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Government Ideology and Unemployment in the U.S. States

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Abstract

Research shows that when the more liberal Democratic Party controls the national government, unemployment is lower, but whether liberal state governments are associated with lower unemployment has not been examined. We argue that more left-leaning governments in the U.S. states have the same preference for and willingness to use government to reduce unemployment, but that the greater resource and policymaking constraints that the states face during economic downturns limit their ability to shape unemployment to economic growth periods. We find evidence for these arguments in an analysis of the U.S. states for the period of 1975–2010. Specifically, when economic growth is low, liberal state governments are associated with increases in unemployment rates similar to or even somewhat higher than conservative governments, but when growth is moderate to high, liberal state governments are associated with greater-than-expected reductions in unemployment. We also provide some evidence that different state spending decisions between liberal and conservative state governments may explain these patterns.

Keywords

political economy, economic policy, public policy, fiscal policy, public policy, political parties, parties and interest groups, federalism

Introduction

In the aftermath of the most recent national recession, state unemployment rates vary dramatically, ranging from just over 3% to nearly 10% in 2013. While a variety of socioeconomic factors influence this variation, these discrepancies also raise the

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question of what role state governments play in shaping employment outcomes. Across affluent nations, left-wing governments are associated with lower unemployment, and national-level research in the United States shows that Democratic control of government is also associated with lower unemployment (Alt 1985; Alvarez, Garrett, and Lange 1991; Beck 1982; Fowler 2006; Hibbs 1977). But whether this association exists in the states has been largely neglected. Thus, in this article, we examine whether left-leaning or liberal state governments in the states are also associated with lower unemployment.

High unemployment creates problems ranging from individual economic hardship to sluggish aggregate demand and a strain on the social safety net. As unemployment is projected to remain high for years, and gridlock and the influence of upper class interests have arguably prevented robust job-producing policies that benefit the unemployed from being enacted in Washington, D.C. (Hacker and Pierson 2010), it is an opportune time to reconsider the effect of state governments on employment outcomes. There has been little study of how state governments influence employment outcomes (Hansen 1999; 2001; Jones 1990; Prillaman and Meier 2014), and despite the findings from national-level studies, how the partisan or ideological character of state government influences unemployment has been virtually ignored.

We expect that liberal state governments are more concerned with and willing to use the government to reduce unemployment, because recent research shows that liberal state governments are associated with economic policies and outcomes beneficial for those with lower incomes (Kelly and Witko 2012; Whitaker et al. 2012). However, while the states do have authority over a large number of policies that may influence unemployment, they also face constraints on their use of public policy to shape employment outcomes (Hansen 1999; 2001), and these constraints are most severe during economic downturns. Thus, we anticipate that even liberal governments will be dependent on economic growth cycles to reduce unemployment. Our analysis of changes in state unemployment rates between 1975 and 2010 shows that when economic growth is slow, increases in unemployment rates in liberal states are similar to or even higher than increases in conservative states. But as growth increases to moderate to high levels, left-leaning state governments are associated with more rapid reductions in unemployment. We suggest that fiscal policy choices and constraints may be an important factor creating these pro-cyclical effects of state government liberalism on unemployment.

Government Liberalism in National and State Governments and Unemployment

Governments may be committed to producing certain economic outcomes for electoral, constituency, or ideological reasons. One view is that because politicians are held accountable for economic performance when they run for reelection, they will take actions that improve economic performance, particularly as elections approach (Tufte 1978). This view is nonideological and nonpartisan in that all incumbent

governments have an incentive to spur growth. Another view is that because different parties represent different economic constituencies and have contrasting ideological views regarding government intervention into the economy, not all incumbent governments prefer the same types of economic outcomes (Hibbs 1977).

Comparative politics scholars have argued that left-wing parties are more likely to produce outcomes that benefit the poor and working classes (Huber and Stephens 2001; Korpi 1978). Although American parties are not as class based as those in other affluent democracies, research shows that Democratic control of national government is associated with economic outcomes that benefit the lower income groups. For example, income inequality is lower (Kelly 2009) and income growth is higher for those with low incomes (Bartels 2008). Most relevant here, Hibbs (1977) argued in his classic work that there are different preferences regarding the unemployment/inflation trade-off between left and right governments. Low interest rates are likely to spur additional employment, but they also create the risk of inflation. High levels of unemployment hurt the working class more than the upper classes because working-class individuals lack the skills to easily find employment and lack the financial resources to cushion the blow of unemployment (Rehm, Hacker, and Schlesinger 2012). Left governments are more willing to run the risk of higher inflation to create additional employment, while right governments will be more sensitive to inflation even if that results in higher unemployment. Hibbs (1977) observed that Democratic Presidents were associated with lower unemployment rates in the time period that he examined, and more recent research indicates that Democratic control of Congress is associated with expectations for higher inflation (Fowler 2006).

In the decades after World War II, during recessions, Democratic governments routinely enacted economic stimulus bills focused on creating jobs (Dark 1999). While a stimulus bill was enacted in the most recent economic downturn, it was more focused on tax cuts than stimulative spending. This reflects that the more conservative Republican Party has a greater ability to influence legislation in the Senate even when they are the minority due to the de facto 60 vote requirement and the increasing influence of wealthy interests that prefer tax cuts over infrastructure and redistributive spending (Hacker and Pierson 2010). Given the Democratic Party's apparent diminishing ability to reduce unemployment by using the powers of the federal government even when it has control, it is important to examine how state governments may influence unemployment.

Government Ideology and Unemployment in the United States

While national economic trends and political factors are important influences on state employment outcomes, states have had increasing control over their economies in recent decades according to some studies (Hendrick and Garand 1991). Indeed, there is substantial cross-state variation in unemployment at any one time. To illustrate this, we present unemployment rates in Michigan and South Dakota from 1974 to 2010 in

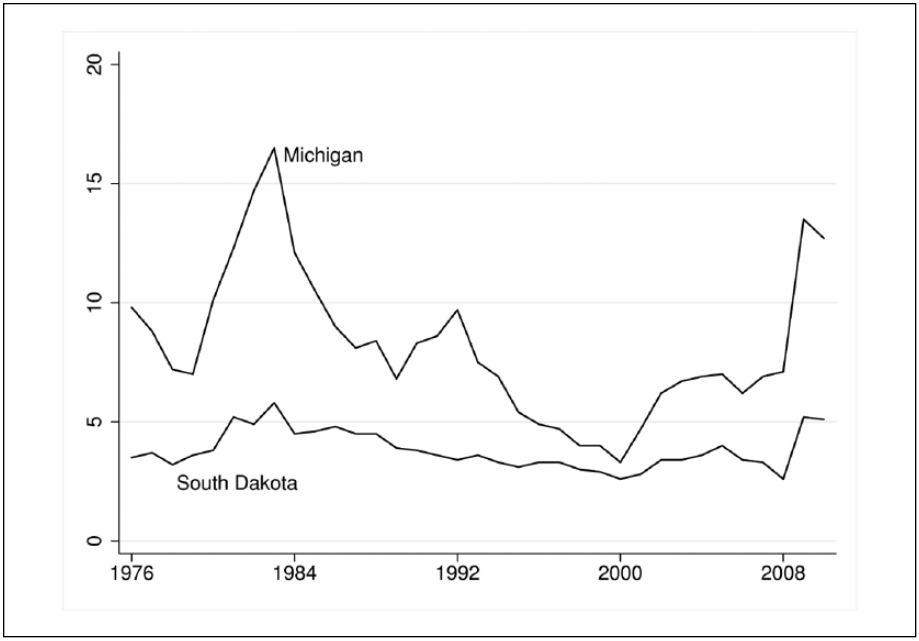

Figure 1. Unemployment rates in Michigan and South Dakota, 1975–2010.

Figure 1. These states are clearly not representative, but they show the extremes in terms of a low level of unemployment with little annual fluctuation in South Dakota and a higher level of unemployment with significant annual variation in Michigan. It is obvious that there are common responses to national economic trends, but equally apparent is a large state-specific element. Much of this variation likely reflects differences in the sectoral mix of the economy and the demographics of the population and does not necessarily indicate any political effects. But, after considering these factors, does state politics affect this variation?

Like national governments, because state politicians are judged by voters for state economic performance, they have an incentive to be concerned about their state's performance and take steps to try and improve it (Atkeson and Partin 1995; Stein 1990). Studies have shown that subjective perceptions and objective indicators of poor economic performance, including unemployment, negatively affect the approval ratings and confidence in both governors (Cohen and King 2005; Hansen 1999) and state legislatures (Kelleher and Wolak 2007). This may lead to the expectation of a political–business cycle where unemployment rises and falls depending on the proximity to elections. Examining state data from 1967 to 1997, Hansen (1999) found, however, that taxes are lower and personal income is higher in gubernatorial election years, but unemployment rates remain unchanged between election and nonelection years.

This might indicate that state governments are simply incapable of spurring additional employment (Hansen 1999), and there is no doubt that state governments face

serious constraints as we discuss below. However, it may also be the case that factors other than proximity to elections determine a government's commitment to reducing unemployment. One possibility suggested by the national-level literature is the partisanship or ideology of the government. Atkeson and Partin (1995) find that Democratic governors are punished less than Republican governors by voters who perceive the economy as poor. This may partly reflect that the Democratic Party "brand" is associated in many states with greater efforts to improve economic conditions, particularly unemployment. But while many state party systems mirror the class-based divisions that we see at the national level, historically this has not been true in the South, where the Democratic Party was often quite conservative and unresponsive to lower income residents (Brown 1995; Key 1949; Rigby and Springer 2011). In fact, southern working-class Whites are currently more likely to support the Republican Party (Gelman, Park, and Shor 2008).

Thus, we consider how liberal state governments are associated with changes in unemployment rates over time in the 50 states. We also examine the association between Democratic governments and changes in unemployment rates in the states outside of the South (and excluding Nebraska, which has a nonpartisan legislature). There are good reasons to expect that liberal (Democratic) governments in the states would be more concerned with, and more activistic in the face of, high unemployment. Indeed, a key tenet of liberal ideology in America is a greater willingness to use the government to promote economic outcomes that benefit the poor and low income. Recent studies show that liberal state governments are more likely to enact policies and produce economic outcomes that benefit the poor, such as higher welfare spending, higher minimum wages, and less inequality (Fellowes and Rowe 2004; Kelly and Witko 2012; Whitaker et al. 2012). Research also shows that liberal governors spend more time discussing economic development issues than conservatives (Coffey 2005). However, even if liberal state governments are more concerned about and willing to use government to reduce unemployment, there are also serious constraints on the ability of state governments to influence employment outcomes that are not faced to the same degree by national governments (Hansen 1999). Therefore, any effect that the left-wing government may have on unemployment in a state is a function of a party's motivations plus relatively serious institutional constraints.

How and When Can the United States Influence Unemployment?

The states face more limitations than the federal government in shaping employment because the states lack certain policy tools and are more reliant on economic growth to use the tools that they do have. First and most obviously, the ability to manipulate monetary policy is an important tool for affecting employment outcomes, which the states lack (Hibbs 1977). Second, it may be that increasing globalization makes such locally based efforts to spur employment ineffective because businesses have many more choices when deciding to expand or relocate (Hansen 1999). And states have

very limited control over things such as trade policy and exchange rates that affect globalization.

However, research indicates that states can influence a variety of state-level macroeconomic outcomes, such as growth in personal income and gross state product (GSP; Brace 1991; Hansen 1999; Hendrick and Garand 1991; Jones 1990). There is less evidence that states can influence employment (Hansen 1999; 2001), but some studies show such an effect (Jones 1990; Prillaman and Meier 2014). Jones (1990) demonstrates that different fiscal policy choices lead to variation in employment outcomes in the states in certain time periods. Similarly, while Prillaman and Meier (2014) fail to observe any relationship between low business taxes and employment, they do observe that certain types of government spending can influence employment outcomes.

There are also many other types of public policies made by state governments that may influence employment. Regulation can affect employment outcomes by forcing businesses to hire additional workers, which is why regulation is often resisted by industry. For example, laws requiring a larger number of breaks during the workday, mandating a minimum number of workers per client in particular businesses (such as child care facilities), or limiting hours that employees can work, all potentially make additional hiring necessary. State governments can also try to lure businesses from other states (locational economic development strategies) or encourage the creation or growth of enterprises within their own state (entrepreneurial strategies; Saiz 2001), which can result in increased employment (Turner 2003). Of course, state agencies can directly hire employees or contractors or mandate the hiring of additional employees by local governments (as when states pass maximum class size laws or require universal pre-K education).

All of these actions might affect employment outcomes, and liberal and conservative governments tend to have different preferences for these policies. Regulations that encourage the hiring of additional employees are more likely to be enacted and enforced by left-leaning governments (Burgoon and Baxandall 2004). Research also indicates that governors in states with liberal citizens engage in more entrepreneurial economic development activities than states with conservative citizens (Taylor 2012). Finally, liberal governments demonstrate a different mix of spending than conservative governments (Nicholson-Crotty, Theobald, and Wood 2006; Witko and Newmark 2010). Because these policies differ depending on whether state governments are liberal or conservative and these policies affect employment, it is reasonable to expect that liberal and conservative governments have different effects on unemployment.

Liberal state governments will have a greater ability to use such policies to spur employment during periods of economic growth, however, because economic downturns limit state governments' policy autonomy and innovation in a number of ways. For example, because regulation that may mandate additional hiring is generally opposed by industry (Hayden 2006), governments especially concerned about attracting business investment or maintaining business confidence, as is the case during recessions, should be less likely to enact them (Smith 1999). And research does show that states are less likely to enact new regulations on business during economic downturns (Gerber and Teske 2000).

The same dynamic exists in the realm of economic development policy according to some research. It is intuitive that governors would seek to spur employment during bad economic times. But Taylor (2012) finds the opposite. He observes that governors are more active in economic development policymaking during good economic times. And while there is little difference in the use of locational economic development policies between liberal and conservative governments, states with liberal citizens are more likely to use entrepreneurial economic development policies (that seek to develop homegrown businesses rather than lure businesses from other states or nations; Taylor 2012).

There are also major constraints on the ability of the states to use spending to influence employment during economic downturns. Unlike the federal government, state governments have balanced budget requirements and debt limitations. Although these fiscal institutions vary in their effectiveness, it seems clear that in general they place additional constraints on state governments' ability to borrow and spend (Alt and Lowry 1994). Thus, states cannot engage in Keynesian countercyclical direct hiring or other forms of countercyclical stimulus spending very easily. During economic downturns, states generally must cut budgets, which costs jobs, as was seen on a large scale in the most recent recession. States could raise taxes to fund new or maintain existing spending, but a tax increase partly offsets any positive stimulative effect of additional government spending and interstate economic competition constrains states from raising taxes very much in any case (Case 1993).

The state politics literature also makes a distinction between "consumption" spending and "investment" or "developmental" spending (Brace 1991; Jones 1990; Witko and Newmark 2010). The latter is intended to stimulate future economic growth, while the former is intended to serve current human needs for things such as food, shelter, and medical care. Investment or developmental expenditures are largely under the control of state governments (Brace 1991; Jones 1990; Peterson 1995; Witko and Newmark 2010), but states also play a critical role in the provision of consumption expenditures on programs in health care and welfare (Fellowes and Rowe 2004; Volden 2002). In terms of the major expenditure categories in state budgets, welfare and health care are considered to be consumption, while transportation (mostly roads, bridges, etc.) and education are considered to be investment spending (Peterson 1995). Jones (1990) finds that greater education and highway spending increases employment rates, while spending on welfare and health care are associated with higher future unemployment in some decades. Similarly, Prillaman and Meier (2014) find that health care spending is negatively associated with employment.

However, these analyses do not consider how spending decisions and the effects of spending on employment may vary depending on economic conditions. During recessions, governments must make trade-offs between investment and consumption spending, and liberal state governments prefer consumption over investment spending in such situations (Nicholson-Crotty, Theobald, and Wood 2006), which may create a net drag on job growth during economic downturns when it cannot easily be offset by other policies that spur employment. In contrast, during periods of growth, additional consumption spending that does not come at the expense of investment spending or

require tax increases may be net stimulative, and liberal governments have more freedom to enact other types of policies that stimulate employment.

Due to the variety of policies that can potentially influence employment outcomes, measuring each type of policy that may affect unemployment is impractical. But state government liberalism leads to liberal policy outputs, such as more regulation, more spending, and a different mix of spending. For example, in their influential work, Erikson, Wright, and McIver (1993) find that state government liberalism is associated with an index of state policy liberalism that includes per-pupil education expenditures, Medicaid eligibility, Aid to Families with Dependent Children (ADFC) eligibility, the stringency of consumer protection regulation, and tax progressivity. And a number of studies show that liberal governments engage in more consumption spending (Bailey and Rom 2004; Fellowes and Rowe 2004; Volden 2002). Therefore, based on this discussion, we expect that liberal (Democratic) state governments will be associated with faster reductions in unemployment during periods of economic growth. During periods of recession when liberal policymaking is most constrained, unemployment increases should be no different in states with liberal governments and, based on the discussion of fiscal policy above, may even be somewhat higher. In addition to examining the conditional effect of liberal state governments, we also examine the possibility of a conditional effect of an emphasis on consumption spending relative to investment spending to establish a policy mechanism that may translate liberal government into divergent unemployment rates.

There are strong null and alternative hypotheses, of course. It may be that strategies more likely to be pursued by conservative governments, such as keeping wages low, suppressing unions, or cutting business taxes, are more effective at creating jobs. The national-level studies of the relationship between left governments and unemployment and an analysis at the state level of how low-wage strategies effect unemployment cast doubt on this, however (Hansen 2001; Hibbs 1977). And in a recent comprehensive study, Prillaman and Meier (2014) find that conservative taxation policies do not stimulate economic growth or create additional jobs in the states that adopt them. It may be the case that, liberal or conservative, the states simply have a limited ability to influence employment outcomes, which does receive some support in the literature (Hansen 1999). Ultimately, which of these views is correct is an empirical question. If the former is correct, we should see that liberal governments are consistently associated with higher unemployment, and if the latter is correct, government ideology should have no effect on employment outcomes under any circumstances. If state governments act like their national-level counterparts, we should see that liberal governments are associated with more rapid reductions in unemployment, but mostly during periods of economic growth.

Analysis

We examine our arguments using data from 1975 to 2010. We stop our analysis in 2010 for data availability reasons. One of the key explanatory variables, the Berry et al. (2012) state government ideology measure, only extends through 2010.

Data

Outcome Variable: The Change in the State Unemployment Rate

The main outcome variable is the annual change in the state unemployment rate. Unemployment rates are often used as outcome variables for national studies (e.g., Alt 1985), and such data are also available for many years in the states. These data were obtained from the Bureau of Labor Statistics data page and The Book of the States (for years prior to 1977). Because business cycles lead to increases and decreases in unemployment rates and we use the first difference, the mean of the dependent variable is very close to 0 (−0.03). It is theoretically appropriate to use the change in unemployment, and the differenced unemployment data is clearly stationary, whereas there is mixed evidence for stationarity in the undifferenced data.[1]

Before turning to the explanatory variables it is worth discussing the possibility of joint or reverse causality. That is, under conditions of high unemployment it might be rational for voters to choose left-leaning governments because these governments will provide a more generous safety net for the unemployed. Furthermore, our estimation approach requires that the key explanatory variables are at least weakly exogenous with respect to the outcome variable. Therefore, we performed exogeneity tests using the approach recommended by Charemza and Deadman (1992). We observe that unemployment rates do not affect either the leftism of government or the partisanship of government, which are instead determined by past leftism/partisanship and citizen liberalism (see results in Table 3 in the appendix).

Explanatory Variables and Controls

As noted, we examine how state government liberalism affects changes in unemployment because at the state level, party and ideology are not always highly correlated (in the South) in all 50 states, especially early in the time period we examine. However, we also examine the effect of partisan control of government in non-Southern states, where the Democratic Party has been the more liberal party during the entire time period of this study. To measure state government ideology, we use Berry et al.'s (2012) Nominate-based measure of state government ideology. While some other state-level studies of the effect of government liberalism on economic outcomes have used the older Berry et al. (1998) measure (e.g., Kelly and Witko 2012), either measure produces very similar results in this context, as Berry et al. (2012) demonstrate is almost always the case.

To measure Democratic Party power in state government, we create a simple additive measure that assigns 1 point for Democratic control of each of the following: the lower legislative house, the upper legislative house, and the governorship. The logic of this additive measure is that as the number of institutions controlled by a party increases, the ability of actors to influence outcomes increases. For example, while a Democratic governor can always veto legislation, if partisan allies control at least one house of the legislature, the governor can also influence the legislation that is brought

to the floor. If all three branches are controlled by the Democrats, they can influence legislation, budgets, and appointments to a much larger degree (for a similar approach at the federal level, see Witko 2014).[2] The data to create this measure were obtained from Carl Klarner's data website (http://www.indstate.edu/polisci/klarnerpolitics.htm). In addition to restricting the analyses using the party variable to non-Southern states, we are forced to omit Nebraska because it has a nonpartisan, unicameral legislature.

To control for the possibility of election cycle effects (where all incumbent governments seek to boost employment in election years, regardless of party or ideology), we also include a dummy variable for whether there is a gubernatorial election in a given state year. Again, we gathered this information from the Klarner website.

Because unemployment is unlikely to increase as much when there is already high unemployment, we control for the past level of unemployment (which as we explain below is also important for our modeling approach). As unemployment is highly responsive to economic cycles, it is also necessary to control for changes in economic growth within the state. We do this by including a variable measuring the percentage change in GSP in the current year. Note that there are more dramatic swings in GSP than U.S. gross domestic product (GDP) because some state economies are highly dependent on the production of goods and services that experience dramatic price variations (e.g., oil in Alaska, see Goldsmith 1999).

We test for the conditional relationship between state government liberalism/partisanship and changes in unemployment using an interaction term multiplying the lagged growth in GSP variable by the lagged state ideology variable. If there is a pro-cyclical effect of government liberalism on changes in unemployment as we anticipate, then the coefficient for the interaction between state government liberalism and GSP growth should be negatively signed and significant. In some models, as a robustness check, we also control for U.S. GDP growth that may influence state unemployment above and beyond any GSP growth (e.g., through expanded orders for goods and services from other states). Because including this variable necessitated not using year fixed effects we omit it in a number of the models in favor of the fixed effects specification. Similarly, we control for total federal intergovernmental aid to the state obtained from the Census Bureau. Because these data were no longer collected after 2008, all models including federal government aid to the states have fewer observations.

We also include controls for characteristics of the economy and workforce that may affect unemployment. It is widely recognized that the United States has undergone a period of deindustrialization; therefore, we control for the percentage of GSP derived from manufacturing activity. The GSP data were obtained from the Census Bureau's website. In addition, in recent years, businesses appear to have moved operations to states without strong labor unions to avoid the greater bargaining power they provide to workers (Grant and Wallace 1994). Unions may also make hiring more expensive for firms located in the state. On the other hand, it is possible that unions use their political influence to demand policies that reduce unemployment. So, theoretical expectations for union strength are ambiguous. In any case, it is important to control

for the amount of union density in the state, the proportion of the nonagricultural workforce represented by a union. The data were originally collected by Hirsch, Macpherson, and Vroman (2001), and we have extended the data into the more recent years included in our analysis.

Because of the different demand for employment from different age groups and the variable unemployment rates across different ethnic groups, we also include the proportion of the population that is nonwhite and more than age 65. As the unemployment rate is substantially higher among nonwhites, states with a higher proportion of nonwhites in their population are expected to have more rapid increases in unemployment rates. In contrast, states with a higher proportion of the population more than age 65 are expected to have more rapid reductions in unemployment rates because the unemployment rate incorporates only those workers actively seeking employment.

Testing Policy Mechanisms

While a number of policies may influence employment, we wish to at least consider one policy mechanism for which data are available for the unusually long time period of this study and which previous studies indicate likely influences employment, state spending. We begin by considering how state government liberalism may influence spending decisions, and once we identify spending that varies along with state government ideology, we then consider whether this type of spending may also influence unemployment.

Based on the theoretical discussion above, we anticipate that a greater reliance on consumption, as opposed to investment spending, may result in cyclical effects on unemployment. Therefore, we examine whether state government liberalism can explain variation in (1) investment spending per capita, (2) consumption spending per capita, and (3) the ratio of consumption to investment spending per capita (and because the components of this variable—education, highway, health, and welfare spending—are always positive, using this simple ratio measure does not present any problems resulting from negative values in the numerator or denominator). In these models, in addition to examining the effect of government liberalism and the other controls, we also control for federal intergovernmental aid. More specifically, in the model of investment spending, we control for the amount of federal aid in investment programs to the state, and we do the same in the model examining consumption spending. Finally, in the model examining how state government ideology influences the ratio of consumption to investment spending, we generate a similar ratio measure of federal aid to the state.[3]

We use the Berry et al. (2012) ideology measure in these models rather than partisan variable to include all 50 states in the analysis. In these analyses, we establish that government liberalism does explain variation in consumption spending and the ratio of consumption to investment spending. Therefore, we then examine whether the ratio of consumption to investment spending is related to changes in unemployment in a manner consistent with government liberalism—that is, variable depending on economic growth conditions.

Model Estimation

We utilize error correction models (ECMs) estimated with ordinarly least squares (OLS) and panel-corrected standard errors with two-way fixed effects. ECMs have become common in political science applications (De Boef and Keele 2008), and they can be appropriately applied to an analysis of time series cross-sectional data (TSCS) because, as Beck (2001) points out specifically in regard to error correction models, "[W]hatever we can do for time series we can do for TSCS" (p. 279), so long as the number of time units is sufficient, generally at least ten (p. 274). Much of the variation in a data set such as ours comes from differences across states, but over time variation within a state is also important. Indeed, ECMs are ideal for estimating both long- and short-term relationships between variables, and it is possible that political variables influence unemployment in both the long and short terms.

Single-equation ECMs are a useful approach to avoid spurious findings in the presence of integrated data (De Boef and Keele 2008), and as noted above, we could not rule out the possibility that the dependent variable was integrated (though it clearly was not after being differenced). The same is true for many of our independent variables. Engle and Granger (1987) pioneered the "two-step" ECM, but more recent research typically uses the single-equation ECM approach because it produces all of the same information about long- and short-term relationships but does so more efficiently by estimating a single equation rather than a series of equations.[4] More precisely, whereas the Engle-Granger approach estimates separate equations to analyze long- and short-term relationships between variables, both parameters are simultaneously estimated with each explanatory variable having the first differenced term and a lagged term included in the model. The coefficient of the lagged level of the outcome variable provides the "error correction rate," and using the error correction rate and the coefficients of the lagged levels of the explanatory variables, we can obtain the total "long-term" impact of an explanatory variable (computed by dividing the coefficient of the lagged-level explanatory variable by the *absolute value* error correction rate).

One way to express a single-equation error correction model is as follows:

$$\Delta Y_t = \alpha_1 Y_{t-1} + \beta_1 \Delta X_t + \beta_2 X_{t-1} + \epsilon_t.$$

For each independent variable X, we have up to two parameter estimates—β_1 for the differenced variable and β_2 for the lagged level of the variable. If either of these coefficient estimates indicates a statistically significant relationship, then it is appropriate to conclude that the explanatory variable has a relationship with the dependent variable (if β_2 is significant then α_1 must also be significant to conclude that a relationship is present, with α_1 following a Dickey-Fuller distribution). The ECM approach is ideal for understanding how shocks to the explanatory variables manifest themselves in both short- and long-term changes in the outcome variable. In this simple bivariate example, β_1 provides an estimate of the initial change in the dependent variable produced in the short term by a shock to the independent variable. This is called the "short-term" effect, not meaning that the effect is impermanent but that the effect

occurs wholly at a specific point in time. β_2 and α_1 provide the information needed to estimate the slightly more complicated "long-term" impact. This is also called the error correction component of the model. The long-term impact is the portion of the connection between *X* and *Y* that does not occur at one particular point in time but is distributed temporally such that a portion of the impact is felt in each period over a time span. The size of this long-run impact is a function not only of β_2 but also of α_1, which is known as the error correction rate. The total long-term impact of a shock to *X* on *Y* via the error correction component, the long-run multiplier, is computed by dividing β_2 by α_1. In order for single-equation ECMs to produce reliable estimates and significance tests "weak exogeneity" is required.[5] The approach to investigating weak exogeneity established by Charemza and Deadman (1992) indicated that the explanatory variables were at least weakly exogenous (see results in the appendix). As well, when applied to integrated data, the series must be cointegrated to avoid issues with spurious regression. We test for cointegration by using the error correction test as described in Enns, Masaki, and Kelly (2014).

There are two minor departures from the standard error correction approach here. First, due to very different levels of GSP per capita among states, we utilize the percentage change in GSP, or the GSP growth rate, rather than the raw differenced variable.[6] Second, as noted above, we include a dummy variable for a gubernatorial election year because unemployment may be lower in such years. However, because it does not make sense that past gubernatorial elections would influence future unemployment, we omit the lagged variable from the model.

Finally, we include both state and year fixed effects in most of our models (where we do not, it is to not "wash out" the effect of the national GDP variable, which is constant across states in a given year). The year fixed effects control for the national economic trends that influence state unemployment but that are not fully controlled for by the state GSP growth variable, as well as the partisan control of national government. State fixed effects control for any unobserved state-level variables (such as the presence of natural resources) that influence unemployment levels over the time period examined.

Results

We begin by presenting the results of the analysis of how state government ideology and partisanship influence unemployment. Table 1 presents a number of models that examine the effect of government ideology and partisan control of government, both assuming a constant effect and allowing the effect to vary along with economic conditions. In the first and third columns of results, we observe that the ideology and partisan variables do not have significant simple linear effects on unemployment. However, when we interact these variables with the GSP growth variable, we find that the interaction terms for ideology and partisanship have significant or nearly significant negative effects on unemployment ($p = .061$ for the government ideology interaction in model 2) in the expected direction. That is, as economic growth increases, liberal or Democratic governments experience more rapid reductions in unemployment.

Table 1. The Effect of State Government on Unemployment.

	(1)	(2)	(3)	(4)	(5)	(6)
	Δ Unemploy$_t$	Δ Unemploy$_t$	Δ Unemploy$_t$	Δ Unemploy$_t$	Δ Unemploy$_t$	Δ Unemploy$_t$
Unemploy$_{t-1}$	−0.266***	−0.267***	−0.282***	−0.283***	−0.226***	−0.240***
	(−9.36)	(−9.46)	(−8.88)	(−9.10)	(−6.52)	(−6.81)
ΔGov Ideo	−0.002	−0.002			−0.001	
	(−1.29)	(−1.31)			(−0.42)	
Gov Ideo$_{t-1}$	−0.0002	0.002			0.003	
	(−0.23)	(1.23)			(1.23)	
Gov Ideo × GSP Gro$_{t-1}$		−0.0320			−0.0631**	
		(−1.88)			(−2.71)	
Δ Dem Gov.			−0.039	−0.0387		0.118
			(−0.93)	(−0.91)		(0.30)
Dem Gov.$_{t-1}$			−0.028	0.037		0.029
			(−1.01)	(0.95)		(0.61)
Dem Gov × GSP Gro$_{t-1}$				−0.889**		−1.368***
				(−2.37)		(−3.26)
Gov Elect$_t$	−0.044	−0.044	−0.039	−0.036	−0.026	−0.043
	(−0.89)	(−0.89)	(−0.69)	(−0.63)	(−0.32)	(−0.47)
Δ Unionization	0.022	0.023	0.030	0.032*	0.031	0.029
	(1.50)	(1.53)	(1.86)	(2.00)	(1.89)	(1.67)
Unionization$_{t-1}$	0.019	0.020	0.019	0.021	0.068***	0.063***
	(1.57)	(1.62)	(1.13)	(1.26)	(4.99)	(4.33)
Δ GSP Gro	−3.33***	−3.345***	−2.955***	−3.005***	−3.827***	−3.570***
	(−4.67)	(−4.71)	(−4.33)	(−4.43)	(−5.22)	(−5.13)
GSP Gro$_{t-1}$	−6.924***	−5.228***	−6.253***	−4.931*	−2.904	−4.283**
	(−7.36)	(−3.96)	(−6.85)	(−4.69)	(−1.72)	(−3.72)
Δ Manuf	1.640	1.733	1.592	1.549	−5.531*	−5.652*
	(0.87)	(0.92)	(0.77)	(0.76)	(−2.03)	(−2.10)
Manuf$_{t-1}$	−2.011*	−1.937*	−0.971	−0.850	−1.155	−0.623
	(−2.39)	(−2.32)	(−1.20)	(−1.04)	(−1.20)	(−0.69)
Δ More than 65	37.07*	39.629*	47.142	50.269*	−25.497	−9.260
	(2.27)	(2.42)	(1.83)	(1.81)	(1.97)	(−0.25)
More than 65$_{t-1}$	−10.89***	−11.053***	−13.512***	−14.204***	−19.801***	−19.193***
	(−3.40)	(−3.43)	(−3.60)	(−4.07)	(−4.39)	(−4.08)
Δ Nonwhite	0.124	−0.161	−0.979	−0.791	−6.029	−4.662
	(0.06)	(−0.08)	(−0.39)	(−0.32)	(−1.71)	(−1.27)
Nonwhite$_{t-1}$	0.828	0.742	0.302	0.090	−0.039	−0.519
	(1.33)	(1.20)	(0.51)	(0.15)	(−0.05)	(−0.57)
Δ U.S. GDP Gro					−0.089**	−0.087**
					(−2.72)	(−2.66)
U.S. GDP Gro					−0.365***	−3.354
					(−9.07)	(−8.93)
Δ Fed Inter Gov Aid					9.39e−09	6.88e−08
					(0.17)	(1.09)
Fed Inter Gov Aid$_{t-1}$					−3.05e−08***	−1.98e−08*
					(−3.54)	(−2.41)

(continued)

Table 1. (continued)

	(1)	(2)	(3)	(4)	(5)	(6)
	Δ Unemploy$_t$	Δ Unemploy$_t$	Δ Unemploy$_t$	Δ Unemploy$_t$	Δ Unemploy$_t$	Δ Unemploy$_t$
Constant	3.462***	3.359***	2.882***	2.798***	4.797***	2.971***
	(5.23)	(5.01)	(4.09)	(3.86)	(5.59)	(4.79)
N	1,750	1,750	1,221	1,221	1,550	1,147
R^2	.75	.75	.67	.67	.58	.59

Note. *z* statistics in parentheses. GSP = gross state product.
*p < .05. **p < .01. ***p < .001.

In the last two models, we remove the year fixed effects and include U.S. GDP growth (which does not vary across states) and federal intergovernmental aid (which does vary across states) as control variables. The results are the same for the government ideology and state partisan control variables. We see also that many of the slowly changing socioeconomic controls are significant in this specification omitting year and state fixed effects. In contrast, once we control for these fixed effects, most of these socioeconomic controls are not significant, with the exception of GSP growth and lagged unemployment. Because Democratic parties in the South were often very conservative, we exclude them from the partisan models, but if we include them, the coefficient is smaller for the interaction term (though still significant, $p = .049$).

Overall, the results show that whether we conceive of government leftism in a partisan or ideological sense, the results are basically the same. Interpreting interaction terms by looking at coefficients can be difficult, so in Figure 2, we present the marginal effect of a one-unit increase in government liberalism and Democratic control of the institutions of state government at different levels of GSP growth (plus and minus one standard deviation, etc.). The black line represents the point estimate, and the shaded area is the confidence interval. Because government ideology is not quite significant at the .05 level ($p = .06$), the confidence intervals slightly overlap the 0 line in the left panel, but nevertheless, we observe that as GSP growth increases, increasing government liberalism is associated with more rapid reductions in unemployment, an effect that is not as pronounced, and is even reversed at very slow levels of growth. An additional institution controlled by Democrats produces a similar effect.

More specifically, at mean levels of GSP growth, we see that an additional institution of Democratic government is associated with a slightly more rapid reduction in unemployment, though this is not statistically distinguishable from 0. However, as growth increases, the effect of Democratic control on changes in unemployment becomes larger and significant. The reason that the party variable appears to have "larger" effects is that it requires a much greater political shock to produce a one "institution" change (out of three institutions) in the partisanship of government than it does to produce a one-unit change in the ideology of government (on a 0–100 scale).

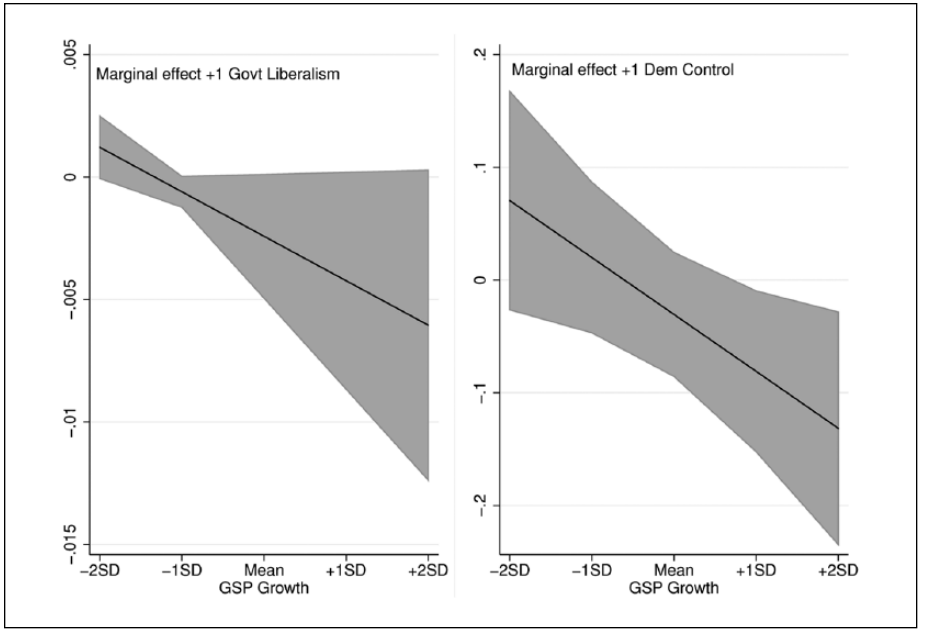

Figure 2. The marginal effect of government liberalism and democratic control on unemployment.
Note. GSP = gross state product.

Keep in mind also that the total effects of partisanship and ideology are considerably larger than the one-period effects presented in Figure 2. In ECM models, using the coefficient of the lagged level of the explanatory variable and the error correction rate (the rate of adjustment between the explanatory and dependent variable, which is the coefficient for the lagged dependent variable), we can compute the total long-term effect of explanatory variables by dividing the explanatory variable coefficient by the error correction rate. Because we have an interaction term, we chart the marginal coefficient for government liberalism and Democratic control in Figure 2 as a means to help visualize the total long-run impact of each of these variables. We allow GSP growth to move from two standard deviations below to two standard deviations above its mean value. We hold the ideology and partisan variables constant at one standard deviation above their means. For instance, at plus one standard deviations of GSP growth, the marginal long-run coefficient for a one-unit increase in liberalism is approximately −0.004 (as seen in Figure 2). If we divide this number by the error correction rate from model 2 of Table 2 (0.27), we can conclude that the long-term effect of a one-unit increase in government liberalism at plus one standard deviations of GSP growth is about a 0.01% reduction in the unemployment rate. A standard deviation increase in liberalism would result in about a 0.2 percentage point reduction in the unemployment rate because the standard deviation is 21.04 ($21.04 \times -0.01 = -0.21$). If we take the marginal effect of a

Table 2. Spending and Unemployment in the United States.

	(1)	(2)	(3)	(4)
	Δ Invest	Δ Consume	Δ Con to Inv	Δ Unemploy$_t$
Invest$_{t-1}$	−0.089** (−3.21)			
Consume$_{t-1}$		−0.134*** (−4.75)		
Con to Inv$_{t-1}$			−0.191*** (−5.94)	0.166* (1.97)
Unemploy$_{t-1}$				−0.274*** (−9.86)
Δ Gov Ideo	−0.052 (−0.56)	−0.100 (−0.74)	0.000135 (0.43)	−0.002 (−1.03)
Gov Ideo$_{t-1}$	0.060 (0.87)	0.249*** (2.89)	0.000357 (1.73)	0.001 (0.45)
Gov Ideo × GSP Gro$_{t-1}$				−0.009 (−0.51)
Con to Inv × GSP Gro$_{t-1}$				−3.507*** (−4.53)
Gov Elect$_t$			−0.051 (−1.02)	
Δ Fed Consume		752.7*** (21.51)		
Fed Consume$_{t-1}$		187.8*** (5.42)		
Δ Con to Inv				0.226 (1.67)
Δ Fed Con to Inv			0.144*** (9.28)	
Fed Con to Inv$_{t-1}$			0.0556*** (4.19)	
Δ Fed Invest	444.84*** (7.81)			
Fed Invest$_{t-1}$	114.93*** (3.10)			
Δ GSP Gro	88.636 (1.88)	−0.155 (−0.00)	−0.112 (−1.64)	−3.397*** (−4.84)
GSP Gro$_{t-1}$	114.237 (1.77)	47.483 (0.95)	−0.143 (−1.49)	−3.770** (−2.77)
Unionization$_{t-1}$	1.043 (−0.11)	0.526 (0.65)	0.00120 (0.70)	0.020 (1.60)
Δ Unionization	0.883 (1.05)	1.322 (1.38)	0.000863 (0.39)	0.022 (1.54)
More than 65$_{t-1}$	480.018 (1.65)	550.393* (2.34)	−0.479 (−0.86)	−10.17*** (−3.31)
Δ More than 65	−398.165 (−0.26)	1,302.494 (0.90)	3.814 (1.17)	43.142** (2.63)
Δ Nonwhite	135.001 (0.85)	−34.347 (−0.26)	−0.310(−1.11)	−0.344 (−0.17)
Nonwhite$_{t-1}$	−29.003 (−0.74)	8.416 (0.24)	0.0280 (0.35)	0.674 (1.13)
Δ Manuf	−258.059* (−2.44)	−16.678 (−0.12)	0.663* (2.33)	1.943 1.04
Manuf$_{t-1}$	−5.899 (−0.14)	−127.899** (−2.44)	0.0699 (0.67)	−1.164 (−1.44)
Constant	−67.332 (−1.60)	−37.048 (−1.11)	0.144 (1.84)	2.997*** (4.60)
N	1,550	1,550	1,550	1,750
R^2	0.28	0.47	0.32	0.76

Note. *z* statistics in parentheses. GSP = gross state product.
*p < .05. **p < .01. ***p < .001.

one-unit increase in party control (i.e., one additional Democratic institution) at plus one standard deviation of GSP growth, we would expect to observe a reduction in the unemployment rate of around 0.08 (again, as seen in Figure 2). If we divide this by the error correction rate from model 4, we would get a total long-run marginal effect of approximately −0.29 (−0.08/0.28). Considering that economic fundamentals affect the unemployment rate so much, these effects are substantial and represent tens of thousands of additional employed people in even the smallest states.

What might explain why liberal governments are associated with lower unemployment, and why does this effect appears to be limited to periods of rapid economic

growth? As we explained above, a number of policies might result in this pattern. It is impossible to consider all such policies, but here we examine the effect of state spending on unemployment. Specifically, we examine whether states exhibit differences in terms of patterns of consumption and investment spending and whether these differences might explain some of the variation in unemployment under different economic conditions across liberal and conservative states.[7]

Table 2 presents the results of an analysis of how state government ideology affects state consumption and investment spending, and how the ratio of consumption to investment spending is associated with unemployment. Here, we use the measure of state government ideology in these models to include all 50 states. In addition to the controls from the other models, we include controls for federal aid in the same investment and consumption programs (and the ratio of consumption and investment aid), which may affect state spending choices. We see in column 1 that there are no ideological differences in terms of investment spending, but in columns 2 and 3, more liberal states do spend more on welfare and have a higher ratio of consumption to investment spending as anticipated based on prior research (for the latter, $p = .08$ or .04 using a one-tailed test, which is appropriate given theoretical expectations). Again, the smaller sample size in the first three models reflects that the state-level federal grant data is no longer collected by the Census Bureau as of 2008.

In column 4, we examine how the consumption to investment ratio affects unemployment, while controlling for government ideology's effect (because government ideology may influence unemployment through a variety of channels and not just spending). In general, previous research would lead us to believe that a greater emphasis on consumption spending would produce higher unemployment (Jones 1990; Prillaman and Meier 2014). Model 4 shows that at zero economic growth (i.e., when the consumption ratio interaction is equal to zero), this is indeed the case, as we can see that the coefficients for the long- and short-term consumption to investment variables are positive (and one of them is significant). However, we again see that the interaction between the consumption to investment ratio and GSP growth is negative and significant. This indicates that as GSP increases, the total effect of the ratio of consumption to investment spending on unemployment changes, decreasing rather than increasing unemployment.

If we estimate marginal long-term effects similar to those presented in Figure 2, we observe that at one standard deviation below the mean in GSP growth, the consumption to investment spending ratio does not have an effect on changes in unemployment rates distinguishable from zero, and at two standard deviations below the mean of GSP growth, the spending ratio variable even has a positive marginal effect of 0.30. This means that a greater emphasis on consumption spending at very low levels of economic growth actually increases unemployment. In contrast, at plus one standard deviations of GSP growth, a one-unit increase in the consumption to investment variable results in an approximate 0.30 *reduction* in the unemployment rate, and at plus two standard deviations of economic growth, this reduction is approximately 0.50. These varying effects across the economic growth cycle likely reflect that under conditions of rapid growth, a higher ratio of consumption spending does not automatically

imply reduced abolute levels of investment spending or increased taxes, and thus consumption spending can be stimulative in such circumstances. While this exploration of the policy mechanisms is admittedly somewhat tentative and preliminary, it is notable that once we control for these spending differences, government ideology no longer has a significant independent cyclical effect on unemployment.

Conclusion

A great deal of literature focuses on the role of national-level politics in shaping economic outcomes. But considering the gridlock and apparent upper class bias in policymaking in Washington, D.C., it is important to reconsider how the state governments may influence unemployment. National studies show that more left-leaning governments are associated with lower unemployment, but whether this relationship between liberal government and unemployment holds at the state level has been relatively neglected. As unemployment is projected to remain high for years, the question of how state governments may influence unemployment takes on added urgency.

Left-leaning state governments probably have the same desire and willingness to use the government to reduce unemployment as left national governments, but these governments also face many more policy constraints, constraints that are greatest during periods of slow economic growth. The analysis supported the view that liberal state governments are associated with low unemployment, but only during periods of economic growth when state governments have greater policy autonomy. Our analysis suggests that fiscal policy differences may be an important mechanism translating left-leaning state government preferences into the more pronounced unemployment cycles seen in liberal states, but this should be more fully examined in future research. Future research should also consider how other policies—regulation, taxation, and economic development to name just a few—that differ among liberal and conservative states may have effects on unemployment that vary across economic conditions.

Despite the constraints the states face, this study shows that the they play an important, albeit complex, role in the political economy of employment. But it also shows the limitations that the states face when trying to shape employment outcomes, which other scholars have noted (Hansen 1999; 2001). As the dysfunction and gridlock in Washington, D.C., continue unabated, states have taken the lead in trying to tackle growing problems such as income inequality, poverty, and unemployment (Franko, Tolbert, and Witko 2013). Regarding employment, however, unlike national governments, left-leaning state governments appear very dependent on economic growth cycles to produce lower unemployment. Unfortunately then, states that would like to act to reduce unemployment have a very limited ability to do so during major recessions when the need for government to stimulate employment is greatest. While the states have powerful tools to shape important economic outcomes, they also face many more limitations than a well-functioning federal government. On the other hand, it seems clear that as the economy continues to recover, states will have more discretion to influence employment outcomes should they choose to do so.

Appendix

Exogeneity Tests

Here, we examine whether unemployment is at least weakly exogenous by examining how the lagged level of unemployment influences current changes in government ideology and state party control of government. Two-way fixed effects are estimated, but not shown in the interest of space. We can see that lagged unemployment does not drive current changes in government ideology or state party control of government, demonstrating at least "weak" exogeneity, which is necessary for reliable ECM estimates.

Table 3. The Effect of Unemployment on Government Ideology and Partisanship.

	(1)	(2)
	Δ Gov Ideo	Δ Dem Gov
Gov Ideo$_{t-1}$	−0.199*** (−6.87)	
Dem Gov.$_{t-1}$		−0.266*** (−7.80)
Unemp$_{t-1}$	−0.173 (−0.80)	−0.002 (−0.14)
Unionization$_{t-1}$	−0.321* (−2.01)	−0.005 (2.72)
GSP Gro$_{t-1}$	2.065 (0.46)	−0.005 (−0.02)
Manuf$_{t-1}$	−10.272 (−1.34)	−0.277 (−0.59)
More than 65$_{t-1}$	1.798 (0.05)	−3.655 (−1.59)
Nonwhite$_{t-1}$	0.291 (0.05)	−0.562 (−1.43)
Cit. Ideo$_{t-1}$	0.138** (3.74)	0.004 (1.65)
Constant	18.214** (2.91)	0.451 (0.94)
N	1,750	1,221
R^2	0.18	0.26

Note. *z* statistics in parentheses. GSP = gross state product.
*$p < .05$. **$p < .01$. ***$p < .001$.

State Fiscal Policy Choices and Employment Outcomes

It is possible that states influence unemployment by differences in aggregate spending or by spending policy priorities beyond just consumption and investment as we define them here. Thus, we examined how state government ideology influences aggregate spending and Jacoby and Schneider's measure of state spending priorities. We do not observe that state government ideology explains variation in either of these variables during the period of this study, and thus, they cannot explain observed ideological differences in employment patterns.

Table 4. Ideology and Aggregate Spending and Policy Priorities.

	(1)	(2)
	Δ Total Spending Per Capita	Δ Priority
Total spending	0.184*** (3.61)	
Δ Fed Inter Gov Aid	307.1** (2.98)	
Fed Inter Gov Aid$_{t-1}$	−156.6* (−2.42)	
Δ GSP Gro	428.6 (1.31)	0.0191 (1.43)
GSP Gro$_{t-1}$	973.7* (2.25)	0.0274 (1.30)
Unionization$_{t-1}$	−0.125 (−0.04)	0.000391 (0.82)
Δ Unionization	−5.246 (−1.34)	−0.000251 (−0.54)
More than 65$_{t-1}$	−3,805.4** (−3.26)	−0.143 (−1.33)
Δ More than 65	3,257.5 (0.45)	−1.461** (−2.62)
Δ Nonwhite	−546.3 (−1.13)	−0.0890 (−0.74)
Nonwhite$_{t-1}$	−38.70 (−0.30)	−0.00767 (−0.35)
Δ Manuf	−103.4 (−0.26)	−0.0663 (−1.35)
Manuf$_{t-1}$	329.7 (1.31)	−0.0418* (−1.98)
Δ Gov Ideo	−0.141 (−0.44)	0.0000142 (0.28)
Gov Ideo$_{t-1}$	0.0968 (0.43)	−0.0000240 (−0.70)
Priority$_{t-1}$		−0.204*** (−6.01)
Δ	Fed Con to Inv	−0.0155*** (−8.17)
Fed Conv to Inv$_{t-1}$		−0.00838*** (−4.55)
Constant	169.2 (1.02)	0.0364 (1.96)
N	1,550	1,150
R^2	0.31	0.38

Note. *t* statistics in parentheses. GSP = gross state product.
*p < .05. **p < .01. ***p < .001.

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Notes

1. In the undifferenced unemployment data, the Im-Pesaran-Shin test (Im, Pesaran, and Shin 2003) with a null hypothesis that all panels contain a unit root indicates that at least some panels are stationary (p = .00), but the Hadri Lagrange multiplier test (Hadri 2000) with a null that all panels are stationary indicates that some panels have a unit root (p = .00). The

differenced data are stationary (Hadri Lagrange multiplier, $p = .99$).

2. We also estimated models with a simple dummy variable for the partisanship of the governor and the percentage of Democrats in the legislature, and these models showed that party influences unemployment in a similar manner. Specifically, in the specification analogous to column 4 in Table 1, we observed that the Democratic governor and gross state product (GSP) growth interaction was negative and significant. In the specification analogous to column 6 of Table 1, we observed that the interaction between the percentage of Democrats in the legislature and GSP growth was negative and significant.
3. In Table 4 in the appendix, we also present analyses examining whether state government ideology may influence total spending and Jacoby and Schneider's (2009) measure of state policy priorities. We do not find any significant effect.
4. For a discussion of the general utility of single-equation error correction models (ECMs), see De Boef and Keele (2008); for a recent application of single-equation ECMs using similarly structured data, see Kelly and Witko (2012).
5. Urbain 1992.
6. This was necessary because even after adjusting GSP by population, the very different magnitudes of GSP per capita can mask the relative magnitude of economic growth or decline. For example, in California, a $2,000 increase in per capita GSP would actually represent much slower economic growth than a $2,000 increase in per capita GSP in Alabama, because the latter has a much lower level of GSP per capita.
7. In the appendix, we also examine how ideology influences aggregate spending and Jacoby and Schneider's (2009) broader state policy priorities measure, but we do not find any differences between liberal and conservative states and thus do not examine how these policies might influence unemployment because they cannot explain ideological or partisan differences across states during the period of this study.

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