on local tax revenue—an institutional arrangement that yields benefits both to state residents and local lawmakers. However, a growing number of economists have begun questioning the conventional view that federal aid represent a simple transfer of resources from Washington. As federal grants have expanded rapidly in recent decades, reaching record levels in the wake of the 2009 "American Recovery and Reinvestment Act" stimulus bill, a variety of unintended side effects on states have become apparent. These include:

Growing Demands on State Resources: There is a large academic literature on the budgetary effects of federal aid to states, with studies consistently finding that federal dollars stimulate state government spending significantly more than a comparable increase in state personal income—the so-called "flypaper effect" on state budgets. More recent studies have found evidence that these temporary federal grants often give rise to permanent state spending programs and expanded public sector payrolls, ultimately requiring higher state and local tax revenue than would have prevailed without the influence of federal grants.

Loss of Local Control: Federal grants are routinely accompanied by regulatory requirements—so called "strings attached" dollars. These accompanying federal rules affect a variety of state policy issues, including Medicare reimbursement rates, eligibility for state unemployment insurance, K-12 school testing and administration, highway speed limits and drunk-driving laws, and more. These federal mandates effectively shift the locus of political control from states to grant-administering federal agencies and the U.S. Congress. This transfer of control over state health and welfare, transportation, public safety, education, environmental and other policies may be a significant hidden cost of states' growing reliance on federal intergovernmental grants.

Expanded Bureaucracy: As the scope and complexity of federal aid programs has grown in recent decades, it has given rise to an increased number of dedicated staff within state and local governments responsible for managing application and reporting processes required by federal rules. These administrative burdens represent an additional ancillary

cost of accepting federal aid, which has in some cases been reported to exceed the dollar value of the corresponding federal grant.[1]

The goal of this study is to examine these indirect costs of federal intergovernmental aid, both in North Dakota and throughout the U.S. states generally. The remainder of this paper is organized as follows. In Section II we provide an overview of federal aid to North Dakota, summarizing its size, composition and recent trends. In Section III we examine the statistical evidence of the effect of federal aid on state tax burdens using a large data set of federal grants and taxes from 1981 to 2010. In Section IV, we provide four detailed case studies of ways in which federal aid has led to a loss of local control over North Dakota policy: transportation policy; education; Medicaid; and land and resource use. In Section V we conclude and summarize our findings.

[1] Box 1 provides a variety of practical examples of this phenomenon from local media reports.

II. Overview of Federal Grants-in-Aid to North Dakota

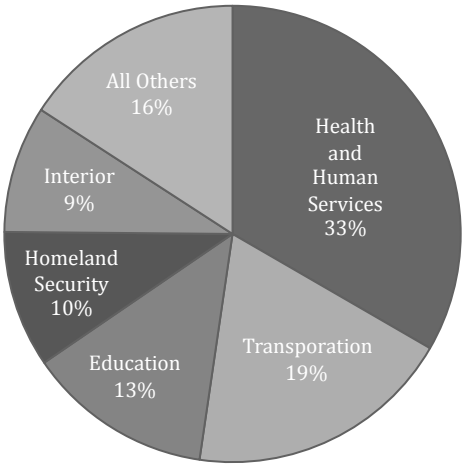
This section provides a brief overview of federal intergovernmental grants to North Dakota, summarizing recent trends and providing a comparison to other U.S. states.

A. Composition of Federal Aid

Federal intergovernmental grants play an important role in North Dakota's state government finances. In 2010, North Dakota received $2.17 billion in federal grants, amounting to $3,219 per capita or roughly 35 percent of the state's $6 billion budget. These federal dollars affected nearly every area of state government spending, including roads and transportation, police and public safety, public schools, health care, environmental and natural resource policy and more.

Figure 1 shows the composition of federal aid received by North Dakota, categorized by granting federal agency. The single largest area of aid comes from the Department of Health and Human Services, which administers the federal Medicaid program largely in the form of grants to states. These health-care dollars for low-income households comprise one-third of all federal aid to the state. The second largest category comes from the Department of Transportation (19 percent), followed by the Department of Education (13 percent), the Department of Homeland Security (10 percent), and the Department of the Interior (9 percent). All other federal agencies make up the remaining 16 percent.

Figure 1. Composition of Federal Grants to North Dakota, 2010



Source: U.S. Census Bureau

As priorities in Washington have shifted in recent decades, so has the composition of federal intergovernmental aid. Table 1 illustrates the changing composition of federal grants to North Dakota since 1981. The composition has remained remarkably stable during the past three decades, with no area of federal aid shifting by more than 7 percentage points in either direction. The most significant changes in composition have been increases in health and education grants (both growing by 7 percentage points), declines in housing and urban development, agriculture and labor (each falling by 5

percentage points), and declines in transportation grants (falling by 4 percentage points). These trends largely reflect nationwide shifts in federal priorities. Federal grants have gradually shifted away from more traditional transportation and public housing grants in recent decades and toward more rapidly growing federal Medicaid and education expenditures.

TABLE 1. THE CHANGING COMPOSITION OF NORTH DAKOTA'S FEDERAL AID, 1981-2010

Federal Agency	2010 Amount (Thousands of 2010 Dollars)	Percentage of 2010 Total	1981 Amount (Thousands of 2010 Dollars)	Percentage of 1981 Total	Change in Percentage (1981 - 2010)
Health and Human Services	$723,468	33%	$197,683	26%	7%
Transportation	$411,450	19%	$172,298	23%	-4%
Education	$285,151	13%	$49,798	7%	7%
Homeland Security	$210,043	10%	n.a.	n.a.	n.a.
Interior	$195,537	9%	$28,875	4%	5%
Housing and Urban Development	$102,890	5%	$71,608	9%	-5%
Agriculture	$87,792	4%	$69,831	9%	-5%
Environmental Protection Agency	$46,728	2%	$34,786	5%	-2%
Energy	$39,117	2%	$9,835	1%	1%
Labor	$28,809	1%	$48,534	6%	-5%
Justice	$14,072	1%	$2,176	0%	0%
Defense	$11,202	1%	$2,903	0%	0%
Veterans Affairs	$4,983	0%	$6,736	1%	-1%
Commerce	$4,541	0%	$11,246	1%	-1%
All Others	$3,646	0%	$55,517	7%	-7%
Total	$2,169,429	100%	$761,824	100%	n.a.

Source: U.S. Census Bureau.

Another significant shift in the composition of federal aid to North Dakota has been the expansion of Department of Homeland Security grants in the wake of the September 11, 2001 terror attacks. The Department of Homeland Security provides grants for a diverse array of police, disaster preparedness and public safety programs at both the state and local levels. These grants today comprise a larger share of total aid (10 percent) than many of the more traditional areas of federal involvement in the state's budget, including housing (5 percent), agriculture (4 percent), the EPA (2 percent), energy (2 percent), and others.

B. COMPARISON TO OTHER U.S. STATES

North Dakota is unusual among states in that it spans a large geographic area with a small and stable population. At roughly 70,700 square miles, North Dakota is the 19th largest state yet has the 3rd smallest population of just 684,000 in 2011. Also unusual is that North Dakota enjoys relatively high per capita personal incomes of $45,750 per person, ranking 9th highest nationally. These characteristics have led to an unusual pattern of federal aid. On a per capita basis, North Dakota receives among the highest federal aid in the nation at $3,219 per person, ranking 6th highest nationally. In terms of total dollars, the state receives the 3rd lowest total aid at $2.17 billion, ahead of only South Dakota and Vermont.

Table 2 compares total federal aid among the 50 states in 2010. The overall national average is $1,974 per capita or roughly $12.2 billion in federal grants. In per capita terms, Alaska receives the highest federal aid at $4,658 per person, roughly $480 more than any other state. They are followed by Wyoming ($4,174), Delaware ($3,696), and New

Mexico ($3,297). In terms of total dollars, the nation's most populated states of California, New York and Texas receive the largest share of aid dollars from Washington. For example, California alone received a staggering $66.57 billion from the federal government in 2010, roughly ten times the entire state budget of North Dakota.

TABLE 2. COMPARISON OF FEDERAL GRANTS-IN-AID AMONG THE 50 STATES, 2010

State	Total Federal Grants (Thousands of 2010 Dollars)	Rank	Per Capita Federal Grants (2010 Dollars)	Rank
Alabama	$8,608,682	25	$1,799	35
Alaska	$3,325,600	39	$4,658	1
Arizona	$13,369,959	14	$2,085	21
Arkansas	$6,417,566	32	$2,197	17
California	$66,565,008	1	$1,782	38
Colorado	$7,650,615	30	$1,515	47
Connecticut	$7,673,349	29	$2,145	18
Delaware	$3,325,253	40	$3,696	3
Florida	$27,731,390	4	$1,472	48
Georgia	$15,879,057	10	$1,635	43
Hawaii	$2,519,624	45	$1,848	33
Idaho	$3,057,136	42	$1,945	28
Illinois	$23,193,956	6	$1,806	34
Indiana	$10,400,147	22	$1,602	45
Iowa	$5,871,249	33	$1,925	29
Kansas	$4,979,729	34	$1,742	40
Kentucky	$9,756,383	23	$2,245	16
Louisiana	$13,436,716	13	$2,957	8
Maine	$3,580,856	38	$2,697	12
Maryland	$10,832,455	19	$1,872	31
Massachusetts	$15,120,981	12	$2,306	15
Michigan	$19,646,277	8	$1,989	26
Minnesota	$10,871,859	18	$2,047	23
Mississippi	$8,610,832	24	$2,899	9
Missouri	$12,716,668	15	$2,121	20
Montana	$2,809,550	44	$2,835	10
Nebraska	$3,121,977	41	$1,706	42
Nevada	$3,610,308	37	$1,335	49
New Hampshire	$2,355,468	47	$1,789	37
New Jersey	$16,309,163	9	$1,853	32
New Mexico	$6,810,761	31	$3,297	4
New York	$61,341,252	2	$3,163	7
North Carolina	$15,521,727	11	$1,623	44
North Dakota	$2,169,429	48	$3,216	6
Ohio	$23,072,473	7	$2,000	25
Oklahoma	$8,022,194	27	$2,133	19
Oregon	$7,849,235	28	$2,045	24
Pennsylvania	$26,290,942	5	$2,069	22
Rhode Island	$2,943,662	43	$2,796	11
South Carolina	$8,295,544	26	$1,789	36
South Dakota	$2,145,070	49	$2,627	13
Tennessee	$12,513,949	16	$1,969	27
Texas	$43,732,317	3	$1,731	41
Utah	$4,211,998	36	$1,517	46
Vermont	$2,044,160	50	$3,266	5
Virginia	$10,647,181	21	$1,327	50
Washington	$11,944,680	17	$1,771	39
West Virginia	$4,830,214	35	$2,605	14
Wisconsin	$10,710,023	20	$1,882	30
Wyoming	$2,356,009	46	$4,174	2
Total	$610,800,633	n.a.	$1,974	n.a.

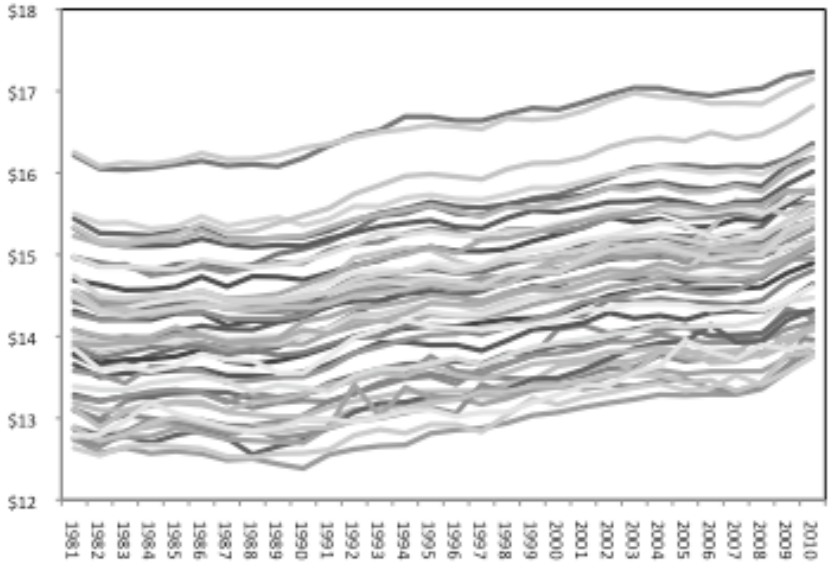
Source: U.S. Census Bureau, "Federal Aid to States for Fiscal Year 2010."

C. TRENDS IN FEDERAL AID OVER TIME

The most striking trend in federal intergovernmental aid is the steady growth in recent decades. This trend has been fueled by a combination of rapidly growing federal Medicaid costs, expanded federal involvement in local education following the 2001 "No Child Left Behind Act," and growing use of federal grants as a tool for macroeconomic stimulus during recessions. Figure 2 shows the overall trend in federal aid among the 50 states between 1981 and 2010. Each line represents total federal aid for an individual state, expressed as the log of inflation-adjusted federal aid in thousands of 2010 dollars.

The overall trend is remarkably similar among states. Federal grants stagnated in real terms throughout the 1980s. A clear upward trend becomes apparent in the early 1990s, which continues unabated until the mid-2000s. Federal budgetary changes in 2005, 2006 and 2007 led to a brief period of declining federal aid to states. This downward trend was then dramatically reversed by the passage of the 2009 "American Reinvestment and Recovery Act" (ARRA) stimulus bill, which relied heavily on federal grants to states. This effort to provide macroeconomic stimulus led federal aid to grow faster in 2009 and 2010 than at any other time in the previous three decades.

FIGURE 2. OVERALL TREND IN FEDERAL INTERGOVERNMENTAL GRANTS TO THE 50 STATES, 1981-2010 (LOG OF THOUSANDS OF REAL 2010 DOLLARS)

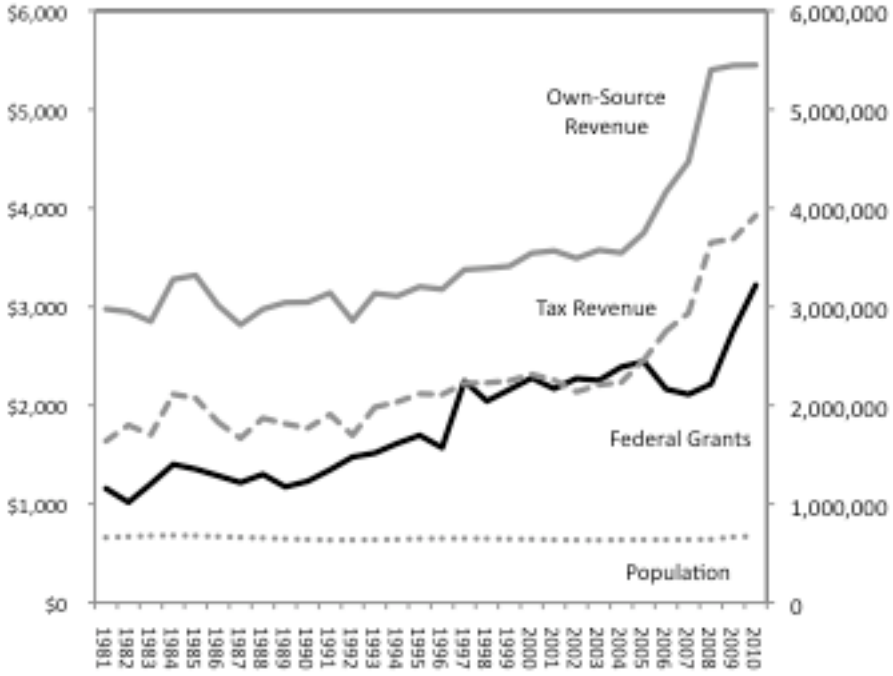


Source: Columbia Economics, L.L.C.

Federal aid to North Dakota has generally followed the national trend. Figure 3 shows real per capita federal grants to North Dakota since 1981, along with state tax revenue, own-source revenue (which includes a variety of fees, lottery revenue and other non-tax revenues), and state population. Federal aid to North Dakota remained essentially flat in real terms throughout the 1980s at roughly $1,200 per person. Beginning in the 1990s federal aid began a decade and half of steady growth, reaching $2,443 by 2005. Federal grants to North Dakota trended downward in 2006, 2007 and 2008, following overall federal budgetary changes. The passage of the 2009 federal stimulus bill led to rapidly

increasing federal aid to the state, reaching an all-time high of $3,219 per person in 2010, roughly triple the level of three decades ago in real terms.

FIGURE 3. TRENDS IN NORTH DAKOTA REAL PER-CAPITA FEDERAL GRANTS, TAX REVENUE AND POPULATION, 1981-2010



Source: Columbia Economics, L.L.C.

As with most states, North Dakota's state tax and own-source revenues have also followed an upward trend since 1981. State tax burdens were roughly flat throughout the 1980s, beginning an upward trend in the 1990s that would continue until the mid-2000s. Tax revenues have grown rapidly since 2005, largely due to the state's booming oil and gas industry, reaching record levels in 2010. One notable trend is in North Dakota's population, shown by the dotted line at the bottom of Figure 3. State population has been remarkably steady over the previous three decades, varying between 630,000 and 680,000. This suggests recent trends in state tax burdens and federal aid are not likely to be explained by shifts in state population alone.

Table 3 provides a detailed view of North Dakota's federal aid, tax revenue and own-source revenue since 1981. All figures for revenue and federal aid are in inflation-adjusted 2010 dollars. As is clear from the table, federal influence over North Dakota's state budget has grown dramatically in recent decades. Despite a stable population, per capita federal aid has increased by 178 percent in real terms since 1981, growing an average of 3.6 percent annually during the period.

TABLE 3. SUMMARY OF REAL NORTH DAKOTA FEDERAL GRANTS, OWN-SOURCE REVENUE AND STATE TAX REVENUE, 1981-2010 (THOUSANDS OF 2010 DOLLARS)

		Federal Intergovernmental Grants		State Own-Source Revenue (OSR)		State Tax Revenue	
Year	Population	Thousands of 2010 Dollars	Grants Per Capita	Thousands of 2010 Dollars	OSR Per Capita	Thousands of 2010 Dollars	Taxes Per Capita
1981	660,000	$762,836	$1,156	$1,964,555	$2,977	$1,081,296	$1,638
1982	669,000	$680,154	$1,017	$1,972,794	$2,949	$1,203,558	$1,799
1983	677,000	$814,426	$1,203	$1,930,082	$2,851	$1,151,594	$1,701
1984	680,000	$952,814	$1,401	$2,228,427	$3,277	$1,436,355	$2,112
1985	677,000	$915,997	$1,353	$2,246,007	$3,318	$1,402,799	$2,072
1986	670,000	$861,480	$1,286	$2,018,737	$3,013	$1,225,721	$1,829
1987	661,000	$804,273	$1,217	$1,861,814	$2,817	$1,100,594	$1,665
1988	655,000	$851,580	$1,300	$1,948,665	$2,975	$1,224,760	$1,870
1989	646,000	$757,920	$1,173	$1,964,741	$3,041	$1,171,418	$1,813
1990	639,000	$785,802	$1,230	$1,945,970	$3,045	$1,129,674	$1,768
1991	634,000	$853,332	$1,346	$1,990,552	$3,140	$1,208,840	$1,907
1992	635,000	$937,190	$1,476	$1,815,239	$2,859	$1,077,080	$1,696
1993	637,000	$965,784	$1,516	$1,996,806	$3,135	$1,262,217	$1,982
1994	640,000	$1,032,897	$1,614	$1,988,703	$3,107	$1,301,735	$2,034
1995	648,000	$1,098,862	$1,696	$2,075,267	$3,203	$1,371,406	$2,116
1996	650,000	$1,020,701	$1,570	$2,064,947	$3,177	$1,370,784	$2,109
1997	650,000	$1,459,508	$2,245	$2,193,938	$3,375	$1,445,446	$2,224
1998	648,000	$1,323,686	$2,043	$2,196,647	$3,390	$1,443,797	$2,228
1999	644,000	$1,390,138	$2,159	$2,195,835	$3,410	$1,447,672	$2,248
2000	642,000	$1,461,960	$2,277	$2,274,745	$3,543	$1,485,286	$2,314
2001	636,000	$1,379,073	$2,168	$2,268,787	$3,567	$1,434,502	$2,256
2002	634,000	$1,440,685	$2,272	$2,212,990	$3,491	$1,354,604	$2,137
2003	633,000	$1,425,914	$2,253	$2,262,720	$3,575	$1,397,049	$2,207
2004	636,000	$1,519,038	$2,388	$2,255,327	$3,546	$1,420,224	$2,233
2005	637,000	$1,556,346	$2,443	$2,387,294	$3,748	$1,566,702	$2,460
2006	637,000	$1,378,491	$2,164	$2,654,072	$4,167	$1,754,192	$2,754
2007	638,000	$1,346,783	$2,111	$2,852,985	$4,472	$1,873,976	$2,937
2008	641,000	$1,420,174	$2,216	$3,461,920	$5,401	$2,339,292	$3,649
2009	665,000	$1,835,979	$2,761	$3,621,740	$5,446	$2,453,606	$3,690
2010	674,000	$2,169,429	$3,219	$3,673,318	$5,450	$2,645,695	$3,925

Note: All figures are inflation adjusted using the U.S. Bureau of Labor Statistics' Consumer Price Index (1982-84 = 100). Federal grant figures from 1995-2010 are from the U.S. Census Bureau's "Federal Aid to States for Fiscal Years" reports; grant figures from 1981-1994 are from the U.S. Census Bureau's "Federal Expenditures by State for Fiscal Years" report; all tax revenue data are from the U.S. Census Bureau's "State Government Finance" series.

Source: U.S. Census Bureau; Columbia Economics, L.L.C.

The recent growth of federal aid has raised questions about the long-term impact on state finances. How have state taxes and spending responded to the recent expansion of federal grants? What are the likely consequences of the large increases in federal aid enacted by the 2009 ARRA stimulus bill? The following section explores these questions empirically, providing new estimates of the long-term effects of federal aid on state tax burdens in North Dakota and in the 50 states more generally.

III. Econometric Estimates: The Effect of Federal Grants on State Tax Burdens

When a state receives a federal grant, they are able to expand state budgets without raising taxes. But what happens in future years when grants expire or aid priorities shift in Washington? Do states trim budgets and lay off public employees or do they rely on local taxes to fill in for disappearing federal dollars? In this section we address these questions empirically using a standard econometric model and a large data set of federal grants and state taxes from 1981 to 2010.

A. Economic Theory: Federal Grants and State Budgets

To help understand how federal grants affect state taxes, economists rely on what is known as the "median voter model." In this simple model, state lawmakers choose the level of taxes and spending each year to broadly satisfy the demands of voters. Specifically, lawmakers choose policies that cater to the "median" voter—the voting block whose centrist views allow them to cast the decisive vote in many local elections. Under this model, lawmakers pick the level of government spending and taxes that maximize the "utility" or satisfaction of the median voter.

Mathematically, we can express this model as an annual decision problem faced by state lawmakers. Under the median voter theory, state governments aim to solve the following problem as they develop their annual budgets,

$$(1) \qquad \max_{C,G} U(C,G), \text{ subject to } P_C C + P_G G \leq Y + T$$

where *U(C,G)* is the "utility function" of the median voter, which captures citizens' preferences over private consumption goods C and government services G. P_C is the average price of private consumption goods, P_G is the average price of government services, Y is state private income and T is the level of federal intergovernmental grants in that year. This corresponds to the familiar problem in economic theory of an individual consumer maximizing utility among two goods subject to a budget constraint.

Solving for the first-order conditions of the above problem, we have,[2]

$$(2) \qquad \frac{U_C(C,G)}{P_C} = \frac{U_G(C,G)}{P_G}$$

$$(3) \qquad P_C C + P_G G = Y + T$$

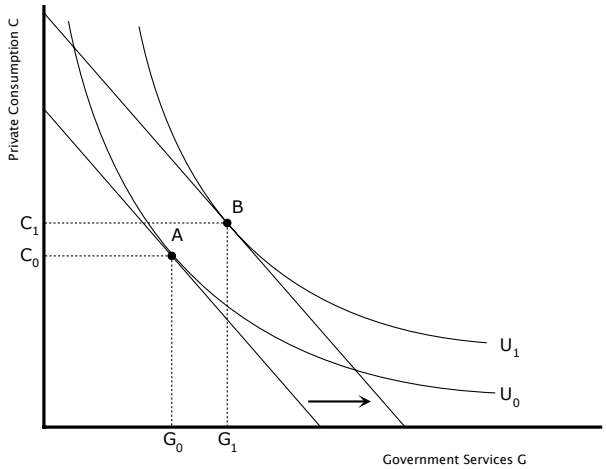
where U_C and U_G are the first derivatives or "marginal utilities" for the median voter's preferences with respect to C and G, respectively. Equation (2) says that state lawmakers should follow a simple rule: continue spending on government services until the marginal

[2] We assume the usual well-behaved properties of continuity and concavity for the median voter's utility, allowing first-order conditions to be sufficient for a local maximum.

utility of G relative to the price of government services P_G is just equal to the marginal utility of private consumption goods C relative to their price P_C. Equation (3) provides the state's "balanced budget" constraint, which says total spending on C and G cannot exceed the sum of state private income Y plus federal grants-in-aid T in that year.

To see what this model predicts about the effect of federal grants on taxes, it is useful to illustrate with a simple diagram. Figure 4 presents the basic median voter model graphically. Spending on government programs G is drawn on the horizontal axis, while private consumption C is on the vertical axis. The downward-sloping straight lines represent the budget constraint faced by states from equation (3), and the preferences of the median voter are shown as inward-bowed "indifference curves." The goal of lawmakers is to choose C and G each year such that they reach the median voter's highest possible indifference curve subject to the state's budget constraint.

FIGURE 4. THE BASIC MEDIAN VOTER MODEL AND THE IMPACT OF A NON-MATCHING FEDERAL GRANT



Source: Columbia Economics, L.L.C.

In Figure 4, lawmakers initially choose point A, which corresponds to C_0 private consumption, G_0 government spending, and Y - P_cC_0 taxes. At this point, the marginal utility of government spending relative to its price is just equal to the marginal utility of private goods relative to their price, satisfying the equilibrium condition of equation (2). At this point, the utility of the median voter is maximized subject to the state's budget constraint.

Now consider the effect of a federal intergovernmental grant. For simplicity, suppose the grant is a non-matching or "block" grant that represents a pure transfer of dollars from Washington.[3] The grant shifts the state's budget constraint outward as T increases, shown by the rightward arrow in Figure 4. These new federal dollars increase state resources,

[3] The case of matching grants is similar, but features a "substitution" effect that rotates the state's budget constraint in addition to the "income" effect illustrated in Figure 4.

which can be used either for private consumption C in the form of tax cuts rebated back to households, or for increased state government spending G.

After receiving the federal grant, lawmakers will choose the new point B. At this point, they are able to reach the higher indifference curve labeled U_1, increasing the utility of the median voter. This point corresponds to a higher level of private consumption C_1, a higher level of government spending G_1, and lower taxes Y - $P_c C_1$. Thus, non-matching grants cause an increase in government spending and an increase in private consumption in that year. States spend part of the federal dollars, and rebate the remainder back to households in the form of tax cuts. Thus, the simple median voter model yields the surprising prediction that we should observe higher government spending *and* lower state taxes in the period in which a federal grant is received by states.

There is a large previous literature testing this classic prediction of the median voter model. It is generally known as the "flypaper effect" literature, and is surveyed extensively in Gramlich and Galper (1973); Wyckoff (1991); Hines and Thaler (1995); Bailey and Connolly (1998); and Inman (2008). In Table 4, we show several estimates of the impact of federal grants on state spending from this literature. Ignoring the outliers on either end, a one-dollar federal grant boosts state spending by 40-90 cents in that year, with a median impact of 60 cents. The remaining 10-60 cents are returned to households in the form of tax cuts, with a median tax cut of 40 cents per dollar of federal aid.

TABLE 4. LITERATURE ESTIMATES OF THE IMPACT OF FEDERAL GRANTS ON STATE SPENDING AND TAXES

Author(s)	Year	Increase in State Spending Per $1 Federal Grant	Implied State Tax Cut Per $1 Federal Grant
Inman	1971	$1.00	$0.00
Weicher	1972	$0.90	($0.10)
Nathan *et al.*	1975	$0.70	($0.30)
Case, Hines and Rosen	1993	$0.65	($0.35)
Feldstein	1975	$0.60	($0.40)
Weicher	1972	$0.59	($0.41)
Olmstead, Denzan and Roberts	1993	$0.58	($0.42)
Bowman	1974	$0.50	($0.50)
Gramlich and Galper	1973	$0.43	($0.57)
Gramlich and Galper	1973	$0.25	($0.75)
Median Impact	n.a.	$0.60	($0.40)

Source: Bailey and Connolly (1998).

An important limitation of the above model is that it is *static*. It only describes the impact of federal grants on taxes and spending in the same year. It does not make any prediction about future years, or how federal grants might affect states dynamically over time. In particular, the median voter model assumes that there is no upward "ratcheting" of state government spending, and that cutting state budgets when federal aid expires takes about the same political effort as expanding them to begin with. When grants expire, the basic model predicts states should simply decrease G symmetrically, returning state taxes and spending to their pre-grant levels and leaving no lasting imprint on state budgets.

There is considerable evidence that state budgets are not, in fact, symmetric with respect to increases and decreases. Federal grants intended to provide temporary support often

transform into health, transportation and public safety programs that become a permanent feature of state budgets. When grants expire, lawmakers often respond by increasing state taxes rather than face the political costs of budget cuts and layoffs for public employees. Box 1 below presents a variety of real-world examples of this phenomenon at the state and local level. In other cases, federal grants are specifically designed to provide "pilot" funding for state projects, which intentionally increase demands on local funding sources in future years. For all of these reasons, we might expect to find an upward "ratcheting" of state tax burdens over time from federal intergovernmental grants.

A Multi-Period Model

To allow for the possibility that temporary federal aid may result in permanently higher state tax burdens, consider a simple extension of the median voter model. In this version, we allow the above one-period model to repeat each year for t periods. Additionally, we allow for the possibility that some federal aid may result in permanent state government programs over time, putting upward pressure on state tax burdens.

Consider a typical state, indexed by the letter i. Suppose state i initially receives no federal aid and has government spending of S_{i0} and taxes of $T_{i0} = S_{i0}$.[4] In year one, suppose the state receives a federal grant G_{i1}. Under the median voter model presented above, state lawmakers will spend a fraction of the grant α, and will refund the remaining $(1-\alpha)$ back to households in the form of tax cuts. We call α the "flypaper effect" coefficient in this model. As predicted by the simple median voter model, in year one state government spending rises to $S_{i0} + \alpha G_{i1}$ and state taxes fall to $S_{i0} + (\alpha-1)G_{i1}$.

Now consider the following year. In year two, suppose the state receives an additional federal grant G_{i2}. As before, state i will spend part of the grant and refund the remainder back to households. However, suppose the grant-funded spending from last year does not fully disappear from state budgets, and instead some fraction β of it has become permanent state spending. We call β the "ratcheting effect" coefficient in this model. Now there are combined "flypaper" and "ratcheting" effects from federal grants. In year two, state spending will rise to $S_{i0} + \alpha\beta G_{i1} + \alpha G_{i2}$, where the term $\alpha\beta G_{i1}$ is the upward "ratcheting" of state spending from past federal aid. Similarly, taxes in year two will rise due to past federal aid to $S_{i0} + \alpha\beta G_{i1} + (\alpha-1)G_{i2}$.

We can continue tracing the "flypaper" and "ratcheting" effects of federal aid on taxes and spending in future years as well. In Table 5, we illustrate the evolution of state government spending and taxes under the multi-year median voter model for several years. In the bottom row, we provide general expressions for state spending and tax burdens in year t, given some history of federal grants $\{G_{i1}, G_{i2}, ..., G_{it}\}$ and coefficients α and β for the "flypaper" and "ratcheting" effects of federal aid.

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[4] For simplicity, we assume states maintain balanced budgets. Of the 50 states, 45 are constitutionally required to do so, and four others are required to do so by statute. Only Vermont has neither a constitutional nor statutory balanced budget requirement.

TABLE 5. THE EVOLUTION OF STATE GOVERNMENT SPENDING AND TAXES OVER TIME IN THE MULTI-PERIOD MEDIAN VOTER MODEL

Year	State Government Spending (S_{it})	State Tax Revenue (T_{it})	Federal Grants (G_{it})
0	S_{i0}	$T_{i0} = S_{i0}$	0
1	$S_{i0} + \alpha G_{i1}$	$S_{i0} + (\alpha\text{-}1) G_{i1}$	G_{i1}
2	$S_{i0} + \alpha\beta G_{i1} + \alpha G_{i2}$	$S_{i0} + \alpha\beta G_{i1} + (\alpha\text{-}1) G_{i2}$	G_{i2}
3	$S_{i0} + \alpha\beta (G_{i1} + G_{i2}) + \alpha G_{i3}$	$S_{i0} + \alpha\beta (G_{i1} + G_{i2}) + (\alpha\text{-}1) G_{i3}$	G_{i3}
⋮	⋮	⋮	⋮
t	$S_{io} + \alpha\beta \sum_{j=1}^{t-1} G_{ij} + \alpha G_{it}$	$S_{io} + \alpha\beta \sum_{j=1}^{t-1} G_{ij} + (\alpha - 1) G_{it}$	G_{it}

Source: Columbia Economics, L.L.C.

The equation we are primarily interested in is the long-term effect of federal aid on state tax burdens at time *t*. This is given in the bottom row of Table 5 as,

$$(4) \qquad T_{it} = S_{io} + \alpha\beta \sum_{j=1}^{t-1} G_{ij} + (\alpha - 1) G_{it}$$

Equation (4) says that state tax burdens in state *i* in year *t* should be equal to a state-specific constant S_{i0}, plus $\alpha\beta$ times the sum of past federal grants-in-aid, plus $(\alpha\text{-}1)$ times current federal aid. While we can observe taxes T_{it} and federal grants to states G_{it} directly, we cannot observe the "flypaper" and "ratcheting" coefficients α and β. Instead, they must be estimated econometrically using data on state taxes and federal grants over time.

B. DATA AND ECONOMETRIC ESTIMATION

We make use of a large panel data set of state revenue and federal grants for the 50 states from 1981 through 2010.[5] Ideally, we would like to focus our analysis only on North Dakota. However, the limited number of data points for any one state is small—just 30 annual observations—making it impossible to apply the usual econometric methods. By pooling the 50 states into a panel and controlling for differences across states, we can greatly enlarge the number of observations to 50 x 30 = 1500, enough to identify the effect of federal aid on state taxes.

Data on federal intergovernmental grants are from the U.S. Census Bureau's annual "Federal Aid to States for Fiscal Years" and "Federal Expenditures by State for Fiscal

[5] We thank Russell Sobel and George Crowley for providing their data set with observations for 1995-2008, to which we have appended observations for 1981-1994 and 2009-2010.

Years" reports. The data on state taxes and own-source revenue are from the Census Bureau's annual "State Government Finances" report. All figures are inflation-adjusted into real dollars using the "Consumer Price Index" series from the U.S. Bureau of Labor Statistics.[6] Table 6 reports summary statistics for the panel.

TABLE 6. SUMMARY STATISTICS FOR THE PANEL DATA SET

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Year	1500	n.a.	n.a.	1981	2010
State Population	1500	5,345,230	5,853,118	418,000	37,300,000
Real Own-Source Revenue ($000)	1500	7,043,333	8,304,256	467,833	67,300,000
Real Total Tax Revenue ($000)	1500	5,311,147	6,659,144	295,657	55,300,000
Real Income Tax Revenue ($000)	1500	1,742,820	2,930,967	0	25,900,000
Real Corporate Tax Revenue ($000)	1500	353,660	603,192	0	5,497,981
Real General Sales Tax Revenue ($000)	1500	1,725,809	2,209,663	0	16,000,000
Real Alcohol Tax Revenue ($000)	1500	50,405	66,656	0	397,946
Real Tobacco Tax Revenue ($000)	1500	102,541	124,787	2,817	725,652
Real Total Federal Grants Received ($000)	1500	2,975,975	3,730,408	239,480	30,500,000

Note: Revenue and federal grant figures are reported in thousands of inflation-adjusted 1982-84 dollars. The data set is a panel of the 50 U.S. states from 1981-2010. Due to the use of various lags of the data, only 1200 observations from 1987-2010 are utilized in our estimation procedure.

Sources: Federal grants from 1995-2010 are from the U.S. Census Bureau's "Federal Aid to States for Fiscal Years" reports; grants from 1981-1994 are from the U.S. Census Bureau's "Federal Expenditures by State for Fiscal Years" report; all tax revenue data are from the U.S. Census Bureau's "State Government Finance" series.

ECONOMETRIC MODEL

Our goal is to estimate the "flypaper" and "ratcheting" coefficients α and β from equation (4) above. To do so, consider the following fixed-effects model,

$$(5) \qquad T_{it} = \delta_i + \phi_1 \sum_{j=t-k}^{t-1} G_{ij} + \phi_2 G_{it} + \gamma_i t + \xi_t + \varepsilon_{it}$$

where T_{it} is state tax revenue in state i at time t, δ_i is a state-specific fixed-effect that controls for factors that differ across states but are unchanging over time, G_{it} is total federal grants-in-aid, $\gamma_i t$ is a state-specific linear time trend that controls for upward trends in taxes and federal aid over time, ξ_t is a year-specific fixed-effect that controls for factors that are changing over time but are the same across states (such as national business cycles), and ε_{it} is a mean-zero error term. With these controls in place, we are able to treat our 50-state panel as 1500 distinct observations of federal grants and taxes for a single representative state over time. For the sum of previous federal aid, we choose the most recent five years (k = 5) in our basic model. Even multi-year federal grants typically require states to spend the obligated funds within four fiscal years.[7] Thus, any

[6] Due to timing differences between state and federal fiscal years, we lag all federal grants in the panel by one year. This is done to assure that all information about the complete year of federal aid at time t is available to states prior to the start of their state's fiscal year.

[7] For additional detail on the multi-year structure of federal grants-in-aid, see Gamkhar (2003).

associated "ratcheting" effect of federal aid on state tax revenue should be apparent within one to five years following the initial grant.[8]

The parameters we are interested in from equation (5) are ϕ_1 and ϕ_2. Note that these coefficients correspond directly to the structural parameters α and β in our multi-year median voter model. Specifically, $\phi_1 = \alpha\beta$, and $\phi_2 = (\alpha\text{-}1)$. Thus, by econometrically estimating equation (5) via "ordinary least squares" (OLS) we are able to uncover the "flypaper" and "ratcheting" coefficients α and β from the median voter model as,

$$(6) \qquad \alpha = \phi_2 + 1$$

$$(7) \qquad \beta = \phi_1 / (\phi_2 + 1)$$

The estimate of α can be interpreted as the fraction of federal grants that result in new state spending in the same year. The estimate of β can be interpreted as the fraction of that grant-funded spending that ultimately results in permanent state government programs. The combined effect $\alpha\beta$ can be interpreted as the amount by which state tax burdens are ultimately "ratcheted" upward in the long run from each $1 of federal intergovernmental aid.

TABLE 7. EXPECTED REGRESSION COEFFICIENTS IMPLIED BY THE MULTI-YEAR MEDIAN VOTER MODEL

Coefficient	(A) No "Ratcheting" from Federal Grants	(B) 50 Percent "Ratcheting" of Federal Grant	(C) 100 Percent "Ratcheting" of Federal Grant
Coefficient on Current Grants ($\phi_2 = \alpha\text{-}1$)	(0.40)	(0.40)	(0.40)
Coefficient on Sum of Past Grants ($\phi_1 = \alpha\beta$)	0.00	0.30	0.60
Flypaper Effect (α)	0.60	0.60	0.60
Ratcheting Effect (β)	0.00	0.50	1.00

Source: Columbia Economics, L.L.C.

The above theory provides clear predictions about the sign and magnitude of our regression coefficients. Table 7 summarizes three possible scenarios. In all cases, we should find a coefficient on current grants of roughly -0.40, which corresponds to the median value from the previous "flypaper effect" literature discussed above. If federal grants cause no upward "ratcheting," we should find a coefficient on the sum of past grants $\alpha\beta = 0$, which implies a "ratcheting" coefficient of $\beta = 0$ in the above model. If there is only partial "ratcheting" from federal grants ($\beta = 0.5$), we should find a coefficient on the sum of past grants of roughly $\alpha\beta = 0.30$, as illustrated in column (B). In the extreme case in which every dollar of federal aid results in a permanent one-dollar increase in state taxes ($\beta = 1$), we should expect to find a coefficient on the sum of past grants of roughly $\alpha\beta = 0.60$, as illustrated in column (C).

[8] While this estimating equation is derived structurally from the above theoretical model, Sobel and Crowley (forthcoming) arrive at a nearly identical specification following a purely reduced-form approach.

ESTIMATION RESULTS

Table 8 presents our basic results. It shows the regression of state own-source revenue for the 50 U.S. states on current and past federal grants-in-aid. Each column represents a slightly different specification. Our basic model is presented in column (6), in which we regress state own-source revenue on current federal grants and the sum of the previous five years of grants. Columns (1) though (5) show the individual components of the overall sum. For example, in column (1) we regress own-source revenue on current grants and last year's grants; in column (2) we regress revenue on current grants and the last two years of grants; and so on. Standard errors are reported in parentheses, which are heteroskedasticity-robust and are clustered at the state level to account for multiple repeated observations of each state in the panel over time.

TABLE 8. REGRESSION OF STATE OWN-SOURCE REVENUE ON CURRENT AND PAST FEDERAL GRANTS (FULL SAMPLE OF 50 U.S. STATES)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Federal Grants at Time *t* (ϕ_2 = α-1)	-0.977***	-0.783***	-0.657***	-0.631***	-0.651***	-0.554***
	(0.333)	(0.254)	(0.229)	(0.227)	(0.232)	(0.139)
Federal Grants at Time *t-1*	0.721**	0.206	0.261	0.294	0.320	
	(0.291)	(0.241)	(0.266)	(0.256)	(0.249)	
Federal Grants at Time *t-2*		0.688***	0.321***	0.369***	0.379***	
		(0.163)	(0.091)	(0.116)	(0.128)	
Federal Grants at Time *t-3*			0.537***	0.332***	0.373***	
			(0.135)	(0.054)	(0.070)	
Federal Grants at Time *t-4*				0.277	0.051	
				(0.216)	(0.148)	
Federal Grants at Time *t-5*					0.239	
					(0.206)	
Sum of Past Federal Grants (ϕ_1 = αβ)						0.274***
						(0.079)
n	1200	1200	1200	1200	1200	1200
Adjusted R-squared	0.997	0.997	0.997	0.997	0.997	0.997

*, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.
Note: All specifications include state and year fixed effects, as well as state-specific linear time trends. Heteroskedasticity-robust standard errors are reported in parentheses, which have been clustered by state.
Source: Columbia Economics, L.L.C.

As expected, the coefficients on federal grants at time *t* are all negative and statistically significant, as predicted by the simple median voter model. They are also the size we expect from previous literature. A coefficient of -0.554 in column (6) implies a "flypaper" coefficient of $\alpha = 0.446$, which implies states spend an average of $0.45 of each federal dollar on new government spending, refunding the remaining $0.55 back to households in the form of tax cuts. This estimate is well within the range of past studies.[9]

[9] In the "flypaper effect" literature, studies typically estimate the impact of non-matching federal grants only, whereas we estimate the combined effect of both matching and non-matching grants. Because matching grants generally have a more stimulative effect on state spending, we should expect our estimate of α to be somewhat higher than if only non-matching grants were analyzed.

The key finding from Table 8 is the positive coefficient on the sum of past federal grants in column (6). A coefficient of $\alpha\beta$ = 0.274 implies each dollar of federal aid results in higher state own-source revenue of about $0.27 in the long run. This implies a "ratcheting" coefficient of β = (0.274 / 0.446) = 0.614, suggesting that roughly 61 percent of all temporary grant-funded spending ultimately becomes a permanent tax-financed state program.[10] Put differently, of the roughly $0.45 of each grant dollar spent by states, about $0.27 or 61 percent ultimately becomes permanently higher state spending financed through own-source revenue. These results provide strong evidence that federal grants indeed have lasting effects on state finances, increasing state tax burdens beyond what residents would have otherwise chosen in the absence of federal aid.

TABLE 9. REGRESSION OF STATE TAX REVENUE ON CURRENT AND PAST FEDERAL GRANTS (FULL SAMPLE OF 50 U.S. STATES)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Federal Grants at Time *t* (ϕ_2 = α-1)	-0.822**	-0.674***	-0.568**	-0.549**	-0.561**	-0.459***
	(0.313)	(0.241)	(0.221)	(0.217)	(0.218)	(0.130)
Federal Grants at Time *t-1*	0.624**	0.232	0.278	0.302	0.317	
	(0.290)	(0.195)	(0.218)	(0.212)	(0.205)	
Federal Grants at Time *t-2*		0.524***	0.216**	0.252**	0.258**	
		(0.150)	(0.089)	(0.112)	(0.116)	
Federal Grants at Time *t-3*			0.451***	0.301***	0.325***	
			(0.107)	(0.054)	(0.049)	
Federal Grants at Time *t-4*				0.203	0.065	
				(0.190)	(0.074)	
Federal Grants at Time *t-5*					0.146	
					(0.177)	
Sum of Past Federal Grants (ϕ_1 = αβ)						0.221***
						(0.073)
n	1200	1200	1200	1200	1200	1200
Adjusted R-squared	0.996	0.996	0.996	0.996	0.996	0.996

*, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.
Note: All specifications include state and year fixed effects, as well as state-specific linear time trends. Heteroskedasticity-robust standard errors are reported in parentheses, which have been clustered by state.
Source: Columbia Economics, L.L.C.

Table 9 presents results for the regression of federal grants on state tax revenue, which excludes all non-tax revenue sources such as fees, charges and lotteries that are included in own-source revenue. As above, the estimated coefficients for our basic model in Column (6) all have the correct sign and magnitude, and are strongly statistically significant. We find one dollar of federal grants lowers state tax burdens by an average of $0.46 in the current year (α = 0.541) but ultimately results in higher state tax burdens of roughly $0.22 in the future ($\alpha\beta$ = 0.221, and β = 0.409).

[10] We bootstrap the standard error for our estimate of $\beta = (\phi_1/\phi_2+1)$ with n = 1,000 replications, yielding a standard error of 0.341. This implies β is statistically significant at the 10 percent level (p = 0.072).

One interesting finding is that the "ratcheting" effect of federal aid is significantly higher for state own-source revenue (β = 0.614) than for state tax revenue (β = 0.409). This mirrors the previous finding of Sobel and Crowley (forthcoming). This disparity suggests states may rely more heavily on non-tax revenue from fees, charges and lotteries when responding to expiring federal aid than direct tax increases. This may be the result of legal constraints that make direct taxes more difficult to increase than non-tax sources, or may simply reflect that non-tax revenues are generally less visible or "salient" to taxpayers and can thus be raised at lower political cost to lawmakers.

TABLE 10. ROBUSTNESS CHECKS: REGRESSION OF OWN-SOURCE REVENUE ON FEDERAL GRANTS IN VARIOUS SUB-SAMPLES

Variable	(1) Full Sample (All U.S. States)	(2) Similar Federal Grants to North Dakota	(3) States with Tax-Expenditure Limitations	(4) No Tax-Expenditure Limitation	(5) Super-majority Voting Rules on Taxes	(6) No Super-majority Voting Rules
Federal Grants at Time *t* (ϕ_2 = α-1)	-0.554***	-0.595***	-0.502**	-0.581***	-0.538*	-0.506***
	(0.139)	(0.035)	(0.239)	(0.060)	(0.276)	(0.111)
Sum of Past Federal Grants (ϕ_1 = αβ)	0.274***	0.315***	0.262**	0.310***	0.310**	0.251***
	(0.079)	(0.088)	(0.115)	(0.093)	(0.120)	(0.088)
n	1200	360	720	480	384	816
Adjusted R-squared	0.997	0.998	0.997	0.998	0.996	0.998

*, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.
Note: All specifications include state and year fixed effects, as well as state-specific linear time trends. Heteroskedasticity-robust standard errors are reported in parentheses, which have been clustered by state. Information on TELs and supermajority voting rules is from the National Conference of State Legislatures.
Source: Columbia Economics, L.L.C.

TABLE 11. ROBUSTNESS CHECKS: REGRESSION OF STATE TAX REVENUE ON FEDERAL GRANTS IN VARIOUS SUB-SAMPLES

Variable	(1) Full Sample (All U.S. States)	(2) Similar Federal Grants to North Dakota	(3) States with Tax-Expenditure Limitations	(4) No Tax-Expenditure Limitation	(5) Super-majority Voting Rules on Taxes	(6) No Super-majority Voting Rules
Federal Grants at Time *t* (ϕ_2 = α-1)	-0.459***	-0.422***	-0.441*	-0.445***	-0.429	-0.429***
	(0.130)	(0.037)	(0.222)	(0.043)	(0.275)	(0.059)
Sum of Past Federal Grants (ϕ_1 = αβ)	0.221***	0.225***	0.221**	0.229***	0.272**	0.180***
	(0.073)	(0.065)	(0.108)	(0.055)	(0.110)	(0.061)
n	1200	360	720	480	384	816
Adjusted R-squared	0.996	0.997	0.995	0.998	0.995	0.998

*, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.
Note: All specifications include state and year fixed effects, as well as state-specific linear time trends. Heteroskedasticity-robust standard errors are reported in parentheses, which have been clustered by state.
Source: Columbia Economics, L.L.C.

One objection to applying the above findings to the State of North Dakota is that the estimates represent national averages. Is it possible that North Dakota's legal and political structure differs in an important way from other states, rendering the overall

estimates invalid? To investigate the robustness of our findings, Tables 10 and 11 show the effect of federal aid on state own-source revenue and taxes within a variety of subsamples of states that more closely resemble North Dakota along a variety of legal and political dimensions. For simplicity, we report only estimates for our basic econometric model from column (6) in the above tables.

In column (1) we repeat the overall national results for comparison. In column (2), we restrict the sample to the 15 states with levels of per-capita federal grants most similar to North Dakota. In columns (3) and (4), we examine states with and without statutory tax-expenditure limitations or TELs (North Dakota currently has no TEL). Finally, in columns (5) and (6) we show results for states with and without supermajority voting rules on taxes (North Dakota has no supermajority voting rule on taxes). Overall, we find the same general pattern as in the full national sample. None of the subsample estimates are statistically different from the estimates from the full sample. There is little evidence that states more like North Dakota along these legal and political dimensions differ significantly from the national average effect of federal grants on state tax burdens. In each case, North Dakota appears to face the same budgetary problem of upward "ratcheting" from federal aid as the other U.S. states examined.

The next question we explored is which state taxes are most heavily affected by federal aid. Among the major state taxes, which ones do states rely on most heavily when filling in the budgetary holes left by expiring or shifting federal grants? Table 12 presents results for five major state taxes: state personal income taxes, corporate income taxes, general sales taxes, and alcohol and tobacco excise taxes.

TABLE 12. IMPACT OF FEDERAL GRANTS ON VARIOUS STATE TAX BURDENS

Variable	(1) Total State Tax Revenue	(2) Personal Income Tax Revenue	(3) Corporate Income Tax Revenue	(4) General Sales Tax Revenue	(5) Alcohol Tax Revenue	(6) Tobacco Tax Revenue
Federal Grants at Time *t* ($\phi_2 = \alpha$-1)	-0.459***	-0.346***	-0.097***	0.010	0.003	0.001
	(0.130)	(0.105)	(0.025)	(0.037)	(0.002)	(0.006)
Sum of Past Federal Grants ($\phi_1 = \alpha\beta$)	0.221***	0.135**	0.035**	0.020**	-0.001	-0.003
	(0.073)	(0.057)	(0.015)	(0.010)	(0.001)	(0.004)
n	1200	1200	1200	1200	1200	1200
Adjusted R-squared	0.996	0.990	0.980	0.996	0.993	0.958

*, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.
Note: All specifications include state and year fixed effects, as well as state-specific linear time trends. Heteroskedasticity-robust standard errors are reported in parentheses, which have been clustered by state.
Source: Columbia Economics, L.L.C.

Of the state taxes examined, federal grants have a significant upward effect on three: personal income taxes, corporate income taxes and general sales taxes. We find each dollar of federal aid raises personal income tax burdens by roughly 13.5 cents, corporate income tax burdens by 3.5 cents, and general sales tax burdens by 2 cents. We do not find any effect of federal grants on state alcohol or tobacco tax burdens. As noted above, these estimates only represent a partial view of the overall fiscal impact of federal aid, as much of the upward "ratcheting" appears to occur through higher non-tax fees, charges and lottery revenues.

Next we examined whether federal grants from some federal agencies are more likely to put upward pressure on state tax burdens than others. In Table 13 we present estimates from regressions of state tax and own-source revenue on current and past federal grants from a variety of individual federal departments, including Agriculture, Education, Health and Human Services, Housing and Urban Development, Transportation, and all other federal agencies combined.[11]

TABLE 13. IMPACT OF FEDERAL INTERGOVERNMENTAL GRANTS FROM SPECIFIC GRANTING AGENCIES

Variable	(1) State Own-Source Revenue	(2) State Tax Revenue
Total Federal Grants at Time *t* ($\phi_2 = \alpha$-1)	-0.454**	-0.375**
	(0.188)	(0.168)
Sum of Past Department of Agriculture Grants ($\phi_1 = \alpha\beta$)	1.782	1.299
	(1.852)	(1.562)
Sum of Past Department of Education Grants ($\phi_1 = \alpha\beta$)	0.819	0.684
	(0.509)	(0.477)
Sum of Past Department of Health and Human Services Grants ($\phi_1 = \alpha\beta$)	0.931***	0.892***
	(0.265)	(0.312)
Sum of Past Department of Housing and Urban Development Grants ($\phi_1 = \alpha\beta$)	0.123	-0.047
	(0.266)	(0.240)
Sum of Past Department of Transportation Grants ($\phi_1 = \alpha\beta$)	1.461***	1.390***
	(0.497)	(0.500)
Sum of Past All Other Department Grants ($\phi_1 = \alpha\beta$)	-0.444	-0.576
	(0.567)	(0.661)
n	500	500
Adjusted R-squared	0.998	0.997

*, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.
Note: All specifications include state and year fixed effects, as well as state-specific linear time trends. Heteroskedasticity-robust standard errors are reported in parentheses, which have been clustered by state.
Source: Columbia Economics, L.L.C.

Of the federal agencies examined, only two had a statistically significant effect on state taxes and own-source revenue. The Department of Health and Human Services, which administers a large fraction of all federal aid through state Medicaid grants, and the Department of Transportation both had a large and significant impact on taxes and own-source revenue. Grants from Health and Human Services raised state own-source and tax revenue by $0.931 and $0.892 per dollar of grants, respectively. Transportation grants resulted in the largest "ratcheting" effect, raising state own-source and tax revenue by $1.461 and $1.390 per dollar of grants, respectively. While it may appear puzzling that federal aid could raise state taxes by more than $1, recall that the figures in Table 13 are

[11] Due to limited data availability for individual federal departments prior to 1995, we restrict our sample in Table 13 to the ten-year period from 2001-2010 (n = 500).

mean estimates. The 95-percent confidence intervals for each figure reach well below $1, which is more consistent with predictions from economic theory.

Overall, we find strong evidence that federal grants-in-aid result in significant upward "ratcheting" of state taxes over time. Each dollar of federal aid leads states to increase spending by roughly 45 cents in the same year ($\alpha = 0.446$). In future years, roughly 27 cents or 61 percent of this spending results in permanent state programs financed by higher state own-source revenue ($\alpha\beta = 0.274$, $\beta = 0.614$). We find this effect in every subsample of the data examined, including states with similar legal and political characteristics to North Dakota. In the Appendix, we show these results are robust to a variety of alternative econometric specifications. Overall, we conclude there is good reason to doubt the conventional view among state lawmakers that federal grants-in-aid represent a "free lunch" from Washington. To the contrary, federal grants appear to impose significant hidden budgetary costs on recipient states in the long run.

Interpretation and Limitations

As with all non-experimental data, we cannot rule out the possibility that the above results suffer from what is known as "endogeneity" bias. A basic assumption of our regression model is that federal grants to states are "exogenous" with respect to state revenue. Although we have modeled state revenue as a function of federal grants, time and state fixed effects, and an error term capturing all other factors affecting state revenue, there may be unobserved factors driving both federal aid and state tax revenue, potentially biasing our estimates of the "flypaper effect" coefficient in the median voter model, $\phi_2 = (\alpha\text{-}1)$.[12]

Although the possibility of endogeneity suggests caution in interpreting our findings as the "causal" effect of federal grants on state taxes, the above estimates still represent what is known as the "best linear predictor" of the effect of federal aid on state tax burdens over time. Even if the above estimates have no causal content, our econometric model still provides the best available forecast of the impact of current and past federal aid on state taxes, in the sense that it exhibits the smallest "mean squared" forecasting error among all possible linear models.[13] Thus, the above results provide valuable information to state lawmakers weighing the costs and benefits of accepting federal aid, even if they do not reflect purely causal estimates.

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[12] This criticism is unlikely to apply to past federal aid, as grants from previous periods are almost certainly exogenous with respect to current state tax revenue. One approach to overcoming possible endogeneity is to "instrument" for federal grants, using an approach similar to Sobel and Crowley (forthcoming). Instrumenting for federal grants using various measures of state political power in Congress, they find little evidence of a significant endogeneity problem.

[13] For a discussion of the interpretation of OLS estimates as the "best" linear predictor in the mean-squared sense, see Hamilton (1994).

C. Simulated Impact on North Dakota Tax Burdens

In this section we apply the above econometric estimates to North Dakota's tax and own-source revenue data to simulate the impact of federal aid on the state's tax burden over time. In Table 14 we use our baseline estimates to show the estimated range of effects on per-capita tax and own-source revenue between 1995 and 2010. The "low" and "high" estimates represent the upper and lower 95-percent confidence intervals from our regression coefficients.

We find federal aid to North Dakota led to indirect state tax increases of between $128 and $1,181 per capita per year between 1995 and 2010, with an average annual tax increase of between $375 and $711 per person per year. Over the 16-year period, this amounts to an effective state tax increase of between 6.5 percent and 31.8 percent compared to a baseline of no federal grants, with a mean tax increase of 19.2 percent. Similarly, we find federal aid increased North Dakota's own-source revenue by between 6.5 percent and 24.8 percent, with a mean upward "ratcheting" of 15.6 percent.

As an alternative illustration, consider the impact of the 2009 federal stimulus bill, which relied heavily on federal grants to states. North Dakota was awarded roughly $520 million in federal aid from the bill, implying an eventual own-source revenue increase of roughly $143 million or $211 per capita. This illustrates an important potential cost of federal macroeconomic stimulus to states, as some fraction of temporary federal aid ultimately results in permanently higher state tax obligations for residents.

Table 14. Simulated Effect of Federal Intergovernmental Grants on North Dakota Tax and Own-Source Revenues, 1995-2010

				Implicit State Tax Increase Per Capita (2010 Dollars)			Implicit Own Source Revenue Increase Per Capita (2010 Dollars)		
Year	Tax Revenue Per Capita (2010 Dollars)	Own Source Revenue Per Capita (2010 Dollars)	Federal Grants Per Capita (2010 Dollars)	Low	Mean	High	Low	Mean	High
1995	$2,117	$3,203	$1,696	$128	$375	$623	$193	$464	$735
1996	$2,108	$3,175	$1,569	$118	$347	$576	$179	$430	$680
1997	$2,225	$3,377	$2,246	$169	$497	$825	$256	$615	$974
1998	$2,230	$3,392	$2,044	$154	$452	$750	$233	$560	$886
1999	$2,247	$3,408	$2,158	$162	$477	$792	$246	$591	$935
2000	$2,313	$3,542	$2,276	$171	$503	$836	$260	$623	$987
2001	$2,255	$3,566	$2,168	$163	$479	$796	$247	$593	$940
2002	$2,138	$3,493	$2,274	$171	$503	$835	$259	$623	$986
2003	$2,207	$3,574	$2,252	$169	$498	$827	$257	$617	$976
2004	$2,232	$3,544	$2,387	$180	$528	$876	$272	$654	$1,035
2005	$2,461	$3,750	$2,444	$184	$541	$897	$279	$669	$1,060
2006	$2,755	$4,168	$2,165	$163	$479	$795	$247	$593	$938
2007	$2,936	$4,470	$2,110	$159	$467	$775	$241	$578	$915
2008	$3,647	$5,397	$2,214	$167	$490	$813	$253	$606	$960
2009	$3,690	$5,446	$2,761	$208	$611	$1,014	$315	$756	$1,197
2010	$3,922	$5,446	$3,216	$242	$711	$1,181	$367	$881	$1,394
Total	$41,482	$62,953	$35,983	$2,707	$7,958	$13,210	$4,104	$9,851	$15,599
% Increase (1995-2010)	-	-	-	6.5%	19.2%	31.8%	6.5%	15.6%	24.8%

Source: Columbia Economics, L.L.C.

BOX 1. EXAMPLES OF FEDERAL GRANTS-IN-AID ENCOURAGING PERMANENT INCREASES IN STATE-LOCAL TAX BURDENS

"When Charles County officials explain why they plan to raise property taxes, they invariably mention a federal grant program that has provided the county more than $3.7 million over the last five years to help pay the salaries of 49 additional sheriff's officers. But in a tight budget year, some officials are saying that because the county enthusiastically embraced the grant program, it is facing some problems they didn't anticipate when they agreed to take the money. [S]tate-mandated increases in the officers' pay scales have exceeded budget planners' expectations, and the federal grants have not gone as far as the county had banked on."
Washington Post (5/27/2001), "Charles Police Grants Become a Mixed Blessing."

"The $8.8 billion spending plan was to help put 100,000 additional police officers on the street. But the grants paid counties, cities and towns for only three years of the new officers' salaries. Many of the recipients are caught in a political quandary as the first round of grants expires: They can keep the officers on the payrolls by scraping money from already lean municipal budgets or risk voters' wrath by letting the officers go…. 'It's easy to bring an officer on,' Mr. Candland said. 'But it's hard to get rid of one.'"
Washington Times (4/6/1998), "Federal Police Funds Pose Dilemma."

"Alpine residents will be paying more property taxes for public safety. The City Council voted 4-1 this week to approve a 45 percent tax increase, City Manager Rich Nelson said Wednesday... Nelson said the city had received a $143,000 grant several years ago to help cover the cost of firefighters, but that money has expired. Now the city must bear the full cost of the employees hired under it."
Salt Lake Tribune (8/17/2011), "Alpine Council OKs Tax Hike."

"The Legislative Budget Commission agreed to take the cash to provide home visiting services to at-risk families. But Sens. Joe Negron, R-Stuart, and Don Gaetz, R-Niceville, urged lawmakers to reject the funding, warning that the program's services were murky and that if federal dollars dry up, the state could be left covering the cost."
Palm Beach Post (9/7/2011), "After Rejecting Plenty, Scott Admin Accepts Some ObamaCare Dollars."

"Republicans said some of the new initiatives would have duplicated existing state programs, and that the state would eventually have to foot the bill for the program after the grant ran out after the 2015-16 budget year. 'It does set it up, but then down the road, we either have to abandon the program or we have to come up with the money to maintain it,' said House Budget Chairwoman Denise Grimsley, R-Sebring."
Highlands Today (6/26/2011), "Nursing Home Grant Rejected."

"One condition of the federal grant was that Fordland assume the cost of officers' $16,500 salaries once the grant expired. But the town couldn't, and now it may have to pay back the government for its grant.... Fordland is one of a dozen cities nationwide in the same predicament. The Department of Justice made 26,000 such grants for new police officers."
St. Louis Post-Dispatch (8/23/1999), "Lack of Money Leaves Police Chief Alone to Protect MO Town."

"Several agencies, such as San Leandro, said they were utilizing federal grants to fill needed positions, something San Jose controversially declined to do. According to San Jose City Manager Deb Figone, the city would have been on the hook to pay $16 million in salaries when the grant expired."
San Jose Mercury News (7/16/2011), "Laid-off San Jose Cops Quickly Finding Jobs with Other Depts"

"Ten Manchester police officers are funded with a stimulus grant. It runs out next year. The city cannot let the officers go because to get the grant, it had to agree to keep them employed for a year after the federal money expired. Mayor Ted Gatsas pegs that cost at $490,000, which will be borne by the taxpayers."
New Hampshire Union Leader (6/14/2011), "Pay Up: City Stimulus Bill Coming Due."

BOX 1. (CONTINUED)

"Spokane County commissioners balked Tuesday at applying for a federal grant that would provide 11 officers for three years and then a big bill. The grant would provide $2.9 million to cover salaries for three years, but the county would be required to retain the deputies for a fourth year. County Grants Administrator Jennifer Stapleton said the fourth-year cost would be more than $1.2 million."
Spokesman Review (5/11/2011), "County Weights Grant for Adding 11 Deputies."

"Sheriff W.E. 'Billy' Smith said the Lenoir County Sheriff's Office did not apply for any of the funding through the COPS program because of concerns funding would eventually dry up, leaving the county to fund any positions made possible through the grant after it expired. 'Equipment, you can buy and you can keep using it,' Smith said, 'My only reservation with the COPS program is it gets you in there and then it forces the city or county to have to pick that up in a couple of years.'
Free Press (5/3/2009), "Federal Funding Could Bring More Police to Area."

"Riley said the stimulus law requires states to change their laws to expand jobless benefits to those who don't normally qualify, such as those who work part time or who leave their job for a 'compelling family reason.' Riley said that provision could cause a tax increase on Alabama employers, and potentially their employees, when the stimulus dollars expire."
Huntsville Times (2/24/2009), "Cash Has Too Many Strings, Riley Says."

"Florida was rejected for federal education dollars known as Race to the Top…. Scott said he thought Florida was turned down because the state wouldn't commit to continuing programs after federal dollars expired. 'When Florida's application was submitted for the grant in October, we made it clear that we would not accept grant money with strings attached, additional state spending obligations, or requirements that created new burdensome regulations on private providers,' Scott said."
Tampa Bay Times (1/5/2012), "Refuse Temporary Federal Funds that Create Permanent Spending."

"Louisiana's Bobby Jindal, a Republican, became the first governor Friday to refuse officially a part of his state's share of the $787 billion stimulus bill… He said accepting the money would have required a change in state law and, after federal money runs out in three years, would have led to a $12 million increase in taxes on his state's businesses to keep funding the benefit."
Washington Times (2/21/2009),"Jindal Rejects LA's Stimulus Share."

"Gov. John Lynch said yesterday state officials will not apply for any federal stimulus money that commits the state to long-term financial obligations it will not be able to afford. 'I don't anticipate using federal stimulus dollars to expand or create programs that we then cannot support once that one-time money is gone,' Lynch told New Hampshire reporters via telephone from Washington D.C."
Union Leader (2/24/2009), "One-Time Money or Windfall?"

"Requiring our state to spend beyond its means for the next 24 months to be eligible for all the stimulus monies guarantees that South Carolina will dig itself a $740 million financial hole. Who helps us then? Do we raise taxes, and thereby weaken our competitiveness relative to other states and countries -- or do we just summarily end programs for some of the neediest of our state?"
Post and Courier (4/5/2009), "Setting the record straight on best stimulus option."

"As lawmakers around the country debate their states' budgets, they're staring over the edge of a massive fiscal cliff -- the point where about $100 billion in federal stimulus money for education will run out. The bulk of the money, part of $814 billion provided under the American Recovery and Reinvestment Act passed in 2009, went to save the jobs of teachers and other school employees…. Lawmakers in many states drew criticism for making deep cuts in state education spending and replacing the money with stimulus dollars, thus avoiding cuts elsewhere in their budgets."
Huffington Post (4/6/2011), "Educ. Budget Cuts: Schools Face Fiscal Cliff As Stimulus Money Runs Out."

IV. CASE STUDIES: THE EFFECT OF FEDERAL GRANTS ON LOCAL CONTROL

The prior section of this paper examined the impact of federal grants-in-aid on state budgets. This section examines some of the non-budgetary costs. When states accept federal grants-in-aid they are required to follow all of the rules and regulations that come with it. Sometimes these mandates are few and only affect the subsidized activity. Other times they are much more onerous and far reaching.

This phenomenon is highlighted using four case studies. The first examines how the federal role in transportation has grown over time and how its control over highway funds has been used to prod states into enacting a myriad of policies—ranging from billboard removal to raising their minimum drinking ages—many of which they would not have otherwise adopted. The second explores how the federal role in primary and secondary education has grown over the past half-century and describes how this has led to the ongoing rebellion in the states over the federal No Child Left Behind law. The third case study looks at how the enactment of Medicaid has affected the states while the fourth one examines how stringent rules attached to what appear to be fairly innocuous federal natural resource grants can have significant impacts on states and localities.

A. CASE STUDY ONE: TRANSPORTATION

Article 1, Section 8 of the U. S. Constitution grants Congress the power "To establish Post Offices and post Roads." During the late 1700s and early 1800s, policymakers interpreted these words literally (Dilger, 2011). If the founding fathers had intended the federal government to provide other types of transportation infrastructure, this view held, they would have listed them. Since they did not, such responsibilities were assumed to fall under the purview of state and local governments or the private sector. Proponents of a limited federal role in transportation also have pointed to the 10th Amendment which states, "The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people."

In 1816, for example, President James Madison proposed having the federal government provide for a series of infrastructure projects in the states. Before this could be done, however, he felt that the Constitution had to be amended to allow the federal government to take on such an expanded role (Williamson, 2012). When Congress passed a bill to pay for the projects without amending the Constitution, President Madison vetoed the legislation.

As the western frontier began to open up in the first half of the nineteenth century, territorial and newly created state governments had very limited resources to build and maintain wagon roads, bridges and canals. As a result, federal officials faced increased pressure to fund such projects which often did not involve the movement of mail (Dilger, 2011). To overcome constitutional objections a 'state-centered' system was created where states determined their transportation needs and the federal government provided some financial assistance.

At the time federal revenues averaged just one to two percent of gross domestic product, and the bulk of these monies were needed for foreign relations and national defense. After the American Revolution, however, the federal government had acquired large tracts of land. It began to finance large infrastructure projects by granting some of this land to states, which, in turn, auctioned it off and used the proceeds to pay for transportation projects (Dilger, 2011).

By the late 1800s, a rudimentary systems of roads, bridges and canals crisscrossed the United States. As the public began to increasingly rely on this system, interest groups sprung up and began to lobby for its expansion and refinement. Pressure to improve roads grew markedly after the invention and popularization of the automobile in the late-1800s and early-1900s. In 1900 there were 8,000 motor vehicles registered in the United States. Fifteen years later this figure shot to over 2 million (Dilger, 2011).

Congress responded to the soaring number of cars on the road by passing the Federal-Aid Road Act of 1916 (Dilger, 2011). This Act retained the state-centered approach, in which states determined their transportation needs, but used a modern matching system in which the federal government provided one dollar of aid for every one dollar expended by the states on eligible transportation projects.

In subsequent reauthorizations federal authority over transportation policy gradually expanded. In a 1921 reauthorization Congress asserted that its power over transportation policy stemmed not only from its constitutional authority to establish post roads, but also from the 'general welfare' and 'interstate commerce' clauses (Dilger, 2011). A 1944 reauthorization of the Act all but abandoned the need to provide any constitutional justification for federal intervention in transportation policy (Dilger, 2011).

The growth of motor vehicles in the United States slowed during the Great Depression. This continued into the 1940s as millions of Americans were sent overseas to fight World War II and as factories were retooled to produce war material. The post-war economic boom, however, caused automobile sales to soar and highway construction once again rose to the top of the national agenda.

Congress responded by passing the Federal-Aid Highway Act of 1956, which authorized the construction of a 41,000 mile Interstate Highway System. Construction of this network of roads would be the largest public works project in history and was scheduled to take 26 years to complete. Funding for the project was slated to come primarily from federal excise taxes on motor fuels. These funds were placed in the Highway Trust Fund and disbursed to states as projects were implemented ("Highway Trust Fund," 2010). After the completion of the Interstate Highway System, funds were used to pay for repair and maintenance.

On paper, construction of the Interstate Highway System retained the 'state-centered' approach that had characterized transportation policy in the United States for more than a century. Federal officials were to work with their state counterparts to draw up plans for interstate highways within their respective states. State departments of transportation would then be largely responsible for construction and maintenance of the roadways.

In practice, however, construction of the interstate highway system was a massive centralization of transportation policy in Washington. Much of this power stemmed from the fact that the federal government was responsible for 90 percent of project costs. This gave federal officials enormous sway over their state counterparts as to the placement of roads as well as their construction and design. Soon uniform road construction and design standards were being imposed across the nation (Dilger, 2011). This was particularly irksome to local officials since it ignored their needs and drove up project costs. Much more troubling, however, was Congress's use of federal highway funds to encourage, and later coerce, states into implementing policies which could not have otherwise made it through their legislatures. Often these policies were only tangentially related to highway use.

Highway Beautification

One of the first uses of highway funds to alter state policy was the Bonus Act of 1958. This legislation paid states a 'bonus' equal to a half percent of their federal highway construction costs if they restricted the placement of billboards along interstate highways (Staihar, 1971). Only 25 states enacted legislation qualifying them to receive bonus payments and two of those later withdrew from the program.

Seven years later Washington's carrot became a stick when Congress passed the Highway Beautification Act of 1965 (Reistrup, 1970). This Act assessed a penalty equal to 10 percent of a state's federal highway funds if they did not restrict outdoor advertising. It also mandated that automotive salvage yards located along highways be either removed or shielded from view. States were given until July 1, 1970 to comply with the Act.

Interstate highways occupied relatively large swaths of land in many states and drivers often liked the information provided by roadside billboards. Moreover, state legislators were often reluctant to shutter or drive up the costs of businesses that provided both employment and consumers with inexpensive replacement parts for their automobiles. As a result, most state governments ignored the beautification mandate.

As the deadline approached only 14 states had fully complied with the Beautification Act ("29 States Fail," 1971). To force compliance, U.S. Secretary of Transportation John A. Volpe ratcheted up pressure on the states throughout 1971 and into 1972, eventually forcing all but one to comply with the billboard mandate. That state, South Dakota, challenged the federal government's authority to impose the mandate in federal court. After it lost its case in January 1973 it too was forced to comply.[14]

[14] South Dakota v. Volpe, 353 F. Supp. 335 (1973).

The 55 Mile Per Hour Speed Limit

Driving conditions in the United States vary dramatically from highly congested commuter routes in the Northeast to long, unobstructed and lightly used highways across the Plains. Because of this diversity, the setting of speed limits on the nation's roads has traditionally been a state function.

This changed in 1974 when Congress passed the Emergency Highway Conservation Act in response to a series of price spikes brought about by an Arab oil embargo of the United States. Emboldened by its success in forcing states to remove billboards, federal lawmakers required states to set a maximum speed limit of 55 miles per hour or lose all federal highway funding.

Passage of the national speed limit proved extremely unpopular with motorists. Surveys of highway speeds across the country routinely found that many as 85 percent of drivers ignored the law.[15] This put state officials in the awkward position of being charged with enforcing a law that many of their constituents ignored. In addition, some state law enforcement officials felt that the federal mandate caused them to misallocate scarce resources. "Why must I have a trooper stationed on an interstate, at 10 in the morning, worried about a guy driving 60 on a system designed to be traveled at 70," asked South Dakota Highway Patrol Director Jerry Baum. "He could be out on a Friday night catching drunk drivers" (Kraft, 1986).

Unable to repeal the law several states slashed penalties for speeding. Arizona, Idaho, Montana, Nevada, and Utah, for example, all replaced punitive speeding penalties with small, $5-$15 fines for individuals cited for driving less than pre-1974 state speed limits (Grimes, 1982). When Nevada Governor Bob List signed such a bill before a town meeting, the crowd erupted in applause ("Around the Nation," 1981).

Two decades later federal officials felt enough constituent pressure to finally repeal the law. On December 8, 1995, the National Highway Designation Act eliminated the national speed limit and once again allowed states to set their own ceilings. Today speed limits range from lows of 60 mph in Hawaii and 65 mph throughout much of New England to highs of 80 mph in Nevada and parts of Texas.

The National Minimum Drinking Age Act

After the 21st Amendment ended Prohibition in the United States in 1933 most states simply set the minimum drinking age at 21, then the federal age of majority. As millions of 18, 19 and 20 olds returned from World War II after being conscripted into military service, however, pressure began mounting to reduce the age of majority. These pressures only intensified during the Vietnam-era.

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[15] For a discussion of the widespread violation of the 55 mile per hour speed limit see Grimes (1982), "(Speeders in Majority," 1987) and (Hamilton, 1989).

On March 10, 1971 the U.S. Senate voted 94-0 in favor of a constitutional amendment granting individuals 18 years of age and older the right to vote. Thirteen days later the U.S. House of Representatives voted 401-19 in favor of the proposed amendment. It then went to the states where it received the required approval of three-fourths of state legislatures in a record 100 days. On July 5, 1971, President Richard Nixon signed the voting rights expansion, making it the 26th Amendment to the U.S. Constitution.

In the wake of the 26th Amendment's passage, pressure mounted on state lawmakers to reduce young adults' minimum drinking ages as well. By the end of 1975, 29 states had lowered their minimum drinking ages.

Reduction of the minimum drinking age coincided with a growing public awareness of drunk driving, a problem that disproportionately involved young people. In 1984 Congress passed the National Minimum Drinking Age Act, which required states to raise their minimum drinking ages to 21 or lose 10 percent of their highway funds. The law was highly controversial since many individuals still felt that there was much merit to the 'old enough to die for your country, old enough to drink' sentiment. Moreover, the setting of minimum drinking ages had traditionally fallen under the purview of state governments.

As it had done with the federal billboard mandate, South Dakota took a lead role in challenging the constitutionality of the National Minimum Drinking Age Act. Its case, *South Dakota v. Dole*, was ultimately decided by the U.S. Supreme Court which ruled in favor of the Act. By 1988 all U.S. states had minimum drinking ages of 21. Two U.S. territories however, Guam and U.S. Virgin Islands, refused to raise their minimum drinking ages.[16]

Billboard removal, the 55 mile per hour speed limit, and the national minimum drinking age are not the only policies that have been foisted on the states under the threat of withholding federal highway funds. Policies as diverse as mandatory motorcycle helmet (Naumann and Shults, 2012) and campaign finance regulations (Youm, 2009) have also been put in place under such a threat.

Impact on North Dakota and Efforts at Reform

Federal grants-in-aid for transportation have had a powerful influence in North Dakota over the past six decades, affecting the composition of state government outlays as well as other aspects of life. In 1955 total state government spending on transportation totaled $22.5 million and comprised a little less than one-quarter of total outlays. Five years later, after the passage of the Federal Aid Highway Act of 1956, state government expenditures on transportation had more than doubled to $55.1 million and comprised more than one-third of total outlays.

Though its share of outlays has declined, state spending on transportation has remained high over the years. In 1970 outlays totaled $61.2 million. By 1980 this figure more than

[16] In 2010 Guam increased its minimum drinking age to 21.

doubled to $139.0 million. In 1990 total state expenditure for transportation reached $202.7 million and before ballooning to $356.8 million in 2000. By 2010, state expenditures on transportation totaled a gravity-defying $594.9 million.

In addition to distorting state outlays toward spending on transportation, acceptance of federal highway funds has subjected North Dakotans to federal mandates such as those described above. While state policymakers have long voiced concerns over federal meddling, unlike its southern neighbor, they have not taken a leadership role in the fight over state sovereignty. South Dakota, on the other hand, aggressively fought both the highway beautification and nationwide minimum drinking age acts in federal courts.

Given the current political environment North Dakota has two choices if it wants to regain its sovereignty over transportation policy. The first would be to simply reject federal aid for transportation altogether, freeing it from the mandates that accompany such largess. A potential problem with this approach is that federal government currently extracts hundreds of millions of dollars from the state annually in Highway Trust Fund excise taxes. Many defenders of accepting federal transportation funds argue that this must be done in order to return these funds to the state.

An alternate approach would be for the state's congressional delegation to aggressively support the movement in Congress to eliminate or sharply reduce Highway Trust Fund excise taxes and devolve much of the authority over transportation back to the states. In the last several sessions of Congress, Senator Jim DeMint (R-SC) has introduced legislation which would continue federal responsibility over transportation projects that are truly interstate in nature and devolve other responsibilities back to state and local governments. In the current Congress similar legislation has been introduced by Representative Tom Graves (R-GA) in the House of Representatives.

Conclusion

The U.S. Constitution reserved much of the responsibility for transportation infrastructure to state and local governments as well as the private sector. Unfortunately, beginning in the mid-nineteenth century, efforts to work around these limits eventually eroded them. Today the federal government exerts considerable authority over transportation policy. States have lost even more autonomy as the federal government has used this power to coerce them into adopting policies—from billboard removal to the 55 mile per hour speed limit—that are only tangentially related to the construction and maintenance of transportation projects. In many cases these measures would not have otherwise been adopted by state legislatures.

Much of power that the federal government has assumed over transportation stems from its control over the purse strings of the Highway Trust Funds. One way for states to regain some of their sovereignty is for them to refuse to accept these funds. Another is for their congressional delegations to support legislation to reverse the nationalization of transportation policy.

B. CASE STUDY TWO: EDUCATION

When enumerating the powers of the federal government in the U.S. Constitution the founders made no mention of education. At the time the Constitution was written most primary and secondary schools were run by local entities (Friedman and Friedman, 1980). Some were run as cooperatives with parents contributing funds for their children's education. Others were run by churches. Still others were run by local governments.

During the mid-1800s control over primary and secondary education began to be consolidated by state governments and soon most children attended government run schools (Friedman and Friedman, 1980). In 1867 the U.S. Department of Education was formed and charged with collecting information on schools and teaching methods that would assist states in creating more effective school systems (U.S. Dept. of Ed, 2012). Its stature as a federal department was short-lived, however. The next year it was demoted to the Office of Education. Later it became a relatively obscure bureau within the Department of the Interior.

Over the next century the federal government role in primary and secondary education remained extremely limited. In 1917 the Smith-Hughes Act was signed into law (U.S. Dept. of Ed, 2012). This act encouraged schools to provide vocational training. In 1946 the Congress passed the George-Barden Act, which urged schools to provide guidance counseling (Barrett, 1948).

On October 4, 1957, in the midst of the Cold War, the Soviet Union launched Sputnik, the first manmade satellite to orbit the Earth. Sputnik prompted Congress to pass the National Defense Education Act. Among its provisions were measures aimed at improving math and science instruction in primary and secondary schools (U.S. Dept. of Ed, 2012).

The Elementary and Secondary Education Act of 1965

President Lyndon Johnson saw education as an important tool the federal government could use to fight poverty. In 1965, as part of his administration's War on Poverty, he signed into the Elementary and Secondary Education Act, the most significant piece of federal legislation affecting primary and secondary education ever enacted (Hanna, 2005).

ESEA differed markedly from prior federal forays into education policy. Instead of promoting some aspect of education like vocational training or the study of math and science, the Act sought to improve education generally, particularly among children from low-income families. ESEA provided federal grants to school systems across the country. Title I of the Act directed most of this aid go to the children of low-income families (Hanna, 2005). Over the last four and a half decades ESEA has been periodically reauthorized. The last time this occurred was in 2002 when President Bush signed the No Child Left Behind Act into law.

From its earliest days ESEA has been mired in controversy. Just a year after its passage a seminal report on education policy commissioned by federal government called into question the entire premise upon which ESEA was based. In *Equality of Educational*

Opportunity sociologist James Coleman presented strong evidence that increased school funding had little impact on actual student performance (Coleman, *et al*., 1966). Nevertheless, federal aid for education grew rapidly during this period. In 1965 federal grants-in-aid for education totaled $1.4 billion. By 1970 this figure had more than tripled to $4.6 billion.

During the 1972 reauthorization of the program critics charged that ESEA funds intended to assist children from low-income families were often diverted to fund general education programs. To prevent this, spending guidelines were issued. To comply with these regulations, schools frequently placed children from low-income homes in different programs than their middle- and upper-income peers. The segregation of low-income students troubled many education experts who felt that it reduced the quality of their education (Hanna, 2005). Nevertheless, states continued the practice to keep the federal aid spigot flowing. By 1975 federal grants-in-aid for education had grown to $7.9 billion. By 1980 this figure climbed to $12.8 billion.

In August 1981 the National Commission on Excellence in Education was formed and charged with evaluating the state of American education. Two years later it released a report titled *A Nation at Risk: The Imperative for Education Reform* ("National Commission," 1983) The report painted a dismal portrait of American education. Among its findings was that 13 percent of all 17-year-olds in the United States was functionally illiterate. Among poor and minorities—the target of much ESEA aid—the functional illiteracy rates were as high as 40 percent.

Such findings caused many to conclude that the federal government's longstanding, "rich uncle" efforts to improve elementary and secondary education were not working. Both the Reagan and Bush administrations proposed converting ESEA into a block grant to the states with few strings attached, but such measures were never passed by Congress (Hanna, 2005). Meanwhile, funding kept flowing in greater volumes. Federal grants-in-aid to education grew to $15.3 billion in 1985 and then to $21.3 billion in 1990.

Standards and Testing

In the early 1990s the state of American primary and secondary education was widely considered to be in worse shape than it had been 30 years earlier, and the federal government had very little to show for the billions it had spent on K-12 education. In 1994 ESEA was reauthorized by the Improving America's Schools Act. IASA made two major changes to ESEA. First, it required states to set education standards and then come up with ways determining whether schools were attaining these goals. Secondly, it threatened to cut federal aid to underperforming schools.

Eight years later President George W. Bush signed into law the No Child Left Behind Act. NCLB built on the ideas of educational standards, testing, and threats to withhold federal aid first laid out in IASA. NCLB requires states to test every student attending government run schools annually for proficiency in reading and math using a statewide standardized test. Under the law reading and math proficiency levels are required to rise each year until all students became proficient in 2014. Another provision of the law, called Annual Yearly Progress, requires that each school in a state show gradual

improvement over time. Other provisions require that teachers be 'highly qualified' and that a 'high, challenging standard' curriculum be taught to all students. If states do not conform to the requirements of the NCLB, they are penalized with a loss of ESEA aid.

State Reaction to No Child Left Behind

The NCLB passed both houses of Congress with large majorities. In the U.S. House of Representatives it passed with a vote of 384 to 45. In the U.S. Senate it received 91 yeas and 8 nays. Its reception in the states, however, was considerably cooler. While demanding that all students be taught a challenging standard curriculum that would make them all proficient in reading and math may have been effective political rhetoric, many professional educators felt that the existence of children with special needs—such as those with learning disabilities or those for who English was not their native language—made such goals unrealistic. "There's a fallacy in the law and everybody knows it," said Alabama State Superintendent of Education Joe Morton, "[(H)aving every child in the state proficient in reading and math] can't happen…and everybody knows that would never happen" (Stephens, 2010).

State policymakers worried that efforts to reach such unattainable goals would have a significant impact on the states, distorting both how education was provided and in the allocation of educational resources. Many feared that the proficiency mandates would encourage schools to alter instruction so that it focused on the material covered on standardized tests (Armario and Bonner, 2011). Others worried that resources currently dedicated to advanced instruction and noncore subjects, such as art and music, would be redirected toward remedial instruction.

Within two years of its passage states across the country began rejecting No Child Left Behind mandates. The groundswell started in the Northeast but quickly spread to other areas (Dobbs, 2004). "I know it's a tough budget year," said Gilbert Milone, chairman of the Lisbon, Connecticut Board of Education after he rejected ESEA aid in 2003, "but we're losing control with this federal law" (Gordon, 2003). The school superintendent in nearby Somers also rejected the aid complaining of the "ropes and anchors attached" to it (Gordon, 2003).

By early 2004 state legislatures in Hawaii, New Hampshire, Utah, and Virginia had passed resolutions stating that they would no longer spend state funds to comply with the No Child Left Behind Act, and similar measures were under consideration in Arizona, Indiana, New Mexico, Tennessee, Washington and Wisconsin (Minkel, 2004). "This is not a partisan issue; this is a states' rights issue," said Republican Representative Margaret Dayton who led the opt-out fight in Utah ("Utah Set to," 2006).

The anti-NCLB rebellion in the states worried federal officials who lobbied their state counterparts not to withdraw from the program. As reading and math proficiency deadlines loomed, however, federal officials were having less and less success keeping states in the fold. To prevent a mass exodus of states from ESEA, the Obama Administration began offering waivers from the program. In August 2012 South Carolina became the 30th state to be granted a waiver from No Child Left Behind.

The Impact of Federal Aid to Education on North Dakota

The history of federal aid to education in North Dakota parallels that in much of the rest of the country. In 1965, prior to the passage of the Elementary and Secondary Education Act, federal aid for education to the North Dakota state government totaled $5.8 million. Five years later this figure more than tripled to $17.9 million. It then rose to $41.9 million in 1980 and to $82.2 million in 1990. In 2000 it climbed to $148.5 million. Prior to the passage of the Improving America's Schools Act in 1994 most of the strings attached to this aid affected the instruction of low-income children. After IASA, federal rules and regulations began to affect the education of all children in the state. The federal footprint grew markedly after the No Child Left Behind became law in 2002.

During the early 2000s, when the percentage of students required to meet the NCLB's proficiency standards was relatively low, most North Dakota schools met the standard. As proficiency standards have increased over the last decade, however, more and more schools have received a failing grade. In 2011 57 percent of the state's schools did not make adequate yearly progress under No Child Left Behind (Van Ellis, 2012).

While its experience with the No Child Left Behind law has mirrored that of other states, North Dakota has not joined the rebellion that swept much of the nation. Shortly after the President announced that he would be willing to grant waivers to states in September 2011, the state notified the federal government that it intended to apply for one (Van Ellis, 2011). After the state missed a November 11 filing deadline Superintendent of Public Instruction Wayne Sanstead seemed uncertain about whether the state would apply for a waiver. "If indeed there's an application, it won't be 'til February," he stated (Van Ellis, 2011). That deadline, too, came and went. The state now says it intends to apply for a NCLB waiver by September 2012 (Van Ellis, 2012).

Conclusion

The powers enumerated in the U.S. Constitution grant the federal government no power over education. For much of the nation's history the federal government's involvement in primary and secondary education remained extremely limited. This began to change in the mid-1960s with the passage of the Elementary and Secondary Education Act and federal aid to the states for education grew rapidly from $1.4 billion in 1965 to $31.9 billion in 1995.

After 30 years and billions of dollars in spending the federal government had very little to show for its effort. Indeed by the mid-1990s the state of education was widely seen as being worse than thirty years prior. Rather than scaling back its involvement in primary and secondary education, the federal government increased it, first with the Improving America's Schools Act and then with No Child Left Behind.

If history is any guide, a ramped up federal effort will only decrease the quality of primary and secondary education. One way for North Dakota and other states to regain some of their lost sovereignty over education policy is to work within the existing legal framework to seek No Child Left Behind waivers. Another would be to simply reject federal education aid and the strings that come with it altogether.

C. CASE STUDY THREE: MEDICAID

Medicaid is a jointly funded, federal-state program which provides for the health care of primarily low-income individuals. It was created by the Social Security Amendments of 1965, the same legislation that created Medicare, the other large federal health care program for the elderly.

Medicaid's annual spending is not determined by appropriation processes of federal or state legislatures. Instead these bodies determine who is eligible for Medicaid and what services are covered. Annual program costs are then a function of program usage.

Federal regulations mandate the coverage of certain individuals by state Medicaid programs. Most are low-income. Hearne (2005), however, points out that some have incomes significantly higher than the Federal Poverty Level (FPL). Federal rules allow states to add other individuals to their Medicaid rolls.

Federal rules also mandate that certain services be covered. These include physician services; inpatient hospital care; nursing and home health care; and laboratory and x-ray services. States have the option of adding additional services. The Federal government also dictates how state Medicaid programs are administered.

States can request waivers from the U.S. Secretary of Health and Human Services to opt out of certain provisions of the Medicaid law. Applying for a waiver, however, can be a lengthy process and the HHS secretary has considerable discretion over whether it's granted.

Most states have a schedule of fees they are willing to pay for various health care services under Medicaid. Health care providers simply bill the state government for services provided under what's known as a fee-for-service arrangement. States are then, in turn, reimbursed for a portion of their expenditures by the federal government. This amount is determined by a formula known as the Federal Medical Assistance Percentage (FMAP) (Baumrucker, 2010). This formula reimburses states with average incomes lower than the national level at higher rates than states with higher than average income levels. In 2008, Mississippi, the state with the lowest average personal income received a reimbursement rate of 76.29 percent.[17] This compares to a reimbursement rate of 50 percent for high-income states such as New York, California, and Maryland. North Dakota had the 17th highest average personal income in the country that year and a reimbursement rate of 67.49 percent.

The Great Recession of 2008 caused Medicaid rolls and expenses to rise sharply, placing enormous strain on many state budgets. The Obama Administration sought to relieve this pressure in its stimulus package (the American Recovery and Reinvestment Act of 2009) by having the federal government temporarily pick up a larger share of the tab for Medicaid by increasing FMAP percentages through December 31, 2010. Subsequent legislation partially extended this relief for another six months.

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[17] 2008 was chosen because it was the last year in which payments were not affected by the American Recovery and Reinvestment Act of 2009. See discussion below.

Medicaid also played a central role in the President Obama's plan to overhaul the nation's health care system. Under the Patient Protection and Affordable Care Act all individuals who do not have health insurance coverage with incomes up to 133 percent of the federal poverty level were to become eligible for Medicaid coverage beginning in 2014. Coverage was also to be extended to all individuals who were formerly in foster care up to age 26. These provisions were found to be unconstitutional by the U.S. Supreme Court on June 28, 2012.

The Growth of Medicaid

During its first full year of operation in 1967 Medicaid cost state governments about $600 million, or less than 1 percent of total outlays. Over the years, however, the program was continually expanded and by 1975 Medicaid consumed 7.0 percent of state budgets. By 1985 this figure had risen to 11 percent.

Program expansion was driven by a variety of factors. Because neither federal nor state governments bore the full cost of expansion, politicians at both levels had incentives to grow it. Moreover, states soon devised ways of maximizing federal Medicaid payments using inefficient, questionable, and in some cases outright illegal tactics (Hearne, 2005).

By 1995 Medicaid expenditures were consuming more than one-quarter of state budgets and causing much tumult. Growing Medicaid expenditures were squeezing other state programs such as education and transportation. This pressure was magnified during economic downturns when the number of Medicaid beneficiaries grew sharply leading to dramatic increases in spending. Because Medicaid is an entitlement there is little that that states could do in the short-run to rein in spending. Under the balanced budget requirements that most states operate under, this means that taxes have had to be raised or large cuts in popular programs had to be made.

As former Democratic Governor of Tennessee Phillip Bredesen has noted "States are being put in a box. Most are prohibited from borrowing money to balance budgets and Medicaid increasingly shoulders aside investments in other areas such as education and infrastructure. In Tennessee, Medicaid didn't exist in 1965 and in 1981 its budget was about half of what we spent on K-12 education, it surpassed spending on K-12 in 1992, and by 2004 it was 2.25 times our K-12 budget" (Bredesen, 2010).

By 2005 state Medicaid expenditures totaled $120 billion and consumed nearly one third of state government outlays. Then came the Great Recession of 2008 which caused Medicaid expenditures to rise sharply. Even after the temporary rise in Medicaid expenditures brought about by the current economic slowdown subsides, under current law budget experts expect state Medicaid expenditures to place considerable pressure on state budgets well past midcentury (Hearne, 2005).

State Efforts to Control Costs

States have attempted to lessen the fiscal impact of burgeoning Medicaid expenditures in a variety of ways. One set of fixes relies on working within the parameters of the existing program and limiting eligibility and services covered. Last year, for example, Arizona applied for a federal waiver to cut 280,000 adults from its Medicaid rolls ("States

Weigh," 2011). Meanwhile in California, Governor Jerry Brown sought to cut costs by limiting physician visits and the number of prescriptions covered by the state's Medicaid program ("States Weigh," 2011). States have also sought to cut costs by increasing the efficiency of their Medicaid systems. Utah, for example, has received a waiver to communicate with Medicaid recipients via email and hopes to save more than $6 million annually (Pear, 2011).

Other states have launched much more ambitious programs aimed at getting to the root of runaway costs. Medicaid's problems are varied and complex. Many, however, stem from incentives created under the plan. Under its current fee-for-service structure neither beneficiaries nor providers have sufficient incentives to choose efficient treatment regimes. Beneficiaries receive treatment and providers are paid regardless of whether a high- or low-cost option is selected. Consider the costly case of low-weight births. In aggregate it is much less expensive to prevent low-weight births with prenatal care than to care for low-weight infants (Bond, 2010). Too frequently, however, costly neonatal care is effectively substituted for relatively inexpensive prenatal care.

One way of encouraging low-cost treatment regimes involves requiring that Medicaid recipients pay a portion of their medical expenses through the use of a copayment. Under such a program a pregnant woman facing the choice of copaying $5.00 per week for prenatal vitamins or having a 5 percent chance of incurring $100,000 in medical expenses from giving birth to a low–birth weight baby would rationally choose the purchase the prenatal vitamins.

A potential problem with the use of copayments is that low-income Medicaid recipients may be so financially constrained in the short-run that they choose to take gambles that are irrational over the longer-term. One way out of this predicament is to place a portion of recipients' Medicaid benefits into special fund known as a Medical Savings Account (MSA). Recipients could then make copayments out of this fund. Because money not used for copayments can defray the cost of medical care not covered by Medicaid, recipients have strong incentives to make optimal decisions concerning health care. Some plans strengthen this incentive by allowing unused funds to be spent for any purpose after some period of time or after an individual has left the Medicaid program. South Carolina, for example, has implemented Medical Savings Accounts as part of its overall Medicaid reform plan (Landa, 2006).

An alternate way of controlling escalating Medicaid costs is to enroll recipients in private health care plans which, because of bottom line pressures, have an incentive to choose low-cost treatment options. This can be done by providing Medicaid recipients with a voucher, the value of which is based on their medical history, and allowing them to find an insurance plan in the private market that is acceptable to them for a price equal to or less than the value of the voucher. A key component of Florida's Medicaid reform plan involves having recipients purchase private health insurance policies using Medicaid vouchers (Pear, 2011).

Reducing Medicaid spending has not been easy for the states. As noted above, in order to alter their Medicaid programs away from federal guidelines states must apply for a waiver from the U.S. Secretary of Health and Human Services. This can be a time

consuming and burdensome process. When Utah applied for a waiver to allow it to communicate with Medicaid recipients via email it took more than eight months to get approved, and this was only after the state's governor personally appealed to President Obama at a chance meeting of the two (Pear, 2011). Furthermore, the process allows groups who have an interest in maintaining the status quo plenty of opportunities to throw up roadblocks to block change. When Arizona Governor Jan Brewer attempted to trim its Medicaid rolls, groups representing the state's hospitals lobbied the Health and Human Services Secretary to deny the waiver.

Growing Medicaid Spending, Efforts at Reform in North Dakota, and Obamacare

As in other states, the share of the North Dakota state government outlays going to pay Medicaid expenses had grown rapidly over the years. During its first full year of operation in 1967 Medicaid outlays accounted for just one half of one percent of total state spending. Within a decade this figure had grown to 5 percent. By 1985 Medicaid's share of total state expenditures climbed to 9 percent and by 1995 it had grown to nearly one quarter of state outlays.

The Great Recession of 2008 caused both the Medicaid caseload and total expenditures to soar. In 2007 71,058 North Dakotans received benefits from Medicaid. By 2009 (the latest figure available) this figure increased 13 percent to 80,262. Initially the large increase in the Medicaid caseload placed an enormous strain on the state budget as state Medicaid expenditures rose nearly 9 percent from 2007 to 2008. The temporary increase in the FMAP in 2009, however, relieved much of this pressure.

While officials in states such as Florida and South Carolina have aggressively sought to rein in the growth of Medicaid the response from officials in North Dakota has been much more tepid. Over the last three decades North Dakota has neither or applied for or received any Section 1115 Research and Demonstration Project Waivers which would allow it to conduct experiments into ways of making its Medicaid program more efficient. Nor has the state applied for any Section 1915(b) Managed Care Waivers. These would allow the state to move beneficiaries away from fee-for-service and into managed care plans. The state has, however, applied for and been granted seven Section 1915(c) waivers which allowed it to move individuals requiring long-term care out of costly institutional settings and into less expensive home-based and community care environments.

Prior to the U.S. Supreme Court's decision invalidating the provision of the Patient Protection and Affordable Care Act which required states to expand their Medicaid programs, the law was slated to have a major impact on the state. According to estimates from the state's Department of Human services the number of persons eligible for Medicaid was expected to grow to some 90,000, or about 14 percent of the state's population (Wetzel, 2010). After the Federal government ceased paying 100 percent of the cost of additional enrollees in 2017 the state estimated that Medicaid expenditures would increase by tens of millions annually. It's unclear what the state will do in the aftermath of the ruling. According to Maggie Anderson, director of medical services at the state's Department of Human Services "[a]ny expansion would have to have the

approval of the state legislature…[and] that's kind of up in the air right now" (Springer, 2012).

The other provision in the PPACA which was poised to have an impact on the North Dakota state government's bottom line is the requirement that it establish a health insurance market, or "exchange," where individuals and businesses could buy policies from health insurance companies. This provision has upheld by the U.S. Supreme Court. Last year in a special legislative session, state lawmakers choose not to establish an exchange. As with the Medicaid expansion, it is unclear at this moment what lawmakers will do next.

Conclusion

When states agreed to participate in the federal Medicaid program in the late-1960s they surrendered much of their autonomy over state health policy to the federal government. As Medicaid spending has grown rapidly over the last four and half decades they have increasingly lost control over other parts of their budget as well. Several states have had moderate success cutting federal tentacles and regaining control over their state budgets. Unfortunately North Dakota has not been a leader in Medicaid reform.

D. Case Study Four: Land and Resource Use

The federal government offers states numerous grants aimed at encouraging the conservation, promotion and development of natural resources such as forests, waterways, and wildlife. During the 1940s and 1950s this type of aid comprised around 3.5 percent of all federal aid to the states. As other types of federal aid have grown over the past half-century, however, natural resource aid has fallen to less than 1 percent of total federal aid to the states.

Their small share of total federal grant monies, however, belies the impact they can have on a state. Mandates accompanying natural resource grants are some of the most stringent that exist. To see why, consider the case of Land and Water Conservation Fund (LWCF) grants.

The Land and Water Conservation Fund was established in 1965 to fund government purchases of land, waterways and other resources (Vincent, 2006). It receives funding primarily from extraction fees charged to companies drilling for oil and gas offshore. It also receives funding from sales of federal lands and from federal excise taxes on motorboat fuel.

LWCF monies are divided into two funds. The first pays for federal projects. Federal projects receiving LWCF funding have included improvements to the Greater Yellowstone Ecosystem in Montana, Harpers Ferry National Historic Park in West Virginia, and the Big Sur Coast in California ("Land and Water," 2012). The second provides grants to state and local governments. These grants have funded improvements to well known landmarks such as Custer State Park in South Dakota and Central Park in New York City, as well as thousands of more obscure state and local parks. The LWCF

boasts of funding "thousands of local playgrounds, soccer fields, and baseball diamonds" across the country ("Land and Water," 2012).

To be eligible for LCWF grants, states must draw up and periodically update a statewide outdoor recreation plan. These plans are then submitted to the Secretary of the Interior for approval. Once a state's plan has been approved, state and local agencies within the state are eligible to receive LCWF grants. Congress determines the overall amount spent on LWCF grants each year. States are then allocated a share of this total using a formula largely based on population. Once funds have been allocated, states determine which state and local projects will receive grant money. LWCF grants are matching grants which typically cover half the cost of a project. State and local governments are responsible for providing the balance of funding.

A number of strings are attached to LWCF grants. The most significant of these is a provision which requires that any project acquired or developed using an LWCF grant be maintained for that use into perpetuity (Vincent, 2006). The Secretary of the Interior has the power to approve the conversion of the facility to an alternative use but only if he finds that use in accordance with the state's outdoor recreation plan and only if the jurisdiction replaces the converted facility with an equivalent one. In addition, facilities developed with LWCF funds must be maintained to National Park Service standards and are subject to inspection every five years. Failure to comply with these regulations will result in a state being ineligible for future LWCF grants.

Once a state or local government has acquired or developed a facility with an LWCF grant, it must maintain and operate the facility forever, or risk future participation in the program. If better uses for the resources dedicated to an LWCF financed project become available, state and local governments are forbidden from reallocating resources. Even if a state or locality experiences a severe budget crisis where it must choose between providing a core government function, such as police and fire protection, and the maintenance of little-used facilities built decades earlier and partially financed with LWCF grants, the law requires that resources be dedicated to the latter.

California learned firsthand the perils of accepting LWCF grants when it experienced a severe budget crisis in 2008 and 2009. As part of his proposal to trim government spending, Governor Arnold Schwarzenegger proposed closing 70 state parks. Shortly after he made his proposal, the Governor received a letter from the U.S. Department of the Interior notifying him that 13 of these parks had been developed using LWCF funding and that the state would be in violation of the agreements it had with the federal government if it closed them (Jarvis, 2009). The Governor eventually relented on his plan to close the parks and was forced to find savings in other parts of the budget. One way the state saved money was by releasing thousands of inmates from the state's prisons (Archibold, 2010).

A similar, but much less dramatic, situation occurred last year in Oklahoma involving seven golf courses (McNutt, 2011). In spite of charging fees, the state-owned courses regularly lost money, requiring the government to make up the difference. When lawmakers suggested that the state's Department of Tourism and Recreation sell the

courses, its executive director told them that this was not possible: the courses had been partially financed with LWCF grants.

North Dakota's Clean Water, Lands and Outdoor Heritage Fund Amendment

In August 2012 proponents of an amendment to the North Dakota state constitution that would set aside 5 percent of the state's oil and gas revenues for an outdoor heritage fund appeared to have secured enough signatures to place the measure on the ballot in November. The amendment's supporters argue that such a measure would raise tens of millions annually.

The Clean Water, Lands and Outdoor Heritage Fund Amendment's supporters are vague as to exactly what monies from the fund will be spent on. They only state that "[p]rojects authorized by the measure could include improving water quality of rivers, streams, and groundwater; natural flood control improvements; providing habitat for fish, game and wildlife; improved parks and public spaces for outdoor activities; and conservation incentives for working farms and ranches and beginning farmers and ranchers" ("North Dakotans," 2012) They also state that passage of the amendment will not result in any additional taxes.

If the initiative passes, however, administrators of the fund would face strong pressure to use a portion of its monies as matching funds for LWCF and other federal grants which have similar strings attached. After all, doing so would allow the state to potentially double the amount initially spent on conservation projects from the fund. Moreover, supporters of increased conservation efforts may see the use of a federal grant as a way of permanently shielding a resource from development.

Conclusion

Federal natural resource grants pose a significant threat to a state's sovereignty. The rules and regulations that accompany these types of grants are some of the most restrictive that exist and can impact a state decades after it accepted the federal money, making it difficult for state and local lawmakers to do everything from responding to a fiscal crisis to simply changing spending priorities.

V. CONCLUSION

Federal intergovernmental grants to states have grown rapidly in recent decades, reaching record levels in the wake of the 2009 American Recovery and Reinvestment Act (ARRA). In this study, we examined the financial and regulatory consequences of this growth in federal aid to North Dakota and other U.S. states, with an emphasis on (1) the long-term effect of federal grants on state and local tax burdens; and (2) the impact of accompanying federal grant regulations on local control over health, transportation, education and environmental policy.

Based on a standard econometric model and a 30-year panel data set of federal grants and state taxes, we find strong evidence that federal grants-in-aid result in significant upward "ratcheting" of state taxes over time. We find each dollar of federal aid leads states to boost spending by about 45 cents in that year, 61 percent of which results in permanent state budget obligations that must be financed by higher state-local taxes. We find these effects in every subsample of the data we examined, including states with similar legal and political characteristics to North Dakota, and our results are robust to a variety of econometric specifications. Based on these findings, there is reason to doubt the conventional view that federal grants represent a "free lunch" from Washington. Instead, federal aid imposes significant hidden budgetary costs on recipient states over time.

In addition to the hidden budgetary costs of federal grants-in-aid, accompanying grant rules and regulations can have a significant effect on the ability of states to maintain local political control over key areas of state and local policy. We provide detailed case studies of the hidden regulatory costs of federal grants in four key areas: transportation policy; education, Medicaid; and land and resource use. In each case, we present a variety of examples of how well-intended federal grant rules have had the effect of shifting control over key policy areas from state and local lawmakers to federal lawmakers and granting agencies in Washington, D.C. This loss of local control over state policy represents a significant hidden cost of states' growing reliance on federal intergovernmental grants.

Overall, we conclude that recent growth in federal intergovernmental grants may entail significant hidden costs to recipient states—an important consideration for state lawmakers weighing the merits of additional federal assistance. States considering whether to increase their reliance on federal aid should be aware of the long-term fiscal and regulatory consequences that may result.

VI. APPENDIX: SUPPLEMENTARY TABLES

This section provides supplementary regression results from Section III. Table 1A presents the full regression output for our basic econometric model, in which we regress state tax and own-source revenue on current and previous federal grants, state and year fixed effects, and state-specific linear time trends. Note that each of the 50 state-specific linear time trends are positive and statistically significant in both specifications.

TABLE 1A. FULL TABLE OF REGRESSION OUTPUT, BASELINE MODEL (REGRESSION OF STATE TAX REVENUE AND OWN-SOURCE REVENUE ON FEDERAL GRANTS)

Variable	(1) State Own-Source Revenue	(2) State Total Tax Revenue
Federal Grants at Time *t* ($\phi_2 = \alpha - 1$)	-0.554***	-0.459***
	(0.139)	(0.130)
Sum of Past Federal Grants ($\phi_1 = \alpha\beta$)	0.274***	0.221***
	(0.079)	(0.073)
Alabama Time Trend	2776790.648***	1897904.563***
	(378668.635)	(356269.321)
Alaska Time Trend	2721218.701***	1909144.155***
	(366554.605)	(345277.576)
Arizona Time Trend	2813697.666***	1945469.796***
	(391237.251)	(367676.090)
Arkansas Time Trend	2818050.754***	1948379.519***
	(371195.946)	(349488.948)
California Time Trend	3468155.567***	2481502.092***
	(549190.889)	(511068.247)
Colorado Time Trend	2846867.988***	1956706.567***
	(372058.317)	(350271.490)
Connecticut Time Trend	2807634.142***	1960235.129***
	(372954.935)	(351084.669)
Delaware Time Trend	2773703.995***	1909289.520***
	(360074.916)	(339398.625)
Florida Time Trend	3024064.410***	2056283.737***
	(438900.719)	(410933.891)
Georgia Time Trend	2868189.071***	1967674.340***
	(391171.965)	(367615.227)
Hawaii Time Trend	2754133.220***	1905153.399***
	(362440.224)	(341544.556)
Idaho Time Trend	2760273.644***	1914230.602***
	(363046.847)	(342095.073)
Illinois Time Trend	2907783.593***	2019741.269***
	(399727.682)	(375380.238)
Indiana Time Trend	2841730.213***	1955518.028***
	(378246.316)	(355886.503)
Iowa Time Trend	2769329.165***	1898904.397***
	(366632.059)	(345347.971)

Variable	(1) State Own-Source Revenue	(2) State Total Tax Revenue
Kansas Time Trend	2788458.422*** (366722.416)	1925962.274*** (345429.836)
Kentucky Time Trend	2785969.243*** (377780.971)	1911874.908*** (355463.835)
Louisiana Time Trend	2769652.470*** (382778.731)	1921068.369*** (360000.378)
Maine Time Trend	2744558.627*** (365587.172)	1896904.262*** (344399.767)
Maryland Time Trend	2847112.817*** (378169.908)	1966010.731*** (355817.034)
Massachusetts Time Trend	2870608.232*** (389348.958)	1942478.776*** (365961.007)
Michigan Time Trend	2896924.594*** (389029.487)	1963592.896*** (365671.293)
Minnesota Time Trend	2881447.624*** (373181.511)	2024527.713*** (351290.955)
Mississippi Time Trend	2761227.749*** (376674.462)	1909321.384*** (354460.891)
Missouri Time Trend	2770647.851*** (385527.832)	1889347.553*** (362493.450)
Montana Time Trend	2746697.472*** (361999.997)	1901552.608*** (341145.202)
Nebraska Time Trend	2760825.003*** (363983.662)	1913320.640*** (342944.872)
Nevada Time Trend	2813878.834*** (365351.193)	1961333.802*** (344185.885)
New Hampshire Time Trend	2759287.799*** (362026.767)	1909251.900*** (341169.383)
New Jersey Time Trend	2932459.585*** (392917.669)	2046740.325*** (369199.298)
New Mexico Time Trend	2759169.815*** (372603.317)	1899846.416*** (350766.396)
New York Time Trend	2874056.670*** (510914.055)	1909007.429*** (476312.859)
North Carolina Time Trend	2899434.772*** (405626.277)	1998025.996*** (380732.968)
North Dakota Time Trend	2744285.095*** (360748.420)	1904549.678*** (340009.555)
Ohio Time Trend	2899682.866*** (400697.118)	1967322.891*** (376259.249)
Oklahoma Time Trend	2786321.888*** (373744.155)	1910837.207*** (351801.343)
Oregon Time Trend	2807558.161*** (373692.223)	1925337.270*** (351753.934)

Variable	(1) State Own-Source Revenue	(2) State Total Tax Revenue
Pennsylvania Time Trend	2933033.343*** (412633.445)	1968574.459*** (387092.163)
Rhode Island Time Trend	2738968.757*** (363293.999)	1895005.985*** (342319.061)
South Carolina Time Trend	2794846.467*** (378213.841)	1883957.064*** (355856.540)
South Dakota Time Trend	2732382.486*** (361106.086)	1892996.821*** (340334.072)
Tennessee Time Trend	2788340.645*** (391265.029)	1907824.766*** (367699.566)
Texas Time Trend	3071148.908*** (473896.911)	2013951.799*** (442703.026)
Utah Time Trend	2831043.618*** (364508.180)	1940862.657*** (343421.035)
Vermont Time Trend	2758842.563*** (360996.630)	1918009.619*** (340234.825)
Virginia Time Trend	2987082.272*** (377492.244)	2015249.358*** (355202.250)
Washington Time Trend	2848763.586*** (386485.219)	1947647.186*** (363362.156)
West Virginia Time Trend	2761985.055*** (369025.865)	1892941.018*** (347519.639)
Wisconsin Time Trend	2842723.720*** (373908.927)	1945229.037*** (351950.807)
Wyoming Time Trend	2746837.679*** (361003.689)	1911922.258*** (340241.503)
1988	-2767765.530*** (334726.459)	-1882668.246*** (311700.819)
1989	-5391579.128*** (745080.950)	-3706850.167*** (710086.118)
1990	-8148483.060*** (1128067.864)	-5635948.201*** (1061505.846)
1991	-1.095e+07*** (1506340.901)	-7599453.782*** (1414436.332)
1992	-1.344e+07*** (1919382.004)	-9326781.817*** (1810652.649)
1993	-1.599e+07*** (2309779.164)	-1.101e+07*** (2181272.417)
1994	-1.877e+07*** (2635742.189)	-1.289e+07*** (2487451.042)
1995	-2.143e+07*** (2995751.565)	-1.473e+07*** (2834733.383)
1996	-2.431e+07*** (3302785.063)	-1.673e+07*** (3135956.357)

Variable	(1) State Own-Source Revenue	(2) State Total Tax Revenue
1997	-2.721e+07*** (3572684.578)	-1.876e+07*** (3400279.442)
1998	-2.984e+07*** (3924016.255)	-2.055e+07*** (3744765.617)
1999	-3.245e+07*** (4348785.551)	-2.228e+07*** (4141790.833)
2000	-3.487e+07*** (4811807.753)	-2.397e+07*** (4578985.389)
2001	-3.761e+07*** (5225854.338)	-2.590e+07*** (4951655.173)
2002	-4.072e+07*** (5480985.137)	-2.819e+07*** (5165445.154)
2003	-4.348e+07*** (5837303.185)	-3.012e+07*** (5496836.736)
2004	-4.623e+07*** (6154744.044)	-3.197e+07*** (5822711.752)
2005	-4.875e+07*** (6532104.130)	-3.368e+07*** (6173534.029)
2006	-5.138e+07*** (6870491.325)	-3.555e+07*** (6485584.590)
2007	-5.411e+07*** (7150997.912)	-3.743e+07*** (6751774.914)
2008	-5.700e+07*** (7492369.803)	-3.947e+07*** (7075411.664)
2009	-6.049e+07*** (7773260.642)	-4.204e+07*** (7305521.891)
2010	-6.314e+07*** (8289545.144)	-4.387e+07*** (7806540.935)
Alaska	-3954.758 (197017.292)	-1574673.843*** (179070.515)
Arizona	148983.534 (209913.355)	553446.732*** (190792.261)
Arkansas	-1645941.210*** (117913.900)	-1037594.473*** (107176.969)
California	26362868.158*** (1349667.263)	22685885.039*** (1227032.619)
Colorado	-674038.693*** (81585.810)	-456635.602*** (74173.610)
Connecticut	1114462.884*** (10370.176)	1012516.667*** (9704.487)
Delaware	-1918159.420*** (227170.563)	-1418781.754*** (206483.286)
Florida	6582890.669*** (48993.524)	6104298.497*** (46013.831)

Variable	(1) State Own-Source Revenue	(2) State Total Tax Revenue
Georgia	1311320.559*** (140142.542)	1723114.759*** (127401.396)
Hawaii	-987107.048*** (191678.865)	-644986.045*** (174218.880)
Idaho	-2138554.178*** (214908.273)	-1495425.471*** (195336.550)
Illinois	5463648.018*** (614902.798)	4650426.280*** (558926.148)
Indiana	1636226.960*** (62504.044)	1306619.229*** (56856.600)
Iowa	-441955.688*** (68382.152)	-163645.234** (62208.482)
Kansas	-1096507.237*** (129967.022)	-570935.829*** (118131.249)
Kentucky	186501.831*** (18424.531)	445768.171*** (16746.113)
Louisiana	300230.693*** (90629.728)	-322845.711*** (82441.320)
Maine	-1810954.608*** (175016.853)	-1263725.347*** (159073.672)
Maryland	1432723.543*** (62843.781)	1329294.034*** (57165.144)
Massachusetts	3858574.235*** (307190.630)	3299810.069*** (279206.491)
Michigan	6104171.629*** (535323.646)	5002970.999*** (486585.897)
Minnesota	1805236.641*** (113720.615)	1670682.430*** (103480.017)
Mississippi	-1435238.081*** (94631.747)	-871893.816*** (86091.129)
Missouri	569767.885*** (24832.531)	843232.278*** (22617.703)
Montana	-2401054.464*** (183428.151)	-1782154.417*** (166727.228)
Nebraska	-1738097.495*** (165353.803)	-1271788.061*** (150292.238)
Nevada	-2034619.414*** (241935.907)	-1314538.879*** (219899.902)
New Hampshire	-2363880.312*** (212735.627)	-1858178.226*** (193356.300)
New Jersey	5503539.710*** (297692.984)	3825187.314*** (270591.379)
New Mexico	-1064299.541*** (171747.989)	-925927.637*** (156124.612)

Variable	(1) State Own-Source Revenue	(2) State Total Tax Revenue
New York	14466533.349***	12597860.067***
	(1694848.872)	(1540636.401)
North Carolina	2453134.070***	2625109.067***
	(27560.045)	(25479.775)
North Dakota	-2440525.789***	-1873513.642***
	(201240.042)	(182909.659)
Ohio	4989926.964***	4081786.820***
	(544281.506)	(494700.468)
Oklahoma	-525621.783***	-144223.129**
	(73058.700)	(66433.278)
Oregon	-659805.841***	-648745.487***
	(55778.271)	(50720.048)
Pennsylvania	6152670.002***	5323771.865***
	(678965.372)	(617114.040)
Rhode Island	-1975339.933***	-1476645.658***
	(174399.002)	(158512.243)
South Carolina	-225653.539***	244828.232***
	(81238.714)	(73877.174)
South Dakota	-2568422.369***	-1935379.751***
	(200759.710)	(182473.309)
Tennessee	-262042.815***	215179.861***
	(22082.128)	(20647.775)
Texas	7947030.518***	6624881.690***
	(253549.165)	(231238.728)
Utah	-1862474.542***	-1254475.064***
	(151573.957)	(137788.823)
Vermont	-2519272.469***	-1897061.929***
	(227968.624)	(207204.588)
Virginia	1876682.543***	1548414.160***
	(43980.646)	(40083.824)
Washington	2329808.621***	2446985.116***
	(22938.410)	(21108.509)
West Virginia	-1606625.746***	-975401.172***
	(116031.705)	(105474.119)
Wisconsin	1937764.598***	1913946.144***
	(140279.167)	(127599.469)
Wyoming	-2546353.009***	-2020111.648***
	(198456.336)	(180408.038)
n	1200	1200
Adjusted R-squared	0.997	0.996

*, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

Tables 2A and 3A show the effect of including state population as a regressor in our basic model. Population is not statistically significant in any of the tax revenue specifications or in four of the six own-source specifications. Thus, we exclude it from our basic model.

TABLE 2A. BASIC MODEL INCLUDING STATE POPULATION (REGRESSION OF STATE OWN-SOURCE REVENUE ON POPULATION, CURRENT AND PREVIOUS FEDERAL GRANTS)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
State Population	1.090*	1.141*	1.215	1.313	1.391	1.487
	(0.605)	(0.660)	(0.750)	(0.813)	(0.905)	(0.960)
Federal Grants at Time *t* ($\phi_2 = \alpha$-1)	-1.001***	-0.805***	-0.676***	-0.646***	-0.671***	-0.599***
	(0.347)	(0.263)	(0.234)	(0.229)	(0.237)	(0.152)
Federal Grants at Time *t-1*	0.701**	0.178	0.233	0.270	0.298	
	(0.312)	(0.229)	(0.255)	(0.249)	(0.243)	
Federal Grants at Time *t-2*		0.697***	0.317***	0.374***	0.386**	
		(0.195)	(0.099)	(0.136)	(0.151)	
Federal Grants at Time *t-3*			0.557***	0.316***	0.363***	
			(0.159)	(0.056)	(0.087)	
Federal Grants at Time *t-4*				0.328	0.066	
				(0.225)	(0.131)	
Federal Grants at Time *t-5*					0.279	
					(0.252)	
Sum of Past Federal Grants ($\phi_1 = \alpha\beta$)						0.281***
						(0.100)
n	1200	1200	1200	1200	1200	1200
Adjusted R-squared	0.997	0.997	0.997	0.997	0.997	0.997

*, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

TABLE 3A. BASIC MODEL INCLUDING STATE POPULATION (REGRESSION OF TAX REVENUE ON POPULATION, CURRENT AND PREVIOUS FEDERAL GRANTS)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
State Population	0.911	0.949	1.011	1.085	1.134	1.240
	(0.599)	(0.607)	(0.659)	(0.693)	(0.737)	(0.811)
Federal Grants at Time *t* ($\phi_2 = \alpha$-1)	-0.841**	-0.692***	-0.584**	-0.561**	-0.577**	-0.496***
	(0.323)	(0.246)	(0.223)	(0.217)	(0.220)	(0.138)
Federal Grants at Time *t-1*	0.607*	0.208	0.254	0.281	0.300	
	(0.309)	(0.186)	(0.211)	(0.208)	(0.202)	
Federal Grants at Time *t-2*		0.532***	0.213**	0.255*	0.263*	
		(0.185)	(0.101)	(0.137)	(0.143)	
Federal Grants at Time *t-3*			0.467***	0.288***	0.318***	
			(0.132)	(0.051)	(0.059)	
Federal Grants at Time *t-4*				0.245	0.077	
				(0.201)	(0.068)	
Federal Grants at Time *t-5*					0.179	
					(0.203)	
Sum of Past Federal Grants ($\phi_1 = \alpha\beta$)						0.227**
						(0.092)
n	1200	1200	1200	1200	1200	1200
Adjusted R-squared	0.996	0.996	0.996	0.996	0.996	0.996

*, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

One concern with OLS estimates in levels is that they may yield unreliable results if both dependent and independent variables are trending upward over time. A well-known result in time-series econometrics is that regressing two non-stationary series may result in artificial correlations and misleadingly high R-squared values—the so-called "spurious regression" problem of unit-root processes.[18] One way to overcome this problem is to use what is known as a "first differences" estimator. While federal grants and state taxes are trending upward over time, changes in them are not. By taking first differences of our data we create a stationary series that avoids the potential pitfall of spurious regression.

Tables 4A and 5A present estimates of our baseline model using a first-differences estimator. Table 4A presents results for state own-source revenue, and Table 5A shows results for state tax revenue. Overall, the results are similar to our model in levels. All coefficients have the correct sign and magnitude, and remain strongly statistically significant. Our basic findings of a significant upward "ratcheting" effect of federal aid on state taxes appears robust to a variety of econometric specifications.

TABLE 4A. BASELINE MODEL IN FIRST DIFFERENCES, OWN-SOURCE REVENUE (REGRESSION OF CHANGES IN OWN-SOURCE REVENUE ON CHANGES IN FEDERAL GRANTS)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Δ Federal Grants at Time *t*	-0.199*	-0.232**	-0.214**	-0.218**	-0.246**	-0.253**
	(0.115)	(0.114)	(0.096)	(0.103)	(0.112)	(0.107)
Δ Federal Grants at Time *t-1*	0.402**	0.280**	0.253*	0.246*	0.232*	
	(0.167)	(0.130)	(0.140)	(0.143)	(0.121)	
Δ Federal Grants at Time *t-2*		0.580***	0.465***	0.456***	0.457***	
		(0.104)	(0.073)	(0.082)	(0.089)	
Δ Federal Grants at Time *t-3*			0.483***	0.411***	0.392***	
			(0.059)	(0.048)	(0.049)	
Δ Federal Grants at Time *t-4*				0.269***	0.185**	
				(0.072)	(0.082)	
Δ Federal Grants at Time *t-5*					0.316**	
					(0.141)	
Δ Sum of Past Federal Grants						0.321***
						(0.054)
n	1150	1150	1150	1150	1150	1150
Adjusted R-squared	0.217	0.274	0.311	0.320	0.334	0.330

*, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

[18] For a discussion of "spurious regression" and related issues that can arise when analyzing non-stationary time-series data, see Hamilton (1994).

TABLE 5A. BASELINE MODEL IN FIRST DIFFERENCES, TAX REVENUE (REGRESSION OF CHANGES IN STATE TAX REVENUE ON CHANGES IN FEDERAL GRANTS)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Δ Federal Grants at Time *t*	-0.181**	-0.204**	-0.189**	-0.193**	-0.219**	-0.217**
	(0.084)	(0.085)	(0.075)	(0.081)	(0.089)	(0.082)
Δ Federal Grants at Time *t-1*	0.357**	0.271**	0.250**	0.244**	0.232**	
	(0.152)	(0.109)	(0.117)	(0.120)	(0.100)	
Δ Federal Grants at Time *t-2*		0.410***	0.320***	0.313***	0.314***	
		(0.121)	(0.090)	(0.097)	(0.103)	
Δ Federal Grants at Time *t-3*			0.378***	0.321***	0.304***	
			(0.054)	(0.039)	(0.039)	
Δ Federal Grants at Time *t-4*				0.213***	0.135**	
				(0.079)	(0.060)	
Δ Federal Grants at Time *t-5*					0.291**	
					(0.112)	
Δ Sum of Past Federal Grants						0.256***
						(0.062)
n	1150	1150	1150	1150	1150	1150
Adjusted R-squared	0.197	0.235	0.265	0.273	0.289	0.288

*, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

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