Tax Earmarking, Party Politics and Gubernatorial Veto: Theory and Evidence from US States*

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Abstract

This paper provides a theory of earmarking based on the relative power of a legislature and executive. The politically powerful use earmarking as a means of resolving uncertainty and insulating preferred policy from the reach of future government. Tax revenue will be earmarked more often when political power is unified under one party or when a party has the legislative majority needed to overturn a gubernatorial veto. An empirical test of the theoretical predictions are conducted using a panel of data for US States. A state with a legislature controlled by a single party with a large enough majority to overturn a gubernatorial veto will earmark 5% more of its tax revenue than other states and a state with a unified government will earmark 6.5% more. Together these explain 18.5% of the observed decrease in the percentage of state tax revenues earmarked from 1954 to 1997.

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1 Introduction

Earmarking is a term that has two distinct meanings in the economics and political science literatures. It is used by the popular media and by some political scientists in reference to pork-barrel spending: spending targeted to benefit some interest group or jurisdiction. This is different from the definition of earmarking in the public finance literature which is addressed in this paper. I borrow the definition of earmarking as used in Pérez and Snell (1995). "Earmarking means designating some or all of the collections from a specific tax for a specific expenditure, with the intention that the designation will continue into the future." Earmarked tax revenues bypass the normal procedure in which tax revenue is pooled in a general fund and then allocated among various government spending programs. Tax revenues that are earmarked are directed away from the general fund and are not subject to the continued review process inherent in general fund appropriations. In the public finance view, tax earmarking has dynamic implications. The accounts to which earmarked tax revenues are dedicated outlive the current fiscal year; without a change in policy the earmarked money will continue to be dedicated to its purpose into the future. Thus, tax earmarking determines the allocation of funds over relatively long time horizons.[1]

Tax earmarking is a prevalent practice among US state governments. In 1954 the average state earmarked 51% of its tax revenue to specific uses. The percentage earmarked dropped to 27.5% in 1979 and has remained relatively flat in the years following. Table 1 shows earmarking levels for the 50 states as reported in Fiscal Planning Services (2000).

The dominant use of earmarked funds by states is for transportation: the building of highways and bridges, their maintenance, and public transit. It is not surprising, then, that the largest category of tax that is earmarked is the fuel tax and highway user fees.[2] There are few examples of earmarked taxes available at the national level. The lone example is the federal payroll tax which is earmarked to fund social security and Medicare. Most of what

[1] Tax earmarking is also often referred to as tax hypothecation.

[2] For detailed tables listing the purpose and source of earmarked taxes I refer you to tables 19 and 5 respectively in Fiscal Planning Services (2000).

gets termed as earmarking at the national level falls into the political science definition of earmarking which refers to pork barrel politics.

There are several reasons often cited in support of tax earmarking and against it. Those who support earmarking make the case that it can enforce a cost-benefit principle when those who pay the earmarked tax and the benefactors of that tax are one and the same. An earmarked tax on a product or service that is highly complementary in consumption to the government service provided may be viewed as a user-charge of sorts.[3] This alleviates some of the typical efficiency problems, such as freeriding, associated with the provision of public goods. However, user charges can be employed only when the users of a particular service can be identified and charged. The most prominent tax which meets this criterion are gasoline taxes, which often are earmarked for road maintenance and construction. It is very difficult to make such a case for any other tax-expenditure bundle. Many states earmark a portion of their income tax revenues and even more earmark a portion of various sales taxes and registration fees. These taxes get earmarked for items such as: debt service, local government, education, healthcare/welfare and a variety of miscellaneous items, see Pérez and Snell (1995). Clearly, no cost-benefit principle is at play with these earmarked tax dollars.

Another commonly cited reason in support of tax earmarking is that earmarking stabilizes government finances, thus serving as a means of controlling debt. Tax earmarking creates a link between revenue and expenditure; while this link may bring about a rigidity in the budget it can serve to limit current expenditure to current revenue thus reducing the amount of debt financing needed to fund projects.

Earmarking can also serve as a tool to gain public support for new taxes. Voters are assured, through the earmarks, that revenues generated by a new tax will not be diverted to some other expenditure seen as less worthy by the electorate. However, if constituents believe that an earmark will cause general funds to be diverted away from the project in

[3]For discussion of the user charge principle for earmarking, see Lee and Wagner (1991).

question, this justification loses its appeal.

There are also arguments suggesting that earmarking is not a beneficial practice. The most widely stated is that earmarking reduces the flexibility, freedom and oversight of public expenditures. Earmarking may limit the ability of the government to respond to changing economic conditions. This criticism drives at the heart of earmarking as earmarking does not allow either the legislature or the governor to weigh the relative merits of state programs relative to the revenue available at every budget cycle. For this reason earmarking is seen by its critics as an inefficient method of allocating funds to projects regardless of the benefits it may entail.

While a significant amount of research has been devoted to the effects of earmarking on public good provision or education (many earmarked taxes are targeted toward education), surprisingly little attention has been given to the reason why earmarking might occur in the first place. Although there is theoretical literature that tries to explain earmarking, it too is small and incomplete. There is an even greater lack of empirical research into the causes of earmarking. This paper provides both a theory of earmarking and empirical support for the theory.

A recent trend in political economy has been to focus on the role of the separation of powers such as between a legislature and an executive. It is inappropriate to focus analysis on just legislative decision-making when the executive branch also plays a role in policy formation and implementation. This is the case made by Figueiredo, Jacobi, and Weingast (2000). Recently the separation-of-powers approach was applied to the study of the budget process by Grossman and Helpman (2008).

In this paper I describe a theory of earmarking based on the separation-of-powers to policymaking. A legislature chooses a policy bill to send to the governor who can either sign the bill or veto it. The legislature may overturn the veto if the requirements to do so are met. Legislatures controlled by a party with unilateral power to overturn gubernatorial vetoes and unified (one party) governments will tend to implement earmarked policies

more than governments with less concentrated party control. This prediction is tested empirically using a panel of data on US state tax earmarking behavior. The econometric findings show that the legislative ability of a party to overturn a gubernatorial veto causes an increase in a state's percentage of revenues earmarked by five percentage points and a unified government leads to an increase of 6.5 percentage points. This suggests that 18.5% of the decrease in the percentage of state revenues earmarked from 1954 to 1997 can be explained by the reduction in concentrated political control.

The paper is organized as follows. Section 2 reviews the relevant literature while section 3 presents the theory to be tested. Section 4 outlines the econometric strategy and data with the results presented in section 5. Section 6 concludes.

2 Literature Review

The seminal paper on earmarked taxation is Buchanan (1963). Buchanan defines earmarking "as the practice of designating or dedicating specific revenues to the financing of specific public services." Buchanan uses a median voter approach to analyze how earmarking and general fund financing may have differing implications for public spending. Buchanan (1963) and the succeeding literature of Goetz (1968), Goetz and McKnew (1972), Browning (1975), and more recently Athanassakos (1990) present analysis of the implications of earmarking but have little to say regarding the decision to earmark itself.

The more recent theoretical contributions all take a game theoretic approach. Most recently, Jackson (2011) formulates a legislative bargaining model in which all available revenue is spent via earmarking to the neglect of a general fund. Jackson (2011) explicitly models earmarking as it precedes general fund appropriations decisions. A legislator proposing an earmark has the incentive and ability to compensate other legislators enough to secure a winning coalition for his or her earmarking proposal. This earmarking proposal compensates the coalition members for the opportunities they forgo in general fund bar-

gaining. That paper shows that when institutions allow earmarking to occur then, in the absence of any frictions, full earmarking will occur in equilibrium.

The idea that earmarking may present a possible solution to an agency problem is explored by both Dhillon and Perroni (2001) and Bös (2000). While both papers show that earmarking can act as a mechanism that mitigates principle-agent costs, neither model is particularly realistic in its treatment of earmarking. In particular, Dhillon and Perroni (2001) do not model the public choice process involved in public good provision and while Bös (2000) does address aspects of public choice, his model does not consider the legislative body (parliament) as strategic in itself.

Brett and Keen (2000) present a model that proposes a compelling rational for earmarking. In their model, incumbent politicians are able to restrict the behavior of their successors by earmarking funds for preferred expenditures such as environmental protection. This is done when incumbents believe their re-election prospects are sufficiently low. Brett and Keen (2000) also show that earmarking can be used to mitigate the negative reputation effects of implementing a new tax.

A number of papers have also examined earmarking empirically. Novarro (2004) tests the hypothesis of Brett and Keen (2000) using data on earmarking of revenues for environmental policies by Democratic legislative majorities in US states who proceeded to lose control of the legislature in the next election. Novarro (2004) finds no evidence of the type of strategic behavior described by Brett and Keen (2000). In fact she finds no evidence that Democrats earmark strategically at all. This non-finding is perhaps less of a critique of the Brett and Keen model but more due to a failure in the empirical strategy to adequately fit the assumptions of the model. Deran (1965) and Dye and McGuire (1992), along with a large literature, explore earmarking and its effect on education spending. Novarro (2002) and Evans and Zhang (2007) look at the effect earmarking lottery profits has on education spending. Landry and Price (2007) study the effect earmarking lottery profits to a public good (education) has on lottery play. The majority consensus is that earmarking does

not increase public good (education) expenditure. Instead it allows general fund dollars to be diverted to other uses. There is little, if any, literature that actually explores the determinants of the decision to earmark empirically.

A separate but relevant literature on policy insulation has also recently appeared. This literature (Moe 1989, 1990, 1991; McCubbins, Noll and Weingast 1987, 1989) is predominately a non-formal literature that relates political (electoral) uncertainty to bureaucratic constraints and efficiency. The politically powerful implement a bureaucratic and organizational structure that protects their favored policy from those who will hold office in the future. Given this description I interpret tax earmarking as a form of policy insulation. This theory was then formalized by Figueiredo (2002) in what he terms the "insulation game."[4] This game predicts that those who are electorally weak will be most likely to insulate their policy in the event that they are able to gain momentary control of the government. There are two major drawbacks to this theory. First, it assumes that insulated policies will proceed forever. An extension of the game that allows earlier legislation, including insulating mechanisms, to be repealed is hinted at but not rigorously analyzed. Second, the game doesn't consider a rich institutional structure. Bureaucratic structure in practice is centered on the separation of powers between branches, yet this model examines only one branch of government, controlled by one of two parties probabilistically. Figueiredo (2003) then tests these predictions empirically, finding evidence that electorally weak groups will insulate policies when they do have the power to do so. These results are consistent with the conclusion of this paper.

The most recent contribution to the earmarking literature is Anesi (2006). Anesi develops a two-period model in which the incumbent party in time period 1 may choose to earmark some or all tax revenue to one of two public goods.[5] If revenue is earmarked it constrains policy choice, i.e., the bundle of public goods chosen by the party elected in time period two. The party with the stronger preference for g_1 has incentive to earmark

[4]This game is a modification of the reciprocity game introduced by Calvert (1989).

[5]In the paper there are two public goods, g_1 and g_2 but tax revenue may be earmarked only for public good g_1.

revenue when it is the incumbent in an attempt to constrain the other party in the event that the election is lost in period two. This is similar to the intuition gained from Brett and Keen (2000) and Jackson (2011). Anesi's main contribution is that he considers earmarking incentives with endogenous elections. With endogenous elections there are parameter ranges in which the incumbent party may not have an incentive to earmark. By earmarking revenue a party can constrain its opponent in such a way that any pre-election advantage is lost. That is, the majority of voters may have preferences more in line with the incumbent (they, too prefer higher levels of g_1) so that when the incumbent earmarks to g_1 the policies that will be implemented by either party become more closely aligned. If the incumbent has a large electoral advantage initially the act of earmarking may serve only to reduce it. Thus, with endogenous elections there isn't always an incentive to earmark in order to constrain the future office holder. Even further, if the incumbent party prefers a lower level of g_1, it may find it in its interest to earmark revenue to g_1 in an attempt to improve its chances of winning the election in time period two. Such an incumbent may find it optimal to constrain itself to a policy it doesn't prefer in order to increase the probability of reelection. While this theory is compelling there are no direct empirical predictions to be tested.

3 Theory: Earmarking and the Budget Process

Earmarking refers to the dedication of specific tax revenues to specific expenditures on an ongoing basis: tying a tax to an expenditure. Earmarking of this type comes about in two predominate ways at the US state level. First, a state's constitution can stipulate how certain tax revenues must be spent. Secondly, a statute may be passed and signed into law that earmarks specific tax dollars to a specific expenditure. Any earmarking accomplished by constitutional means is both difficult to establish and difficult to abolish. However, earmarking is much more easily accomplished by statute.

State level tax and expenditure decisions are made jointly by the legislative and executive branches of state government. Legislatures submit bills that establish laws, taxes, and specify expenditure plans. The governor can either sign a bill with the bill then proceeding to become law, or veto a bill (if the state's laws permit a veto). Following a veto of a bill the legislative assembly may have the ability (according to state rules) to overturn the governor's veto and cause a vetoed bill to become law. Overriding a gubernatorial veto usually requires the legislature to garner a supermajority in favor of the override. How large a supermajority is required to override a gubernatorial veto varies from state to state.

This process and procedure has strong implications for the patterns of earmarking behavior that should be observed across US states. The legislature can send bills to the governor under two formats. First, it can just spend money in standard appropriations bills that disperse dollars from the general budgetary fund. Alternatively, the legislature could simultaneously specify an expenditure and a tax revenue source to fund it. This is an earmark. Such an earmark requires that all (or a portion of) tax revenue from the specified source (such as a gasoline tax) go into a fund that can only be spent on a specific expenditure (such as transportation infrastructure). Using earmarking to finance public expenditures creates a dedicated account such that all tax revenues from the earmarked tax go into that account and can be used only for expenditures for which the account is dedicated.

Earmarking, by definition, is a means of secure funding for a project on into the future. When tax earmarks are created they are in place for the life of the tax or until another bill either abolishes the tax, the earmark, or the account to which the revenue is earmarked. If a project is funded by a general fund appropriations bill then its funding in the future can be stopped merely by not allocating any funds in future appropriations bills to that project. But, if a project is funded through earmarks the project is more difficult to cancel. The project won't go away through inaction as is the case for a project financed through the general fund; new legislation must be passed to eliminate either the tax or the earmark.

Earmarking is thus an effective legislative tool that can be used to insulate preferred policies from future policy decisions by an unknown government.

Consider a legislature dominated by two parties; each party has a set of expenditures that it favors. For expositional ease call one party the fire party and the other the police party.[6] The fire party believes that it is optimal to spend a lot of money on fire protection and little money on police protection while the police party believes society is best served by spending a lot of money on police protection and little money on fire protection. Both believe that money should be spent on both fire and police services they just differ on the relative levels of provision.

If the fire party currently holds a majority in the legislature and the governor is also in the fire party, then clearly a lot of money will be spent on fire protection and little on police protection in the current time period. If the fire party is confident that it will maintain control of the legislature and the governorship on into the future then there is little incentive to fund fire and police protection with tax earmarks. Tax earmarks are unlikely to alter the funding for fire and police protection in the future and will only create a rigid budget that can't adapt to future needs. If, however, the fire party perceives that there is a chance that it could lose control of either the legislature or the governorship then the fire party may find it in its interest to create tax earmarks to fund its preferred quantity of fire and police protection.

The fire party can establish tax earmarks if it has control over both the legislature and the governorship, that is, when the government is unified or if the legislature is controlled by a large enough majority to overturn any veto of a governor who belongs to the police party. The fire party will be unable to establish tax earmarks favoring fire protection if it does not have control of a unified government, or if it has a legislative majority but it is not large enough to overturn a veto by a governor from the the police party.

Because all governments face electoral uncertainty over future electoral outcomes, it

[6]I borrow the example of earmarking taxes for police and fire protection from Buchanan (1963).

makes sense that a government will tend to earmark policies whenever it can in order to avert this uncertainty. This is consistent with the results of Jackson (2011), who shows that in a frictionless world where policy is the result of legislative bargaining among self-interested legislators, all revenue will be earmarked. The contention of this paper diverges from Jackson (2011) most significantly in that differing party preferences and the separation of powers among government branches creates a friction that prevents earmarking from occurring all the time. Frictions are overcome whenever the government is unified or the legislature has the power to overturn the governor's veto, making the power separation irrelevant.

In summary, we should observe an increase in the use of earmarking as a means of financing public spending when 1) one party controls both the state legislature and governorship and 2) the legislature is controlled by a large enough majority to overturn the veto of a governor from the opposing party. The incentive to earmark is reduced whenever the party in control faces little electoral uncertainty.

4 Data and Econometric Model

Theory suggests that tax dollars will be earmarked to specific uses when a legislature has the power to overturn gubernatorial vetoes and when the government is united under one party's control. The policy insulation literature suggests that parties will have greater incentive to earmark (insulate) when electoral uncertainty is high. I now test these theoretical predictions using an econometric model.

The dependent variable for the study is the percentage of tax revenues that are earmarked for specific uses in US states. The data on state-level earmarking were obtained from Fiscal Planning Services (2000), which contains data for the years 1954, 1963, 1979, 1984, 1988, 1993 and 1997. The report makes use of data from a series of surveys given to state budget officials; the data and their sources can be seen in Table 1. It is important to

note that the data were constructed using a strict definition of earmarking consistent with the public finance perspective. The data refer only to those tax dollars that are designated to a specific purpose on a continuing basis.

To test the theoretical prediction empirically I create two variables: VO and *same*. The variable VO is a dummy equal to one if the state's house and senate are both controlled by a large enough majority of the same party to overturn a gubernatorial veto. The variable *same* is a dummy variable set to one when a state's governorship, house, and senate are controlled by the same party. If earmarking plays the insulative role that theory suggests then these two variables should have positive and statistically significant coefficients.

I also test the prediction of the policy insulation literature that earmarking should occur more often when electoral uncertainty is high and less often when electoral uncertainty is low. To control for electoral uncertainty I create two variables, *senper* and *houper*, which give the percentage of seats held by the majority party in the state senate and house, respectively. If a party currently holds a large share of the seats in the senate (house) then it should expect to maintain control in the future: losing control would require losing a large number of seats. Regardless of which party is in the majority, the percentage of seats held by the majority party can serve as a proxy for electoral uncertainty. Both *senper* and *houper* can take a value ranging between 0.5 and 1 with low values being associated with higher levels of electoral uncertainty and higher values with lower levels of electoral uncertainty. Theory suggests that both of these variables should have negative coefficients and to the degree that electoral uncertainty versus party control (as captured by VO and *same*) matters for earmarking decisions the coefficients should be statistically significant.

Data for the construction of VO, *same*, *senper*, and *houper* were obtained from The Book of the States.[7] The Book of the States reports the number of legislators from each party in both the house and senate, along with the party affiliation of the governor for all US states. There also are tables which describe institutional differences across the states.

[7]The Book of the States is published by the Council of State Governments. It was previously published on a biannual basis but is now available annually.

In particular there is a table that lists the governors with veto power and the size of majority vote required for the legislature to overturn the governor's veto. Two states, Nebraska and Minnesota, provide some difficulty in constructing the variables. Nebraska has a unicameral system with non-partisan elections, meaning that information is available on party affiliations. Therefore, for Nebraska VO is set to zero for all time periods. Minnesota also held non-partisan elections until 1976, VO therefore is set to zero for Minnesota in both 1954 and 1963. It is less clear what to do with the variable *same* in these instances. I show empirical results both for setting *same* equal to one and equal to zero for Nebraska and the relevant years for Minnesota. I must also address the same data points for *senper* and *houper*; I set each of these to 0.5 demonstrating a high level of electoral uncertainty (from the party perspective) when elections are non-partisan.

Does the ability of a legislature to overturn a gubernatorial veto, a unified government, or both cause increased usage of earmarking at the state level? I estimate the effects of VO and *same* on earmarking while accounting for state level and year specific fixed effects. It is also widely known that state level policy variables tend to be subject to spatial autocorrelation.[8] Therefore, the econometric specification also controls for spatial autocorrelation in the data with both a spatial lag and a spatial error term. I confirm the need for spatial techniques by conducting both the Moran-I test and the Lagrange Multiplier spatial diagnostic tests introduced by Anselin, Bera, Florax, and Yoon (1996).[9] For a detailed discussion of spatial econometrics I refer the reader to Anselin (1988).[10]

A spatial lag term controls for the potential influence of the policy of *neighbor* states on a state's own policy. This influence can come from a number of potential avenues as summarized in Revelli (2005). Yardstick competition describes mimicking policy behavior; a state may try to replicate the policy of others because it views those states' policies as

[8]For examples and discussion see Besley and Case (1995), Case and Rosen (1993), Brueckner (2003), Brown and Rork (2005), and LeSage and Dominguez (2010).

[9]In the interest of brevity I have ommitted the spatial diagnotic tests but can provide these results along with the OLS results used to compute them upon request.

[10]The spatial econometric methods I use requires a balanced panel. Therefore, for years in which earmarking data are unavailable, a linearly interpolated value is used.

being successful. Fiscal competition between states can also cause the earmarking policy of one state to affect another as mobile residents cross state borders in response to policy differences. More direct policy spillovers also are possible. For example, investment in highways and bridges in one state may prompt a neighboring state to invest complementarily; if both are are funded through earmarked taxes, then one state's earmarking policy can directly affect its neighbor's. All of these possible avenues of influence are implemented empirically in the same way using a spatial lag.

The spatial lag term is created by premultiplying the dependent variable vector, y_t, by a weighting matrix, W_t. The time specific weighting matrix, W_t, assigns a weight of zero to state i and then averages the value of the independent variable for *neighboring* states. The specification of a weighting matrix is highly dependent on the definition of *neighbor*. The most commonly used weighting matrix is the contiguity matrix that treats those states sharing a geographic border as neighbors and weights them equally.[11] It is also possible that a state will consider other states to be their neighbors when they are similar in some demographic or fiscal dimension.[12] While it is possible to estimate W_t econometrically, doing so is quite difficult.[13] Therefore the empirical analysis proceeds by imposing a variety of weight matrices on the estimation. I estimate results using the standard contiguity based weight matrix (W_{cont}) and weight matrices based on similarity in indebtedness($W_{Debt\ Pop}$ and $W_{Debt\ PI}$).[14] The construction of weight matrices is addressed in the appendix.

The estimation equation including the spatial lag is written in equation 1. The spatial lag parameter is ρ, β_1 the coefficient for VO, β_2 is the coefficient for *same*, β_3 is the coefficient for *senper*, β_4 is the coefficient for *houper*, β a vector of parameters for the control variables in vector $\mathbf{x_{it}}$, γ_i is the state fixed effect, γ_t the time effect, and ϵ_{it} is the

[11] Using a contiguity matrix the weighting matrix will be the same regardless of the time period.

[12] Demographic and fiscal characteristics change over time; therefore a weighting matrix defined over these dimensions may change over time as well.

[13] For an example, see Brett, Slade, and Pinkse (2002).

[14] I also ran regression analysis using spatial matrices based on similarities in population, debt outstanding, personal income, and road miles. The results from these regressions are consistent with those reported in this paper. They are omitted for brevity but available upon request.

error term.

$$y_{it} = \rho W_t \mathbf{y_t} + \beta_1 VO_{it} + \beta_2 same_{it} + \beta_3 senper_{it} + \beta_4 hourper_{it} + \beta \mathbf{x_{it}} + \gamma_i + \gamma_t + \epsilon_{it} \quad (1)$$

The presence of a spatial lag creates an endogeneity problem as the dependent variable appears on both sides of the regression equation. Therefore the OLS estimators will be both biased and inconsistent.

In addition to a spatial lag it is possible that the error term, ϵ_{it}, is subject to spatial dependence. This spatial dependence takes the form specified in equation 2 where $\epsilon_{\mathbf{t}}$ is a vector of all states' errors in year t.

$$\epsilon_{it} = \lambda W_t \epsilon_{\mathbf{t}} + \nu_{it} \quad (2)$$

The spatial dependence of ϵ_{it} comes about when there are omitted variables that are spatially dependent. If the spatial dependence is present and a correction is not made then the OLS estimators will not be consistent.

The presence of both spatial lag and spatial error dependence in equations 1 and 2 results in both biased and inconsistent OLS estimates. These issues are accounted for by using well known maximum likelihood methods as presented in Anselin (1988) to estimate equations 1 and 2 under standard assumptions on ν_{it}.

Summary statistics for all variables can be found in Table 2 and a listing of the control variables and their sources are found in Table 3. The majority of the control variables are dummies that describe the political environment and institutions. There are dummies to account for the party affiliations of the governor and majorities in the house and senate, and dummies that describe when the legislative and executive branches of the government are controlled by the same party. In addition to the political descriptors variables are entered for net population migration of a state, the total road miles in a state, a dummy for the presence of a state lottery, and a control for indebtedness. Observations for Alaska

and Hawaii were omitted as the dataset predates their statehood. The statistical technique employed requires a balanced panel so missing earmarking data were replaced with a linearly interpolated value.

The inclusion of many of these control variables in the estimation merit further explanation. Net migration is included as a regressor to control for the potential effects of mobility as suggested by Tiebout (1956).[15] Road miles are used as a control as a large proportion of earmarked taxes come from fuel and highway user taxes and a large proportion of revenues are earmarked to transportation. A larger transportation infrastructure could then be correlated with a larger percentage of revenues being earmarked. Road miles is a proxy for the size of the transportation network. Lottery adoption is included as a control variable because lottery revenues tend to be earmarked. Lottery money is not included in the dependent variable of this study because it is not considered to be tax revenue, but lottery adoption may reveal a preference for earmarked styles of financing. There is a simple correlation between average percentage of revenues earmarked and average state lottery adoption. This simple correlation is evident from observing Table 2. In 1954 and 1963 no state had a lottery. Then from 1979 to 1997, 77% of states in the sample introduced lotteries.[16] The growth in lottery adoption coincides with a decline in the average percentage of revenues earmarked over the sample time period; one explanation could be that states earmarked fewer taxes in response to the increase in the revenues generated by lotteries.

The most interesting explanatory variables are those that control for the level of indebtedness. There are two controls included in the regressions separately: *debt pop* is debt outstanding weighted by state population and *debt pi* is debt outstanding weighted by state personal income. Each of these provides a measure of a state's ability to service its debt (indebtedness). Because earmarking links expenditures to revenues it is commonly viewed

[15]The empirical models were also run using a lag on net migration to account for possible endogeneity. Using lagged net migration did not change any of the results reported in the following section in any significant way

[16]Alaska and Hawaii are not included in the sample.

as a tool that a state government can use to control debt. The regression results lend support to this view.

5 Results

Table 4 and 5 each present results form the maximum likelihood spatial regressions using two different measures of state indebtedness as a control; the debt to population ratio and the debt to personal income ratio, respectively. Table 4 reports regression results when the missing data for Nebraska and Minnesota were handled by setting *same* to one while Table 5 show the results from setting *same* to zero. While all control variables were included in the regressions, in the interest of brevity I have not reported the estimates for the variables that displayed no statistical significance and were of little interest.

The coefficients for VO are positive and statistically significant for all specifications at the 5% level regardless of the treatment of missing data. The estimates for VO range from as low as 0.0470 to as high as 0.0539. The coefficient estimates for *same* are all positive but statistical significance depends upon the treatment of missing data. In Table 4 *same* is statistically significant at the 1% level across all specifications and ranges from a low of 0.1136 to a high of 0.1356, but in Table 5 *same* is not statistically significant in any specification ranging from a low of 0.0041 to a high of 0.0368. There is more evidence that majorities in the house and senate powerful enough to overide a gubernatorial veto increase the use of tax earmarks, yet the evidence on unified governments is too large to completely ignore. Using an estimate of 0.05 for VO and 0.065 for *same*, the combined average changes in VO and *same* over the period from 1954 to 1997 explain 18.5% of the 52% decrease in average percentage of revenues earmarked in the same time period.[17]

The coefficient estimates for *senper* and *houper* are not statistically significant in any specification. Coefficients for *senper* are always negative as expected, yet *houper* is negative

[17] Alternatively, the average decreases in VO and *same* explain five percentage points of the 26.5 percentage point decrease in average percentage of revenues earmarked at the state level.

when indebtedness is measured by the debt to population ratio but positive when it is measured by the debt to personal income ratio. The effects from VO and *same* are more powerful than any effect stemming from electoral uncertainty.

The controls for indebtedness yield some interesting results. The coefficients for debt to population (*debt pop*) are positive and statistically significant at the 1% level across all specifications. The coefficients for debt to personal income (*debt pi*) are not statistically significant.[18] These findings suggest that a government with a high level of indebtedness will tend to earmark more revenue to specific uses, supporting the view that earmarking is used by state's as a means to control debt spending.

Other than the measures of indebtedness there is little significance in the estimated coefficients on control variables. *Sengov* and *samedem* enter negatively in Table 4. *Sengov* is statistically significant for all specifications while there is less significance for *samedem*. These coefficients lose their significance with the treatment of *same* in Table 5. This indicates that the percentages of tax revenue earmarked tends to be smaller when the senate and governorship are controlled by the same party and there is mild evidence that a government unified under democratic control will earmark less. However, the persistent insignificance of the variables *gov*, *sen*, and *hou* indicates that any party-specific effect is quite weak. The theory presented in this paper makes no prediction about which party will want to earmark more than the other. These results show that the desire to earmark is not strictly a party preference but rather due to the fierce political battle to insulate preferred policies from the other party. Coefficients on *lot* and *rm* are insignificant, indicating that lottery adoption and the size of a state's transportation network have minimal if any effect on tax earmarking behavior.

There is also some significance in the estimates of the spatial parameters. It is hard to interpret the spatial error term (λ) other than to say that it accounts for unobserved variables that are spatially correlated. The λ coefficients rise to the level of significance for

[18] It is worth noting that even though the coefficients for *debtpi* are never significant they are often nearly so, with t-statistics approaching 1.6.

the weighting matrices based on debt to population and debt to personal income ratios. However, there is no significance on any spatial coefficient with the contiguity weighting matrix. The spatial lag term (ρ) is significant only when the weight matrix is based on debt to personal income. The interpretation of this spatial parameter is clear. Not only does a state with relatively high indebtedness tend to earmark more, there is some evidence that states mimic the earmarking practices of other states with similar debt to personal income ratios. If a state finds other states with debt to personal income ratios comparable to their own and those states earmark a large percentage of their revenue, then that state is going to earmark more taxes itself as it replicates the policy of similar states. Interestingly, a state looks more closely at its own debt to population ratio when making earmarking policy decisions yet states mimic the earmarking policies of states who are more similar in terms of the ratio debt to personal income.

Moran I and lagrange multiplier tests for residual spatial autocorrelation were conducted; these tests reject the null hypothesis of spatial autocorrelation for all spatial weight matrices specified. Therefore the estimates in tables 4 and 5 are free from the bias and inefficiencies that OLS estimates would suffer from spatial misspecification.

6 Conclusion

A large share of state tax revenue is earmarked for specific uses and few studies have provided compelling arguments as to why this occurs. The theoretical studies addressing the issue are sparse and the empirical literature even more so. In this paper I have presented a simple theory of tax earmarking that shows how revenue may be earmarked in an effort by a current government to overcome policy uncertainty it faces over the future government's policy choices. The ability of the legislature to earmark is somewhat alleviated by gubernatorial veto; however, the veto is meaningless if the legislature can get the votes it needs to overturn it. The theory predicts that the earmarking of tax revenue will occur more

often when the legislature is controlled by a majority large enough to overturn a veto by the governor or when the government is unified under one party's control.

Few theories of earmarking have been tested empirically and the theory presented in this paper is the first to receive positive empirical support. The theoretical implications are confirmed using spatial econometric techniques on a panel of data from the US states. A state with a legislature that is controlled by a single party with a large enough majority to overturn a gubernatorial veto will earmark 5% more of its tax revenue than other states, whereas a state with a unified government will earmark 6.5% more. These estimates explain 18.5% of the decrease in average state percentage of tax revenue earmarked over the years 1954-1997.

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A Appendix

A.1 Construction of W_t

This appendix details the construction of the weight matrices W_t based on similarity in a characteristic and not on contiguity. Let i and j index generic states and let the set I be the collection of all states. Let C_t be a characteristic vector of state where each C_{it} refers to the value of the characteristic for state i in time period t. For notational simplicity I

neglect the time subscript throughout the rest of this section.

Let $A_{ij} = d(C_i, C_j)$ where d represents the usual standard distance function. Next identify all states that are no further than $\theta > 0$ away from i and call this set $N_i(\theta)$. Formally,

$$N_i(\theta) \equiv \{j \in I \quad s.t. \quad j \neq i, \quad A_{ij} < \theta\}.$$

Define $\theta(n)$ to be the theta that makes the cardinality of the set $N_i(\theta)$ equal to $n < |I|$.[19] That is $\theta(n) \equiv \{\theta \in \mathbb{R}^+ \quad s.t. \quad |N_i(\theta)| = n\}$. By construction, the set of the n closest neighbors to i is given by $N_i(\theta(n))$.

I now begin to define the elements of W. The ith row of W contains weights for all the neighbors of state i. If $k \notin N_i(\theta(n))$ then k is not a neighbor of i and the kth element of row i in matrix W will be zero, $W_{ik} = 0$. Note that $i \notin N_i(\theta(n))$ so that $W_{ii} = 0$ for all i regardless of n. For those $j \in N_i(\theta(n))$ the assigning of weights is more complicated.

Define γ_i as follows.

$$\gamma_i = 2 * \max_{j \in N_i(\theta(n))} A_{ij}$$

Assign to each $j \in N_i(\theta(n))$ a number $\gamma_{ij} > 0$ according to the equation $\gamma_{ij} = (\gamma_i - A_{ij})^2$. The weight given to i's neighbor j, W_{ij}, which appears in the jth column of row i in matrix W, can now be written as follows

$$W_{ij} = \frac{\gamma_{ij}}{\sum_{k \in N(\theta(n))} \gamma_{ik}}.$$

Constructing the weight matrix W in this manner results in the n closest neighbors to state i in terms of characteristic C getting positive weight in a manner such that the closest neighbors get the greater weight. This construction also row standardizes the matrix so that the sum of the weights assigned to neighbors of any i sum to unity.

For the analysis presented in the paper I set $n = 5$. Increasing this number slightly has

[19] The notation $|A|$ refers to the cardinality of the set A.

little to no effect on the results of the analysis but as n gets large computational difficulties build. The spatial econometric techniques I employ work best when the matrix W is sparse. It does not seem reasonable that any state would examine the policies of all the other states when making policy comparisons. It is much more likely that they may look at a few that have similar characteristics. Therefore, setting $n = 5$ is reasonable.

References

Anesi, V. (2006): "Earmarked taxation and political competition," *Journal of Public Economics*, 90, 679–701.

Anselin, L. (1988): *Spatial econometrics: methods and models*. Kluwer Academic Publishers, 1 edn.

Anselin, L., A. K. Bera, R. Florax, and M. J. Yoon (1996): "Simple diagnostic tests for spatial dependence," *Regional Science and Urban Economics*, 26, 77–104.

Athanassakos, A. (1990): "General fund financing versus earmarked taxes: an alternative model of budgetary choice in a democracy," *Public Choice*, 66, 261–278.

Besley, T., and A. Case (1995): "Incumbent behavior: vote-seeking, tax-setting, and yardstick competition," *American Economic Review*, 85, 25–45.

Bös, D. (2000): "Earmarked taxation: welfare versus political support," *Journal of Public Economics*, 75, 439–462.

Brett, C., and M. Keen (2000): "Political uncertainty and the earmarking of environmental taxes," *Journal of Public Economics*, 75, 315–340.

Brett, C., M. Slade, and J. Pinkse (2002): "Spatial price competition: a semiparametric approach," *Econometrica*, 70, 1111–1153.

Brown, R. P., and J. C. Rork (2005): "Copycat gaming: a spatial analysis of state lottery structure," *Regional Science and Urban Economics*, 35, 795–807.

Browning, E. K. (1975): "Collective choice and general fund financing," *Journal of Political Economy*, 83, 377–390.

Brueckner, J. K. (2003): "Strategic interaction among fovernment: an overview of empirical studies," *International Regional Science Review*, 26, 175–188.

Buchanan, J. M. (1963): "The economics of earmarked taxes," *Journal of Political Economy*, 71, 457–469.

Calvert, R. L. (1989): "Reciprocity among self-interested actors: uncertainty, assymetry and distribution," in *Models of strategic choice in politics*, ed. by P. C. Ordeshook. Ann Arbor: University of Michigan Press.

Case, A. C., and H. S. Rosen (1993): "Budget spillovers and fiscal policy interdependence," *Journal of Public Economics*, 52, 285–307.

Coughlin, C. C., T. A. Garret, and R. Hernández-Murillo (2006): "The geography, economics, and politics of lottery adoption," *Federal Reserve Bank of St. Louis Review*, 88, 165–180.

Deran, E. (1965): "Earmarking and expenditures: a survey and a new test," *National Tax Journal*, 18, 354–361.

Dhillon, A., and C. Perroni (2001): "Tax earmarking and grass-roots accountability," *Economics Letters*, 72, 99–106.

Dye, R. F., and T. J. McGuire (1992): "The effect of earmarked revenues on the level and composition of expenditures," *Public Finance Review*, 20, 543–556.

Evans, W., and P. Zhang (2007): "The impact of earmarked lottery revenue on K12 educational expenditures," *Education Finance Review*, 2, 40–73.

Figueiredo, R. J. P. D. (2002): "Electoral competition, political uncertainty, and policy insulation," *American Political Science Review*, 96, 321–333.

——— (2003): "Budget institutions and political insulation: why states adopt the item veto," *Journal of Public Economics*, 87, 2677–2701.

Figueiredo, R. J. P. D., T. Jacobi, and B. R. Weingast (2000): "The new separation-of-powers approach to American politics," in *The oxford handbook of political economy*, ed. by B. R. Weingast, and D. A. Wittman. Oxford University Press.

Fiscal Planning Services, I. (2000): *Dedicated tax revenues: a fifty-state report*. Budget and Fiscal Research Services and Publications.

Goetz, C. J. (1968): "Earmarked taxes and majority rule budgetary processes," *American Economic Review*, 58, 128–36.

Goetz, C. J., and C. R. McKnew (1972): "Paradoxical results in a public choice model of alternative government grant forms," in *Theory of public choice*, ed. by J. M. Buchanan, and R. D. Tollison. The University of Michigan Press.

Grossman, G. M., and E. Helpman (2008): "Separation of powers and the budget process," *Journal of Public Economics*, 92, 407–425.

Jackson, J. (2011): "A legislative bargaining approach to earmarked public expenditures," *Economics Bulletin*, 31, 2006–2020.

Landry, C. E., and M. K. Price (2007): "Earmarking lottery proceeds for public goods: empirical evidence from U.S. lotto expenditures.," *Economics Letters*, 95, 451–455.

Lee, D. R., and R. Wagner (1991): "The political economy of tax earmarking," in *Charging for government: user charges and earmarked taxes in principle and practice*, ed. by R. Wagner, pp. 110–124. Routledge.

LeSage, J., and M. Dominguez (2010): "The importance of modeling spatial spillovers inpublicchoice analysis," *Public Choice*, pp. 1–21.

McCubbins, M. D., R. G. Noll, and B. R. Weingast (1987): "Political procedures as instruments of political control," *Journal of Law Economics and Organization*, 3, 243–277.

——— (1989): "Structure and process; politics and policy; administrative arrangements and the political control of agencies," *Virginia Law Review*, 75, 431–482.

Moe, T. M. (1989): "The politics of bureaucratic structure," in *Can the government govern?*, ed. by J. E. Chubb, and P. E. Peterson. Washington DC: Brookings.

——— (1990): "The politics of structural choice: towards a theory of public bureaucracy," in *Organization theory: from chester barnard to the present and beyond*, ed. by O. E. Williamson. Berkeley: University of California Press.

——— (1991): "Politics and the theory of organization," *Journal of Law Economics and Organization*, 7, 106–129.

Novarro, N. (2002): "Does earmarking matter? The case of state lottery profits and educational spending," Unpublished Manuscript.

——— (2004): "Do policy-makers earmark to constrain their successors? The case of environmental earmarking," Unpublished Manuscript.

Pérez, A., and R. K. Snell (1995): *Earmarking state taxes*. National Conference of State Legislatures, 3 edn.

Revelli, F. (2005): "On spatial public finance empirics," *International Tax and Public Finance*, 12, 475–492.

Tiebout, C. M. (1956): "A pure theory of local expenditures," *Journal of Political Economy*, 64, 416–424.

B Tables

Table 1: State Earmarking of Revenues

state	1954	1963	1979	1984	1988	1993	1997
Alabama	89	87	88	89	89	87	87
Alaska		6	1	2	9	8	5
Arizona	47	51	31	29	32	30	31
Arkansas	41	36	21	18	17	13	16
California	42	28	12	13	12	19	10
Colorado	75	51	17	25	18	20	12
Connecticut	26	23	0	1	12	10	7
Delaware	0	3	0	5	7	6	8
Florida	40	39	28	28	26	28	21
Georgia	29	22	11	9	8	6	6
Hawaii		7	5	5	6	5	11
Idaho	51	44	38	32	25	21	20
Illinois	39	43	14	18	21	32	30
Indiana	49	39	43	33	30	26	28
Iowa	51	44	19	13	21	22	13
Kansas	77	66	29	25	21	25	16
Kentucky	46	29		16		4	14
Louisiana	85	87	5	4	9	15	12
Maine	46	39	19	20	17	12	12
Maryland	47	40	34	24	20	17	18
Massachusetts	56	54	41	40		39	42
Michigan	67	57	38	39	35	39	55
Minnesota	73	74	12	13	14	16	12
Mississippi	40	37		30	26	26	30
Missouri	57	40	20	29	30	27	24
Montana	61	53	55	60	65	64	51
Nebraska	55	53	41	29	22	21	16
Nevada	55	35	34	52	49	57	65
New Hampshire	53	54	31	24	24	14	13
New Jersey	7	2	25	39	36	39	48
New Mexico	80	31	36	44	47	40	33
New York	13	10	0	6		8	11
North Carolina	38	30	20	8	14	19	15
North Dakota	73	43	29	21	22	22	24
Ohio	48	48	21	18	19	17	20
Oklahoma	62	59		43	24	21	24
Oregon	47	36	23	19	23	21	16
Pennsylvania	41	63	15	15	14	11	8
Rhode Island	6	4	0	1	5	5	8
South Carolina	69	62	56	55	44	17	18
South Dakota	59	54	33	32	27	47	25
Tennessee	72	77	60	61	66	60	60
Texas	81	66	54	20	24	21	14
Utah	71	62	52	48		55	54
Vermont	42	39	23	23	12	13	15
Virginia	39	32	27	24	25	25	23
Washington	35	30	29	26	29	30	26
West Virginia	57	39	21	21	20	19	21
Wisconsin	63	61		12	12	9	8
Wyoming	61	64	54	69		17	47
Average	51.27	43.06	27.50	26.60	25.07	24.50	24.06

Sources:
1954, 1963: *Earmarked State Taxes*, Tax Foundation.
1979: March 19, 1980 Memo, Montana Office of the Legislative Fiscal Analyst.
1984, 1988, 1993: *Earmarking State Taxes*, National Conference of State Legislatures.
1997: *Dedicated Tax Revenues: A Fifty-State Report*, Fiscal Planning Services, Inc.

Table 2: Summary Statistics

	1954	1963	1979	1984	1988	1993	1997
Ear	0.5127	0.4458	0.2921	0.2756	0.2668	0.2525	0.2473
	(0.2020)	(0.1959)	(0.1789)	(0.1839)	(0.1717)	(0.1707)	(0.1770)
VO	0.6458	0.4583	0.4375	0.3750	0.3542	0.2708	0.2292
	(0.4833)	(0.5035)	(0.5013)	(0.4892)	(0.4833)	(0.4491)	(0.4247)
same	0.8125	0.6667	0.5417	0.5833	0.3750	0.3958	0.3750
	(0.3944)	(0.4764)	(0.5035)	(0.4982)	(0.4892)	(0.4942)	(0.4892)
senper	0.7877	0.7330	0.7058	0.6882	0.6647	0.6495	0.6008
	(0.1586)	(0.1646)	(0.1457)	(0.1377)	(0.1146)	(0.1229)	(0.0785)
houper	0.7607	0.7116	0.6769	0.6795	0.6571	0.6359	0.6106
	(0.1658)	(0.1620)	(0.1404)	(0.1301)	(0.1159)	(0.1045)	(0.0979)
nm*	39.4625	59.5938	180.4292	159.7792	126.2458	78.4788	37.1449
	(487.242)	(506.464)	(591.140)	(633.795)	(669.169)	(506.873)	(420.814)
gov	0.3958	0.6667	0.6458	0.6667	0.5000	0.5833	0.3125
	(0.4942)	(0.4764)	(0.4833)	(0.4764)	(0.5053)	(0.4982)	(0.4684)
sen	0.3913	0.5870	0.7234	0.7021	0.6809	0.7234	0.4894
	(0.4934)	(0.4978)	(0.4522)	(0.4623)	(0.4712)	(0.4522)	(0.5053)
hou	0.3913	0.5870	0.7021	0.7872	0.7021	0.7234	0.5319
	(0.4934)	(0.4978)	(0.4623)	(0.4137)	(0.4623)	(0.4522)	(0.5044)
sengov	0.8542	0.7083	0.6250	0.6250	0.4583	0.5417	0.4375
	(0.3567)	(0.4965)	(0.4892)	(0.4892)	(0.5035)	(0.5035)	(0.5013)
hougov	0.9167	0.8750	0.8958	0.9167	0.5208	0.5625	0.7917
	(0.2793)	(0.3342)	(0.3087)	(0.2793)	(0.5049)	(0.5013)	(0.4104)
senhou	0.9167	0.8750	0.8958	0.9167	0.7708	0.7083	0.7917
	(0.2793)	(0.3342)	(0.3087)	(0.2793)	(0.4247)	(0.4593)	(0.4104)
samedem	0.2917	0.4375	0.4375	0.5000	0.2500	0.3333	0.1250
	(0.4593)	(0.5013)	(0.5013)	(0.5053)	(0.4376)	(0.4764)	(0.3342)
lot	0.0000	0.0000	0.2917	0.3542	0.5833	0.7500	0.7708
	(0.0000)	(0.0000)	(0.4593)	(0.4833)	(0.4982)	(0.4376)	(0.4247)
rm*	70.6950	75.2043	81.3203	84.8574	80.2869	80.9512	81.7965
	(43.711)	(44.092)	(47.567)	(56.546)	(49.979)	(50.033)	(50.396)
debt pop	0.0508	0.1060	0.4364	0.8346	1.2370	1.6307	1.8009
	(0.0514)	(0.0908)	(0.3364)	(0.6018)	(0.8186)	(1.1290)	(1.3395)
debt pi	0.0303	0.0442	0.0500	0.0630	0.0757	0.0787	0.0724
	(0.0276)	(0.0324)	(0.0370)	(0.0430)	(0.0465)	(0.0488)	(0.0470)

Numbers reported are averages with standard deviations given in parentheses. Summary statistics for *same* place values of 1 on missing data points for Nebraska and Minnesota due to non-partisan elections. *Thousands.

Table 3: Control Variables

Variable	Definition	Source
nm	Net migration	US Census Bureau
gov	Dummy=1 if governor is a democrat	Book of states
sen	Dummy=1 if senate democrat majority	Book of states
hou	Dummy=1 if house democrat majority	Book of states
sengov	Dummy=1 if Gov and Senate majority are same party	Book of states
hougov	Dummy=1 if Gov and House majority are same party	Book of states
senhou	Dummy=1 if Senate and House majority are same party	Book of states
samedem	Dummy=1 if Gov, House and Senate are Democratic	Book of states
lot	Dummy=1 if state has a lottery	Coughlin, Garrett, and Hernandez-Murillo (2006)
rm	Road miles	Highway Statistics (US DOT)
debt	Debt outstanding at end of fiscal year	Book of states
pop	Population	US Census Bureau
pi	Personal income	US Census Bureau
debtpop	debt/pop	
debtpi	debt/pi	

Table 4: Spatial Regression Results: *same* set to one for missing data

	W_{cont}		$W_{Debt\ Pop}$		$W_{Debt\ PI}$	
VO	0.0507**	0.0492**	0.0493**	0.0482**	0.0539**	0.0525**
	(2.2291)	(2.1391)	(2.2349)	(2.1335)	(2.3901)	(2.3146)
same	0.1356***	0.1351***	0.1236***	0.1253***	0.1174***	0.1136***
	(3.0663)	(3.0284)	(2.8550)	(2.8336)	(2.6916)	(2.5854)
senper	-0.0778	-0.0687	-0.0352	-0.0257	-0.0224	-0.0094
	(-0.8812)	(-0.7695)	(-0.4010)	(-0.2868)	(-0.2568)	(-0.1067)
houper	-0.0320	0.0087	-0.0359	0.0318	-0.0485	0.0094
	(-0.3173)	(0.0868)	(-0.3657)	(0.3217)	(-0.4963)	(0.0974)
sengov	-0.0783***	-0.0849***	-0.0706**	-0.0837***	-0.0626**	-0.0687**
	(-2.8432)	(-3.0650)	(-2.5482)	(-2.9820)	(-2.2615)	(-2.4735)
samedem	-0.0897*	-0.0836	-0.0842	-0.0776	-0.0955*	-0.0901*
	(-1.6517)	(-1.5288)	(-1.5476)	(-1.3967)	(-1.7617)	(-1.6488)
debt pop	0.0344***	-	0.0366***	-	0.0311***	-
	(2.6616)	(-)	(3.9795)	(-)	(3.3430)	(-)
debt pi	-	0.3846	-	0.3814	-	0.3145
	(-)	(1.6062)	(-)	(1.5906)	(-)	(1.4178)
ρ	0.2180	0.2390	0.0749	0.1060	0.1050	0.1380**
	(0.7822)	(0.7300)	(1.0336)	(1.3446)	(1.5740)	(2.0890)
λ	0.0109	0.0104	-0.4160***	-0.3900***	-0.4010***	-0.4680***
	(0.0350)	(0.0283)	(-2.9183)	(-2.6360)	(-2.9432)	(-3.3658)
Moran-I	0.8682	0.8749	0.0984	0.1980	0.1762	0.0515
	(0.3853)	(0.3816)	(0.9216)	(0.8431)	(0.8602)	(0.9589)
LM	0.0306	0.0461	0.4089	0.2563	0.3195	0.4295
	(0.8611)	(0.8300)	(0.5225)	(0.6126)	(0.5719)	(0.5122)
Nobs	336	-	-	-	-	-
Nvars	71	-	-	-	-	-
R^2	0.799	0.7952	0.8017	0.7933	0.8017	0.7987
$\bar{R}^2$	0.7478	0.743	0.7512	0.7407	0.7512	0.7474

Significance levels: 1% ***, 5% **, 10% *.
Coefficient t-statistics and test statistic marginal probabilities are in parentheses.

Table 5: Spatial Regression Results: *same* set to zero for missing data

	W_{cont}		$W_{Debt\ Pop}$		$W_{Debt\ PI}$	
VO	0.0505**	0.0488**	0.0480**	0.0470**	0.0523**	0.0506**
	(2.1874)	(2.0900)	(2.1586)	(2.0557)	(2.3125)	(2.2328)
same	0.0368	0.0303	0.0314	0.0211	0.0170	0.0041
	(0.8100)	(0.6610)	(0.7106)	(0.4638)	(0.3793)	(0.0920)
senper	-0.1062	-0.0969	-0.0573	-0.0513	-0.0378	-0.0230
	(-1.1966)	(-1.0788)	(-0.6500)	(-0.5685)	(-0.4343)	(-0.2627)
houper	-0.0142	0.0286	-0.0143	0.0583	-0.0224	0.0390
	(-0.1386)	(0.2796)	(-0.1448)	(0.5827)	(-0.2293)	(0.4095)
sengov	-0.0362	-0.0403	-0.0308	-0.0391	-0.0171	-0.0191
	(-1.2914)	(-1.4259)	(-1.0940)	(-1.3623)	(-0.6175)	(-0.6854)
samedem	-0.0069	0.0045	-0.0046	0.0122	-0.0147	-0.0025
	(-0.1233)	(0.0799)	(-0.0827)	(0.2172)	(-0.2650)	(-0.0458)
debtpopl	0.0348***	-	0.0370***	-	0.0300***	-
	(2.6186)	(-)	(4.0219)	(-)	(3.2821)	(-)
debtpil	-	0.3852	-	0.3737	-	0.3142
	(-)	(1.5812)	(-)	(1.5340)	(-)	(1.4305)
ρ	0.2180	0.2390	0.0760	0.0950	0.1250*	0.1585**
	(0.7211)	(0.6420)	(1.0423)	(1.1682)	(1.9129)	(2.4688)
λ	0.0109	0.0106	-0.4560***	-0.3900***	-0.4870***	-0.5660***
	(0.0324)	(0.0255)	(-3.1561)	(-2.6075)	(-3.5138)	(-4.0190)
Moran-I	0.8336	0.8529	0.1330	0.1777	0.0680	-0.0660
	(0.4045)	(0.3937)	(0.8942)	(0.8589)	(0.9458)	(0.9474)
LM	0.0186	0.0359	0.3682	0.2768	0.4438	0.5868
	(0.8914)	(0.8498)	(0.5440)	(0.5988)	(0.5053)	(0.4437)
Nobs	336	-	-	-	-	-
Nvars	71	-	-	-	-	-
R^2	0.7937	0.7899	0.7984	0.7884	0.8005	0.7985
$\bar{R}^2$	0.7412	0.7363	0.7471	0.7346	0.7496	0.7472

Significance levels: 1% ***, 5% **, 10% *.
Coefficient t-statistics and test statistic marginal probabilities are in parentheses.