DIVIDED GOVERNMENT AND THE SIZE OF GOVERNMENT WITHIN U.S. STATES

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By

Xuan Tu, B.S.

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XUAN TU, B.S.

Thesis Advisor: Robert W. Bednarzik, Ph.D.

ABSTRACT

The literature on U.S. state government size and what drives it has examined the role of political factors such as political party, but has largely ignored the impact of divided government. This paper primarily focuses on whether the division between the governor’s office and the legislature affects the size of state government. Using panel data from 48 states between 1976 and 2006, the evidence is too weak to conclude that divided government can lead to a bigger government.
Acknowledgement

I would like to thank my advisor Dr. Robert Bednarzik for his guidance and patience throughout the process to complete this thesis. I would also like to thank the Staff and Faculty of the Georgetown Public Policy Institute (GPPI) for help and resources they provided, and my family who always supports me.
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1. Introduction

The government’s optimal share in the economy has been subject to considerable debate for decades. In Western Europe, government expenditure has risen rapidly to its current level of about 50 percent of output, on average (Persson, 2002). A popular answer given by public choice theory is that special interest groups get benefit from particular government actions at the cost of overall efficiency and well-being. As a result, governments are perceived as being undesirably and inefficiently large by the majority of citizens.

People living in such environment are likely to be less satisfied with their life. They are likely to perceive their governments’ activities as inefficient since those activities are not consistent with their preferences. Therefore, citizens would feel less involved into the political activities that can change the status quo. Bjørnskov, Dreher and Fischer (2006), who measured government size by using the government’s share in GDP, found that life satisfaction decreases with a bigger government by using data from 74 countries. Particularly, this result for low and middle income people, and males, was stronger when the government was leftwing.

Various measures have been used to measure national government size in previous studies, such as the government share of consumption in GDP (Bjørnskov et al., 2007), total tax share as a percent of GDP (Fölster & Herekson, 2001), and total government share in GDP (Grossman, 1988; Fölster & Herekson, 2001). According to Landau (1985), the way of measuring government size can lead to different estimated results when the relationship between government size and economic growth is examined. In this paper, the main focus is the relationship between state government size and different government types, borrowing mainly
from public choice theory. State government size is measured, based on Garand’s (1988) approach by state government spending as a proportion of total state personal income.

In addition, several reports (e.g., Landau, 1985; Peden & Bradley, 1989; Dar & AmirKhalkhalim 2002; Fölster & Herekson, 2002) have shown evidence that resources are allocated less efficiently by larger governments, which, in turn, leads to a lower economic growth. Therefore, a bigger government can be detrimental to life satisfaction and negatively associated with economic growth. And, in circular fashion, slow economic growth could be detrimental to life satisfaction. Then, it is important to pay close attention to government size. According to Armey (1995), who popularized the notion of optimal size of government, argued that a mix of private and government is the best in terms of allocating resources and getting more output. Several studies have tried to determine the optimal government size. According to Vedder and Gallaway (1998), the optimal Federal Government size in the United States from 1947 to 1997 based on the Armey Curve was 17.45 percent of GDP. Peden (1991) estimated the optimal government size for the United States at 20 percent of GDP. Most economists would accept that the inverted-U shape of the Armey curve is a realistic representation of the real world. But, to validate the curve and get the correct line, analysis has to be empirical and depends on different periods and countries.

Over the past several decades, U.S. state governments have experienced fast growth and reaching higher levels. For example, Rogers and Rogers (2000) argued that “over the 1950–90 period, state government expenditures as a percent of personal income, on average, ranged from a low of 6.25 percent for New Jersey up to 14.9 percent for New Mexico”. It is important to
examine the reasons behind government’s growth and take measures to ensure the growth is not excessive in order to promote a higher level of life satisfaction and economic growth.

In recent years, a myriad of alternative explanations of government growth have been proposed. For example, Barro’s (1979) study of the determination of the optimal stock of government debt concluded that fiscal policy decisions can be explained purely from economic factors. Other scholars have put forth different models. One of these is Black’s (1948) median voter model. In another case, Musgrave (1981) and Oates (1985) evaluated the Leviathan model of Niskanen (1971) and Brennan and Buchanan (1977, 1978). Mueller and Murrell (1986) proposed an interest group model and public choice models of political competition (Buchanan and Wagner 1977) argue that politicians are vote-maximizers who try to attract new voters by proposing new programs which make government bigger. As a result, government is encouraged to get bigger, whenever politicians compete for votes. All of these models focus on how political competition or electoral systems affect government size. They concluded that the degree of political competition is positively correlated with government size. Electoral systems also exert an impact on government size. American-style winner-takes-all electoral systems tend to have smaller governments and smaller welfare programs than European-styple proportional representation system (Persson and Tabellinithat, 2006).

Meanwhile, the correlation between political institutions and fiscal policy has been getting more attention since increasing empirical evidence has shown that political institutions help shape fiscal policy. Do changes of party control in the U.S. states have predictable fiscal effects? How does fiscal adjustment take place in bicameral legislatures when political parties have different targets for the scale of public spending? The few studies that have examined this
issue reach different conclusions. Poterba (1994) found no difference in how the political parties responded to unexpected budget deficits. Besley and Case (1995a) argued that the governor's political party was not significantly related to the level of total taxes. In contrast, Alt and Lowry (2000) estimate that tax revenues are higher when Democrats control the state budgetary process. Caplan (2001) found that taxes increase with the percent Democratic representation in either of the state's legislative chambers.

This paper aims at increased understanding of the influence of political parties on government size. There is a long-standing debate about whether political parties “matter” in the political science and political economy literatures. This paper explores the potential theoretical linkage between party control and government size. Section 2 briefly reviews related literature on the determinants of government size and divided government, and the hypothesis is proposed. In Section 3, variables are described and data are presented. In Section 4, the empirical model is presented to test the relationship between divided government and size of state governments and empirical results will be reported. In Section 5, interpretations of findings are presented.
2. Literature review

2.1 Related empirical literature on the determinants of government size

The determinants of government size have long been a focus of both federal- and regional-level analysis. Oates (1985) found that fiscal centralization variables such as the number of local government units in a state do not significantly influence states' tax revenues as a fraction of personal income. Holtz-Eakin (1988) found that the line item veto does not significantly alter the outcomes of the budgetary process across states, and relates this to the debate over granting the executive line-item veto power. Poterba (1992) tested the hypothesis that budgeting and borrowing rules affect the level and composition of public spending. He argued that states with capital budgets tended to spend more on public capital, especially if they do not impose pay-as-you-go requirements for financing. According to Case, Hines, and Rosen (1993), states' expenditures depend on the spending of similarly situated states. Besley and Case (1993) found supporting evidence that state governors ineligible to stand for reelection were more likely to raise taxes, but were also more likely to increase spending.

Each of the studies above is distinct with a unique focus. But several similarities still can be found, for example, they all measured government size financially. Importantly, for studying government size, the typical study controlled for influence of certain key variables, such as the level of per capita income, grants from other levels of government, and demographic characteristics. As described in the next section, these influences are also included in the model in section 4.
2.2 Party control and fiscal policy outcomes

Studies that have examined the correlation between party control and fiscal policy outcomes come to very different conclusions on the significance of party control. Much of the early studies found little evidence that party control had a statistical significant influence on policy outcomes. For example, Winters (1976) found little effect of party controls on benefits and taxes borne by low-income groups using data for 1961 and 1965. Dye (1984) examined the effect of a change in party control on state welfare spending from 1950 to 1980. Allowing for divided control of the state legislatures and controlling for state income, he found an effect of party control in fewer than half the states. James Garand (1988) examined a number of classic explanations for the size of state government in the post-war period. Among the explanations, the party control (by Democrats) one was associated with faster growth of government. In each state over the period 1945-84, he studied the relationship of the level of state government spending as a proportion of total state income, and party controls. This included the party of the governor, the party controlling the legislature and these two interacted. Little evidence was found to support the importance of parties. Thomas Gilligan and John Matsusaka (1995) also found no supporting evidence that party control (number of seats in lower and upper houses, control over legislatures and the governor's chair, competitiveness of legislative elections) had an effect on state and local general expenditures.

In contrast, more recent work found support for party control. Brian Knight (2000) argued that control of both houses by the Democrats was associated with higher tax rates relative to state GDP, and that control of both houses by the Republicans had the opposite effect. Colleen Grogan (1994) found that party control matters for Medicaid spending for a biannual panel of
states between 1979 and 1989. Self-proclaimed Republicans and Republican Congress members are more likely to oppose increase in Medicaid benefit levels than their Democratic counterparts. Besley and Case (1995b) showed the evidence that Democratic and Republican governors respond differently to term limits, with Democrats more likely to raise taxes and spending when working under a term limit. According to Diane Lim Rogers and John Rogers (2000), Democrat control in the house was associated with larger government, measured in either revenue or expenditure terms. They also found that divided government is an important moderating device, with a Democratic governor and a Democratic house leading to larger government than a Republican governor with a Republican house. Alt and Lowry (1994) found that states with divided governments had more difficulty responding to a shock, with the end result being an increase in deficit finance. Using data from 1968-87, they ran a two-equation system for taxes and expenditures in separate analyses for groups of states, treating the South separately. Overall, they found deficits more likely under divided government, and that greater Democrat representation was associated with higher public spending. Alt and Lowry (2000) used the difference in public spending from year-to-year as their dependent variable to study the impact of divided government for 33 states over the period 1952-95. They found significant differences between parties in their adjustment to fiscal imbalances during their first two years in office. In cases of divided control, they found a smaller shift in the policy direction of the governor's party. Wes Clarke (1998) considered the impact of divided government on the degree of conflict between the executive and legislature by examining the difference between gubernatorial recommendations and actual appropriations for twenty states from 1985-94 (6027 observations). A larger percentage change to the governor's recommendation is taken as evidence of greater
conflict. He found that a unified legislature and an opposition governor yielded greater conflict and that a greater ideological spread and party system liberalism led to greater conflict. In summary, most of studies suggest that deficits or debts are more likely to happen under divided government.

This study extends existing research in terms of testing the relationship of party control and size of government at state level. Previous studies related to divided government all focus on the effects of divided government on budget deficits or taxes. Meanwhile, studies related to size of government or the growth of government ignore the political factor of divided government. Most of these studies focus on the relationship between political competition and size of government. Clearly, budget deficits and tax burdens are closely related to the size of government. But they are different from size of government. This paper fills the gap that previous papers did not study and provides insights to questions that previous papers could not answer. It presents empirical results to answer questions, such as, does party control have a significant effect on growth of government? Which kind of government is more likely to have a bigger public sector?
3. Data and empirical methods

The hypothesis proposed here is: The degree of political party control and size of government are positively related. The relationship of divided government and government size will be tested, while controlling for traditional influences such as the level of state personal income, grants from other levels of government, and demographic and institutional characteristics. Exhibit 1 defines the variables used in the empirical analysis.

The dependent variable is state government spending as a proportion of total state personal income. This measurement is based on Garand’s (1988) approach. Garand also pointed out that there are two major issues related to such a measurement of government size. At the national level, most studies of government size use GDP or GNP as the measure of total economic output (Berry and Lowery 1984a; Lewis-Beck and Rice 1985; Lowery and Berry 1983; Mann 1980). However, no equivalent measure of total economic output is available across all fifty states for the 30-year time period of this analysis. Total state personal income is related to state economic output, as it generally reflects the underlying concept of the size of each state’s economy. The second major issue concerns the use of differential price deflators for the public and private sectors. Garand argued that it is necessary to adjust the government size measure by including the differential price deflators characterizing the public and private sectors. The simple ratio of state government spending to total state personal income is used here. Beck (1976; 1979; 1981) argued that this measure overstates the real growth of government spending because the costs of the goods and services offered by governments increase more rapidly than those of other goods and services, given the fact that productivity gains in sectors such as health and education are bound to be minimal. Therefore, Beck argues that deflating government consumption
spending with a "government consumption" deflator is necessary. After the deflation, the public sector is shown to have grown much less than current figures suggest. Berry and Lowery (1987) and Garand (1988) have thus used the deflating approach. The standard approach is used here without any deflating. According to Heller (1983, 63), in estimating a "government consumption" deflator, "national accounts statisticians assume zero productivity growth for labor employed in the public sector". That assumption is clearly debatable, and thus the deflator "tends to overstate the rise in cost and to understate the increase in real expenditure" (Beck 1979, 326). Then, the argument that deflating adds more accuracy is questionable.

The main independent variable is party control of the state government. Based on the definition of Alt and Lowry (1994), a state can have a unified party, a split branch, or a split legislature government. A unified party government is when one party controls the governor’s office and both houses of the legislature. If one party holds the executive branch and the other party holds the legislature, then it is a split branch government. A split legislature consists of one party holding the executive and one house of the legislature and the other party holding the remaining house. An index for measuring divided government or political cohesion (DGI) is developed by Roubini et al. (1989), and Roubini and Sachs (1989). They code the data between 0 and 3 based on coalitions within the government. This paper uses four dummy variables to represent whether a government is a unified Democratic government, a unified Republican one, a split legislature one, or a split branch one (Alt and Lowry 1994, 2000). Consistent with Roubini et al. (1989), and Roubini and Sachs (1989) we expect that multiple coalitions will be positively related to size of government.
Based on the available literature, a number of control variables should be considered influencing the size of state government. These variables are the ones that have been proven to be the most significant in previous studies (See Exhibit 1 for a complete list). For example, the socioeconomic explanation for government spending looks at factors such as unemployment rate. According to Rice’s (1986) study of government spending in Europe, unemployment rate had a positive effect on spending in nine countries. Higher unemployment rates are always related to a greater level of expenditures as state governments try to stimulate economic growth, and pay increased unemployment compensation. So, by increasing their expenditures, governments attempt to stabilize the economy. The Intergovernmental Grant Explanation ties government growth in the states to the influx of intergovernmental grants from the Federal Government. Evidence (Garand 1988) has been shown that this explanation was well supported empirically. In an early classic work on government growth, German economist Adolph Wagner (1877) posited that government growth was a function of factors related with increased economic affluence, industrialization, and population growth. As income rises, a measure of economic affluence, the government’s share of the economy increases because the elasticity of public expenditures is supposed to be greater than one. The growth of population and the increased level of industrialization can lead to increased levels of societal interdependencies and externalities, which are highly correlated to each other. The increased level of reliance among people socially and the more likelihood of the happening of externalities would cause more undesirable results which require increased governmental regulation and intervention. Based on the limited availability of such data across the fifty states, only the population density and state personal income will be included.
Exhibit 1: Overview of Variables in the Model and Expected Results

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>DEFINITION</th>
<th>SIGN</th>
<th>JUSTIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urep_1</td>
<td>If the state government is a unified Republican government, Urep_1=1; 0, otherwise.</td>
<td>+</td>
<td>Alt and Lowry (1994)</td>
</tr>
<tr>
<td>Sbranch_1</td>
<td>If the state government is a split branch government, Sbranch_1=1; 0, otherwise.</td>
<td>+</td>
<td>Alt and Lowry (1994)</td>
</tr>
<tr>
<td>Sleg_1</td>
<td>If the state government is a split legislature government, Sleg_1=1; 0, otherwise.</td>
<td>+</td>
<td>Alt and Lowry (1994)</td>
</tr>
<tr>
<td>Unemrate</td>
<td>State unemployment rate</td>
<td>+</td>
<td>Rice (1986)</td>
</tr>
<tr>
<td>Fedgrant</td>
<td>Federal grants-in-aid to state governments as a proportion of total state expenditures</td>
<td>+</td>
<td>Garand (1988)</td>
</tr>
<tr>
<td>PerIncom</td>
<td>State income per capita</td>
<td>+</td>
<td>Wagner (1877)</td>
</tr>
<tr>
<td>Popdensity</td>
<td>State population density</td>
<td>+</td>
<td>Wagner (1877)</td>
</tr>
<tr>
<td>State Dummies</td>
<td>48 States</td>
<td>NA</td>
<td>Garand (1988)</td>
</tr>
<tr>
<td>Dependent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Govsize</td>
<td>state government spending as a proportion of total state personal income</td>
<td>NA</td>
<td>Garand (1988)</td>
</tr>
</tbody>
</table>
Definition of Variables and Calculations

\[ Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_i X_i + \epsilon \]

Where:

\( Y = \) Govsize

The size of state government

\( X_1 = \) Urep_1; \( X_2 = \) Sbranch_1; \( X_3 = \) Sleg_1

Divided government dummies

\( X_4 = \) Unemrate

Unemployment rate of state

\( X_5 = \) Fedgrant

Federal grants-in-aid to state governments as a proportion of total state expenditures

\( X_6 = \) PerIncom

State income per capita

\( X_7 = \) Popdensity

State population propensity

\( X_i = \) States

\( \epsilon = \) Unexplained variance, Error term

\( \beta_0 = \) Y-intercept

\( \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_i = \) Coefficients of respective independent variables

Sources of Variables: All variables from U.S. Census Bureau [http://www.census.gov/](http://www.census.gov/)
To assess the relation between divided government and government size, a pooled cross-state, time series sample of 1488 state-year observations for the period 1976-2006 will be analyzed. The sample includes 48 states. Nebraska is removed from the sample because it has a unicameral (one House) legislative branch, which limits analysis of party control and divided government. Louisiana is also removed from the sample because of too many missing values.

According to previous studies (Alt and Lowrey, 1994), fixed effects model should be used to estimate the relationship between party control and government size. A chow test is necessary to confirm the use of fixed effects model is appropriate.
4. Results

The average size of government of each type of government is calculated to see if there is any apparent correlation with different types of government. Table 1 illustrates that “Split Governments” types account for larger share of types of state government than unified government types; moreover, it appears slightly positively related to the size of government.

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>Percent</th>
<th>Size of government^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Split Branch Government</td>
<td>479</td>
<td>34.5%</td>
<td>.141</td>
</tr>
<tr>
<td>Unified Democratic</td>
<td>398</td>
<td>28.6%</td>
<td>.133</td>
</tr>
<tr>
<td>Government</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Split Legislature</td>
<td>286</td>
<td>20.6%</td>
<td>.145</td>
</tr>
<tr>
<td>Government</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unified Republican</td>
<td>227</td>
<td>16.3%</td>
<td>.137</td>
</tr>
<tr>
<td>Government</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1390</td>
<td>100.0%</td>
<td>-</td>
</tr>
</tbody>
</table>

Graphs 1 and 2 show an apparent positive relationship between government size and unemployment rate over the 31 years. This is more readily seen in Graph 2, where the growth rates of government size and unemployment rate have almost the same trends.

^a State government spending as a share of total state personal income
Graph 1: Government size and unemployment rate, on average, 1976-2006

Graph 2: The Growth rate of government size and unemployment rate, on average, 1976-2006
Graph 3 to Graph 6 show the relationship between average government size and each type of the government. Based on these graphs, the relationship between average government size and unified Democratic government seems negative, while the relationship between average government size and split legislature government seems positive. Further analysis is needed to certify these relationships.

Graph 3: Average government size and percentage of unified Democratic government, 1976-2006
Graph 4: Average government size and percentage of unified Republican government, 1976-2006

Graph 5: Average government size and percentage of split branch government, 1976-2006
Graph 6: Average government size and percentage of split legislature government, 1976-2006

Regression results are presented in Table 1\(^b\) in Appendix. Using diagnostic tools, the model is being tested on multicollinearity, heteroscedasticity and model specification problems. VIF results are all less than 10, and thus multicollinearity is not a problem for the model. But, when heteroscedasticity is checked, it is a problem. Then, the method known as Robust Standard Errors is used to get the standard errors that are not unduly affected by small departures of model assumptions (See Table 1). Regarding model specification problems, Table 4 shows results from the Link Test which show no model specification issues.

The base group of the model is unified Democratic government. The hypothesized relationship between government size and type was mixed. Only a unified Republican

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\(^b\) It appears that the model has an omitted variable problem. Since this implies that the standard errors could be unstable, interpreting the results of marginally statistically significant variables should be cautious. Please see appendix for further information.
government relative to a unified Democratic government showed a statistically significant negative relationship, meaning that a unified Democratic government is likely to spend more than a unified Republican government. The OLS regression without time and state fixed effects were also conducted. Still, the results present that it shows small differences among these four types of government in government size. It makes the hypothesis that the degree of party control is positively related to the size of government very weak.

Previous studies that support for party control focus on studying the effects of divided government on budget deficits or taxes. Brian Knight (2000) argued that control of both houses by the Democrats was associated with higher tax rates relative to state GDP, and that control of both houses by the Republicans had the opposite effect. Budget deficits greatly depend on the previous policies and performances of the state government, while government spending per se is less affected by the previous performances of the government. This might be one reason that party control’s impact on government spending is not as significant as that on budget deficits.

According to Diane Lim Rogers and John Rogers (2000), the Democratic Party coincides with bigger government, but only when party representation in both the governor’s house and the legislature is strong. For this paper, the divided government is measured by zero and one, instead of continuous variables. If the divided government variable can also measure the degree of the party ideology of each state, the result might be different.

Alt and Lowry (1994) found that states with divided governments were more difficult to respond to a shock, with the end result being an increase in deficit finance. So, their study focuses on parties’ adjustment to external shocks and previous fiscal imbalance. As a result, they drew the conclusion that divided governments matter in terms of fiscal imbalance. For this paper,
the model does not include external shocks and previous fiscal imbalance, which are not the focuses of the paper. The exclusion of these factors could be the reason that the divided government variables are not statistically significant.

According to R square, the model explains 94 percent of the variance of the size of government. The federal grants-in-aid variable measured by a proportion of total state expenditure shows statistical significance. This supports the intergovernmental grant explanation that government growth is a function of the influx of intergovernmental grants from the federal government. The grants are utilized by the state government to increase the amount of public goods in the state. The positive coefficient implies that the infusion of intergovernmental grants is positively correlated with the growth of state government’s share of total state economic output. State income per capita and state population density are also statistically significant. For the state income variable, the positive coefficient suggests that demand for public goods is income-elastic, which means, increased income is associated with greater demand for public goods relative to demand for private goods. For the state population variable, the positive coefficient suggests that increased societal interdependencies associated with higher population are associated with higher levels of government spending relative to the size of the total state economy. Garand (1988) got negative coefficient for the income and population variables. But his study built models for each of the fifty states and estimated results separately using OLS regression. Then, it is really hard to get a representative result based on the models for individual states. The statistically significance of unemployment rate also reveals the correlation between unemployment and the growth of government. This is consistent with Rice’s (1986) study of government spending in Europe.
5. Conclusions and Policy Implications

Based on the political economy literature, the policy implications of political economy are particularly relevant to institutional reforms. If politico-institutional variables influence policy outcomes, the intervention at the institutional level is necessary to improve policymaking. From the theoretical aspect, government size is viewed as a public policy outcome which is produced by party control, as well as the combined influence of other factors. But based on the regression results of 48 states across 31 years, the evidence is too weak to suggest that divided government can lead to a bigger government. Instead, other factors such as unemployment rate and federal aid to state governments should be focused on to slow the growth of state governments in the United States.

The positive correlation between unemployment rate and government size demonstrates that higher unemployment rates are related to a greater level of expenditures. To stabilize the economy, state governments pay unemployment compensation, which naturally raises state spending. They serve as automatic stabilizers to the states’ economy. The amount of unemployment benefits vary across states. Whether there is an optimal amount of benefits is an open question of balancing efficiency and equity. Further research is required to answer this question.

But, resources are allocated less efficiently by larger governments, which, in turn, lead to a lower economic growth. Then, a lower economic growth causes a higher unemployment rate and state governments want to further extend employment benefits, which further increases the government spending. It becomes a vicious cycle. Therefore, state governments should be cautious when trying to solve the unemployment problem by extending unemployment benefits.
The problems of federal aid have long been recognized. A 1940 article in Congressional Quarterly lamented: "The grants-in-aid system in the United States has developed in a haphazard fashion. Particular services have been singled out for subsidy at the behest of pressure groups, and little attention has been given to national and state interests as a whole." Based on the result that higher federal grants-in-aid are correlated with a larger government size, it further demonstrates that reforms to the aid system are necessary. If the aid system was reduced, state government and the private sector would fund those activities that they thought were worthwhile.
Appendix

Table 1: Model A-Estimated Regression Coefficients with State Government Spending as a Proportion of Total State Personal Income as the Dependent Variable, Using Robust Standard Error

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Model A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unified Republican Government</td>
<td>-0.0023</td>
</tr>
<tr>
<td></td>
<td>(-1.97)**</td>
</tr>
<tr>
<td>Split Branch Government</td>
<td>0.0003</td>
</tr>
<tr>
<td></td>
<td>(0.37)</td>
</tr>
<tr>
<td>Split Legislature Government</td>
<td>0.0007</td>
</tr>
<tr>
<td></td>
<td>(0.56)</td>
</tr>
<tr>
<td>State Unemployment Rate</td>
<td>0.0018</td>
</tr>
<tr>
<td></td>
<td>(5.60)***</td>
</tr>
<tr>
<td>State Income Per Capita</td>
<td>0.0089</td>
</tr>
<tr>
<td></td>
<td>(5.43)***</td>
</tr>
<tr>
<td>State Population Density</td>
<td>0.2543</td>
</tr>
<tr>
<td></td>
<td>(4.15)***</td>
</tr>
<tr>
<td>Federal Grants-in-aid</td>
<td>0.3213</td>
</tr>
<tr>
<td></td>
<td>(2.13)***</td>
</tr>
<tr>
<td>Constant</td>
<td>0.1112</td>
</tr>
<tr>
<td></td>
<td>(30.41)***</td>
</tr>
</tbody>
</table>

| Observations                      | 1400          |
| F-Stat                            | 261.10        |
| R²                                | 0.9359        |

Note: The numbers underneath the respective coefficients in parentheses are t-statistics. The coefficients with a significance level at 10% are indicated by (*), significance of 5% is indicated by (**) and a 1% significance is indicated by (***)

Table 2: Variable Correlation

```
.corr y udemo_1 urep_1 sbranch_1 sleg_1 unemploymentrate
(obs=1400)

<table>
<thead>
<tr>
<th></th>
<th>y</th>
<th>udemo_1</th>
<th>urep_1</th>
<th>sbranch_1</th>
<th>sleg_1</th>
<th>unemploymentrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>udemo_1</td>
<td>-0.0838</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>urep_1</td>
<td>-0.0165</td>
<td>-0.2773</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sbranch_1</td>
<td>0.0160</td>
<td>-0.4538</td>
<td>-0.3167</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sleg_1</td>
<td>0.0638</td>
<td>-0.3193</td>
<td>-0.2229</td>
<td>-0.3648</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>unemployrate</td>
<td>0.1313</td>
<td>0.1833</td>
<td>-0.1932</td>
<td>0.0260</td>
<td>-0.0590</td>
<td>1.0000</td>
</tr>
</tbody>
</table>
```
Table 3: Heteroskedasticity test

```
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of y

  chi2(1) = 3331.41
  Prob > chi2 = 0.0000
```

Note: By conducting the Breusch-Pagan test, the null hypothesis that constant variance is refused. Heteroskedasticity might be a problem here. The method known as Robust Standard Errors is used to get the robust results to solve the problem.

Graph 1: Plot of residuals and fitted values

Note: According to the plot of the standardized residuals against the observed value of the dependent variable, the model specification problem might not exist here.
Table 4: Link test

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 1400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>2.60976533</td>
<td>2</td>
<td>1.30488266</td>
<td>F(2, 1397) = 10202.54</td>
</tr>
<tr>
<td>Residual</td>
<td>0.1767718</td>
<td>1397</td>
<td>.00127898</td>
<td>Prob &gt; F = 0.0000</td>
</tr>
<tr>
<td>Total</td>
<td>2.78843851</td>
<td>1399</td>
<td>.001993165</td>
<td>R-squared = 0.9359</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Adj R-squared = 0.9358</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Root MSE = .01131</td>
</tr>
</tbody>
</table>

| Variable | Coef.     | Std. Err. | t     | P>|t| | [95% Conf. Interval] |
|----------|-----------|-----------|-------|------|---------------------|
| _hat     | .9932324  | .0266133  | 37.32 | 0.000 | .9410262 .1.045439 |
| _hatsq   | .0187808  | .0636662  | 0.26  | 0.792 | -.1081108 .1416724 |
| _cons    | .0005851  | .0024423  | 0.24  | 0.811 | -.004206 .0053761 |

Table 5: Omitted Variable Test

. ovtest

Ramsey RESET test using powers of the fitted values of y
Ho: model has no omitted variables
F(3, 1315) = 20.01
Prob > F = 0.0000

Note: Link test and Ramsey Reset are used to examine model specification problems. Tables 4 and 5 show that there could be an omitted variable problem.
References


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