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What is This?

Financing College Opportunity: Factors Influencing State Spending on Student Financial Aid and Campus Appropriations, 1990 through 2010

By
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and
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Some states invest relatively heavily in financial aid programs that benefit lower-income citizens, while other states concentrate their investment in programs that benefit students from higher-income backgrounds. States also vary in their levels of direct appropriations to campuses, a form of public subsidy that has long been viewed as benefitting middle-income citizens. What factors influence states to allocate higher education subsidies in a more or a less redistributive manner? This article reports on a study that examined sources of variation in state spending on need-based aid, merit-based aid, and appropriations over the period 1990–2010. Findings document relationships among spending patterns and structural and political conditions of states, indicating a "trade-off" between spending on merit- and need-based aid; as states invest more in the former, they reduce spending on the latter. We also show that the presence of a Republican governor and the strength of Republican representation in statehouses each is associated with increased state spending on need-based financial aid. Our results further show that increased wealth is positively associated with state spending on merit-based financial aid programs and state appropriations for higher education, but not need-based financial aid. We also find distinctive patterns of state support for higher education depending on the degree of centralization of a state's governance arrangement for higher education; namely, the presence of a highly centralized structure is associated with decreased spending on merit-based aid programs and increased state appropriations to colleges and universities.

Keywords: higher education; state policy; postsecondary finance; politics of policy; college attainment

As suggested in other articles in this volume, college attainment in the United States depends on several forces including students' academic readiness for college, the social and economic backgrounds of students, social and

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cultural cues about the importance of attending college that students may (or may not) receive early in their lives, the information (or lack thereof) that students possess about college costs and student financial aid, the pricing and financial-aid practices of campuses, and public policies that may directly and indirectly shape the conditions for college attainment. Indeed, state policies can be exceedingly important in shaping postsecondary opportunity and success (e.g., Kirst and Bracco 2004; Perna 2010; Perna and Thomas 2008).

One of the most important facets of state policy contributing to student access and success is state financial support of higher education (Heller 2002; Dynarski 2002). Over time, states have adopted three primary strategies for financing higher education: the provision of direct state appropriations to public colleges and universities; the provision of financial aid to students based on their demonstrated financial need (i.e., need-based financial aid programs); and the provision of financial aid to students based on their academic merit (i.e., broad-based, merit-scholarship programs). Whereas appropriations to campuses help to offset the cost of student attendance for all students by providing institutions a source of revenue other than tuition and fees, need- and merit-based aid programs provide financial assistance to targeted groups of students conditional on their ability to meet preestablished eligibility criteria such as financial need or academic merit.

Figure 1 illustrates the substantial variation across states in the levels of public investment in each of the three main types of postsecondary financing. In Figure 1, note that the left axis is scaled for aid programs (ranging from $0 to $2,000), whereas the right axis is scaled for appropriations (ranging from $0 to $15,000). We see here how state aid and appropriations trend over time, on a per FTE (full-time equivalent) basis, with some states preferring high need or merit aid and others preferring low aid and high appropriations. This variation is important because state appropriations, need-based student financial aid, and merit-based student aid have different implications for the distribution of wealth in a state and, therefore, also for college affordability, access, and attainment.

Redistributive programs have traditionally been conceptualized and pursued as a means for reallocating societal resources from higher-income citizens to lower-income ones (e.g., Barrilleaux and Berkman 2003).[1] In that vein, scholars have long debated the redistributive effects of direct investment in higher education. On balance, most scholars seem to concur that, whereas need-based financial aid redistributes wealth to lower-income individuals, thereby increasing

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FIGURE 1
State Support for Public Higher Education (2010 Dollars per FTE, in Thousands)
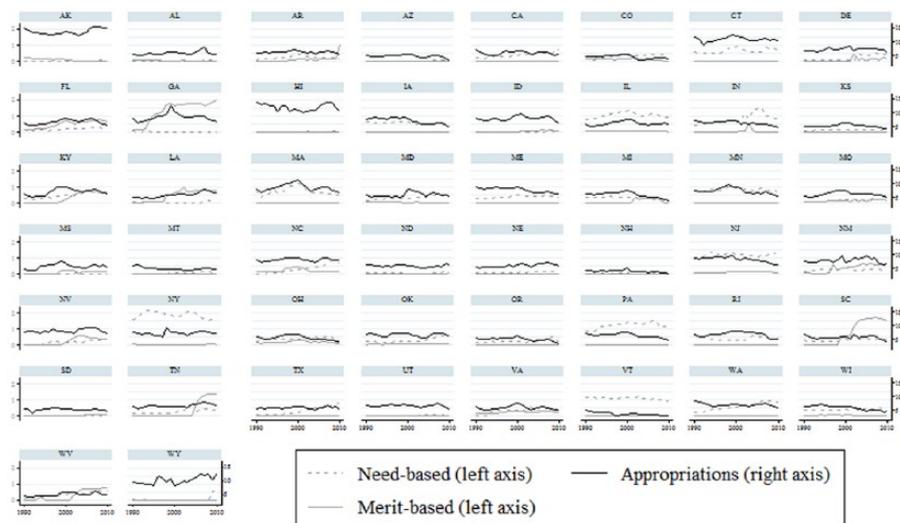
NOTE: Appropriations on right axis, aid on left.

college attendance by those who might not otherwise attend, direct appropria-
tions tend to reward students from middle- and upper-income families—those
students who will likely attend college anyway (e.g., Bailey, Rom, and Taylor
2004; Crean 1975; Doyle 2007; Hansen and Weisbrod 1969; Heller 2002;
Tandberg 2010b). So, too do the benefits of merit-aid programs flow dispropor-
tionately to students from upper-income families (e.g., Dynarski 2002; Heller and
Rasmussen 2002).

How a state invests its finite financial resources raises questions about the vari-
ations in these decisions across states and the implications of these decisions for
the college-going. What factors shape state investment in the various forms of
public subsidy? Why do some states allocate their higher education subsidies in
a redistributive manner?

Conceptual Framework

To examine these questions, we developed a conceptual framework that draws
from two bodies of theory and research on public choice. Most directly, we build
on the foundational work of Plotnick and Winters (1990), who empirically tested
a theory of governmental redistribution of wealth based largely on factors relating
to the political and economic conditions of the states. This tack—combining
political and economic explanations of redistributive policymaking by state gov-
ernments—has found considerable support in the published literature on income

redistribution in the states (e.g., Barrilleaux and Berkman 2003; Plotnick and Winters 1990). It also has shaped theory and research around redistributive policymaking in the domain of higher education (e.g., Doyle 2010).

The second vein of scholarship from which our study draws is the growing body of research on the factors shaping state governmental spending on higher education (e.g., Archibald and Feldman 2006; Doyle 2010; Dynarski 2002; Heller 2002; Kane, Orszag, and Apostolov 2005; Lowry 2001; McLendon, Hearn, and Mokher 2009; McLendon, Mokher, and Doyle 2009; Tandberg 2010a, 2010b; Toutkoushian and Hollis 1998). This line of research has identified a variety of factors that appear to influence both the types and levels of public investment in higher education.

We distilled from these research findings a series of conditions that might account for the decisions by state governments to pursue postsecondary-financing policies that are more-or-less redistributive. Four explanatory categories, in turn, comprise the various hypothesized influences: (1) economic and fiscal conditions of the states; (2) demographic pressures and postsecondary-education enrollment patterns within states; (3) features of state political systems; and (4) the postsecondary policy climates of the states.

A state's investment in any one of the three main forms of postsecondary finance is likely to influence its investment in the other forms (e.g., Doyle 2010; Dynarski 2002; Heller 2002; Heller and Marin 2002). We anticipate that annual gains in merit aid will be associated with reductions in need-based student aid, and vice versa. This is because they serve alternative goals, with need-based financial aid essentially functioning as a form of classic redistributive policy and merit aid not seen as being progressively redistributive (Dynarski 2002; Heller 2002). Furthermore, we anticipate that merit aid and state appropriations will have a positive relationship because neither is redistributive in the traditional sense.

We would note that the absence of uniform empirical evidence around the factors shaping state policy outcomes for higher education precludes our hypothesizing about the various possible relationships with absolute directional certainty. Nevertheless, we believe the research base has developed to such a stage, as we may be able to conjecture (if tentatively, in some cases) about the relationships.

Economic and fiscal conditions of states

Three aspects of the state economic and fiscal climate likely will condition the way states invest in higher education: a state's gross economic product, its levels of unemployment, and its educational attainment levels.

Because increased economic production may reduce a state's need to invest in need-based financial aid, we anticipate a negative relationship between these variables. The opposite would be the case, however, for merit aid, because increased economic activity should translate into greater resources for postsecondary funding and, possibly, increased interest in merit-based financial aid. By the same token, increased production would mean an increased ability by states to support higher education through direct appropriations (Doyle 2010; Tandberg 2010a).

As unemployment increases, one could assume more college-bound citizens would qualify for need-based financial aid, thus increasing state spending on these programs so long as these individuals pursue higher education. Increased unemployment may be negatively related to merit-aid spending and direct state appropriations since periods of weak economic conditions (i.e., high unemployment) can make it difficult for states to sustain all of their higher education investments (McLendon, Hearn, and Mokher 2009; Tandberg 2010a; Toutkoushian and Hollis 1998).

Last, as the number of citizens in a state who hold a bachelor's degree increases, eligibility for need-based financial aid is likely to decrease. The opposite may be true for merit-aid and for state appropriations (Doyle, McLendon, and Hearn 2010).

Demographic pressures and enrollment patterns

A larger number of graduating high school students in a state is likely to increase enrollment in postsecondary education, as well as increase state investment in all three types of programs. Similarly, the larger the share of a state's postsecondary population that is enrolled in the public sector of higher education, the larger the investment could be in all three financing approaches. Finally, the average size of Pell Grant dollars (per FTE) is likely to be associated with state funding decisions, although its precise directional influences are unclear. It is plausible that the more Pell Grant dollars coming into a state, the less a state would need to invest its own funds into need-based grants and the more it might invest in merit aid. Alternatively, states may invest in more need-based aid even if they have high levels of Pell Grant funding, since the purchasing power of the Pell Grant has declined over the past two decades (Mahan 2011). We anticipate Pell Grant awards as likely positively associated with higher levels of state spending on need-based aid, while negatively associated with merit aid and with general appropriations.

Political systems of states

Six aspects of political systems may be related to state funding decisions for higher education: legislative professionalism, gubernatorial power, party affiliation of the governor, party control of the legislature, electoral competition, and political ideology.

Legislative professionalism represents the degree to which a state's legislature resembles the United States Congress, meaning a legislative body that (1) remains in session throughout the year, (2) compensates its members at relatively high levels, and (3) provides its members capacity for lawmaking (e.g., full-time staff). Research has shown that having a highly professionalized legislature is negatively related to state spending on redistributive policies (e.g., Peterson 1995; Barrilleaux and Berkman 2003). This relationship has been explained by the idea that legislators prefer to fund localized budget items that bring clear

benefits to their constituents, and are less likely to fund areas benefitting lower-income populations. Research has also shown that professionalized legislatures are positively associated with state appropriations to higher education (McLendon, Hearn, and Mokher 2009; Tandberg 2010a, 2010b). In light of these findings, we expect legislative professionalism to be negatively associated with need-based financial aid and positively related to state appropriations and merit-based aid.

The institutional powers of governors also vary considerably across states. Barrilleaux and Berkman (2003) argue that governors prefer to support redistributive policies because these policies offer diffuse benefits to constituents, which may favorably redound to governors in statewide elections. For example, they find that governors with greater control over the state budget process tend to use those powers to advance policies that are redistributive by nature (Barrilleaux and Berkman 2003). The authors, however, argue that governors advance these policies because redistributive programs provide benefits to wide and often large segments of the population. Their diffuse benefits may make them appealing to a governor, who is attempting to win statewide election. Both need- and merit-based aid programs provide such diffuse benefits. Merit-aid programs have been shown to be politically popular, particularly among middle- and upper-income citizens who stand the most to benefit and tend to vote in larger numbers (Ness 2010).

Some recent scholarship has also found that increased budgetary powers of governors are associated with decreased state appropriations to postsecondary education (McLendon, Mokher, and Doyle 2009; Tandberg and Ness 2011). Consistent both with the argument above and prior research (e.g., Barrilleaux and Berkman 2003), we surmise that in states where governors have greater institutional powers, state spending on need-based and merit-based aid could be higher, and investment in direct appropriations could be lower.

Electoral competition has been linked to an increased propensity by legislatures to enact redistributive policies (Barrilleaux and Berkman 2003; Plotnick and Winters 1990). Plotnick and Winters (1990) have gone so far as to conclude that one of the strongest links in the field of comparative state politics is between two-party competition and redistribution. When state elections are highly competitive, political leaders will vie for votes by offering services to the widest possible range of voting constituents, thereby endeavoring to garner more votes for themselves. Increased levels of electoral competition, therefore, should be positively related to merit-based financial aid and negatively associated with need-based aid and appropriations to higher education.

The fourth and the fifth political factors in our study are gubernatorial partisanship and legislative partisanship. Republicans traditionally have been strong proponents of limited public spending, particularly in redistributive areas of public policy, such as social welfare and the public provision of educational services (e.g., Barrilleaux, Holbrook, and Langer 2002; Plotnick and Winters 1990). A number of studies have shown that Republican control of the governorship and higher levels of Republican representation in legislatures are negatively associated with state appropriations for higher education (e.g., McLendon, Hearn, and Mokher 2009; McLendon, Mokher, and Flores 2011; Tandberg 2010a, 2010b). Based on

this and other research, we expect a negative relationship between Republican governors and Republican strength in legislatures and state spending on need-based financial aid and general appropriations. With respect to merit-based aid, we expect a positive relationship, because this program seems to align well with many Republicans' espousal of the importance of self-reliance in one's academic and financial preparation for college (Doyle, McLendon, and Hearn 2010).

A final source of possible political-system influence is political ideology. Political ideology can be defined as a set of attitudes toward politics, whether those of elected officials or a state's citizenry. Erickson, Wright, and McIver (1993) argue that state policy largely is the result of public liberalism. For instance, they show that expenditures on Aid to Families with Dependent Children (AFDC) increased linearly as political opinion in the states became more liberal with time. Research conducted on the role of political ideology in a variety of redistributive policy areas buttresses this claim (e.g., Fellowes and Rowe 2004; Ringquist et al. 1997). Although the relationship between political attitudes and state spending on higher education is difficult to discern (e.g., McLendon, Hearn, and Mokher 2009; Nicholson-Crotty and Meier 2003; Tandberg 2010b), we surmise the existence of (1) a positive relationship between liberalism and appropriations, (2) a positive relationship between liberalism and need-based financial aid, and (3) a negative relationship between political liberalism and merit aid.

Policy attributes of state postsecondary systems

The fourth conceptual category involves aspects of the state policy climate for higher education. For example, the relationship between tuition at four-year and two-year public institutions and state spending on need aid and merit aid is likely to be positive, because higher tuition levels typically place upward pressure on state financial aid expenditures, as governments attempt to defray some of the increasing costs to students. Although the relationship between tuition and appropriations clearly is complex (e.g., Toutkoushian and Hollis 1998), we follow Tandberg (2010a, 2010b) in the belief that higher tuition may be associated with decreased appropriations because legislators, being sensitive to the concerns of their constituents, may reduce appropriations as a way of penalizing higher education for being too aggressive with tuition.

The final source of influence on state spending for higher education is the postsecondary governance arrangements of the states. A corpus of empirical research has emerged around the policy impacts of different types of state coordination and governance for higher education (e.g., Hearn and Griswold 1994; Lowry 2001; McLendon 2003; McLendon, Hearn, and Deaton 2006; Tandberg 2010a). Numerous studies have documented relationships between the form of postsecondary governance a state practices and levels of state financial support for higher education, although the direction of the observed relationships has sometimes defied the expectations of analysts.

One reason for the difficulty in producing reliable explanations of the observed relationships between postsecondary governance arrangements and state policy

outcomes for higher education has been the absence of a clearly articulated theoretical framework that is capable of hypothesizing the influences of these boards. One emerging view of the role of governance structures in shaping postsecondary policy outcomes has the potential to fill this void, however. It involves the concept of boards functioning as "academic cartels" (Lowry 2001; McLendon, Hearn, and Deaton 2006; Toma 1990). This view holds that consolidated governing boards—a notably centralized form of governance, wherein a state-level board exercises strong control over constituent campuses—may seek to protect the interests of constituent campuses, particularly the research universities whose interests tend to dominate these systems. The interests of the institutions, so the academic-cartel proposition holds, tend to be borne of a preference for maximizing research capacity, building academic prestige, and enhancing institutional revenue. Because merit-aid programs are expressly touted as capable of incentivizing a state's "best and brightest" high school graduates to attend college in the students' state of origin, consolidated boards may view the programs as a policy instrument that can advance the interests of constituent universities in growing their academic prestige. Accordingly, we would expect a positive relationship between the existence in a state of a consolidated governing board for higher education and spending on merit aid. Consolidated boards, as stalwart advocates for more financial resources for their constituent campuses, also are likely to be associated with higher levels of state investment in need-based aid and in state appropriations.

Study Design, Data, and Analysis

Because our primary intent lies in examining the factors that, over time, have influenced states to allocate their higher education subsidies in a more (or a less) redistributive manner, we created a unique panel dataset containing numerous state-level variables for forty-nine states from 1990 through 2010. As with many such analyses, we exclude Nebraska because its unique legislative design precludes testing of partisan influences. Our dataset, consisting of forty-nine states over a 21-year period, contained a total of 1,029 observations. Table 1 provides descriptive statistics for the variables in the analysis and lists the data sources that we used.

Outcome variables

We model three outcome variables: state spending on need-based aid, state spending on merit-based aid, and state appropriations to higher education. We divide each of the variables by the total number of FTE students enrolled in public higher education. All financial data are inflation-adjusted to 2010 dollars. Aid data come from annual reports of the National Association of State Student Grant and Aid Programs, which report total dollars spent on need-based and merit-based grants for each academic year. Tuition waivers and other types of aid

TABLE 1
Descriptive Statistics of Variables Included in Regression Model (1990–2010)

	Mean	*SD*	Min	Max	Source
Dependent variables					
Need-based grant aid per public FTE	$374.7	$398.5	$0.0	$2,152.0	NASSGAP
Merit-based grant aid per public FTE	$133.6	$301.3	$0.0	$1,989.0	NASSGAP
Higher education appropriations per public FTE	$6,744.7	$2,017.0	$2,917.6	$15,456.5	SHEEO
Economic conditions/fiscal capacity					
Per capita gross state product (GSP), in thousands	$39.2	$10.2	$19.4	$73.1	BEA
Unemployment rate	5.4%	1.8%	2.3%	13.7%	BLS
Percent of adults with bachelor's degree or higher	24.8%	5.4%	11.4%	44.4%	Census (CPS)
Demographic/postsecondary enrollment profile					
Total high school graduates (in thousands)	57.0	62.5	5.1	420.2	WICHE/CCD
Percent of students enrolled in public higher education	80.6%	12.3%	42.3%	100.0%	IPEDS and Digest
Pell grants awarded per FTE	$901.4	$386.7	$253.3	$3,145.7	OPE and SHEEO
Political climate					
Legislative professionalism	19.4	12.7	2.7	65.9	Squire 2007
Institutional powers of governor	3.5	0.4	2.2	4.6	Beyle 2008
Republican governor	47.6	49.5	0.0	100.0	SPPQ various years
Republican legislative strength	46.4	15.6	9.4	89.3	SPPQ various years
Electoral competition	–8.9	–7.1	–32.0	0.0	Holbrook and Van Dunk 1993
Citizen ideology	49.6	15.0	8.4	96.0	Berry et al. 1998/ ICPSR
Policy climate for state's postsecondary education system					
Tuition, public four-year, (in thousands)	$4.9	$2.0	$1.6	$12.5	Digest
Tuition, public two-year, (in thousands)	$2.3	$1.0	$0.2	$6.7	Digest and WHECB
Postsecondary governance structure	0.4	0.5	0.0	1.0	McGuiness 1995

NOTE: NASSGAP = National Association of State Student Grant and Aid Programs; SHEEO = State Higher Education Executive Officers Association; BEA = Bureau of Economic Analysis; BLS = Bureau of Labor Statistics; CPS = Current Population Survey; WICHE/CCD = Western Interstate Commission for Higher Education Common Core of Data; IPEDS = Integrated Postsecondary Education Data System; Digest = Digest of Educational Statistics; OPE = Office of Postsecondary Education; SPPQ = State Politics and Policy Quarterly; ICPSR = Interuniversity Consortium for Political and Social Research; WHECB = Washington Higher Education Coordinating Board.

(i.e., loans, work-study) are excluded from this measure. We drew appropriations data from the State Higher Education Executive Officers Association and *Grapevine's* annual State Higher Education Finance reports.[2] This measure includes all state appropriations to public higher education institutions in the state less any local appropriations, special funds, or appropriations for medical schools. State Fiscal Stabilization Funds are included in total state appropriations for the years 2008, 2009, and 2010.

Independent variables

We derived data for a number of the independent variables from a variety of reliable information sources, including State Higher Education Executive Officers Association, Education Commission of the States, Washington Higher Education Coordinating Board, and U.S. Department of Education's Office of Postsecondary Education. Data for indicators of state finance derive from the Bureau of Economic Analysis, Bureau of Labor Statistics, and the U.S. Census Bureau. For several of the political variables, such as state political ideology scores and partisanship, we accessed data from the Interuniversity Consortium for Political and Social Research, which is housed online at the University of Michigan, and from the State Politics and Policy Quarterly state datasets.

The economic/fiscal capacity of each state is tested using measures of per capita gross state product (GSP), state unemployment rates, and the share of adults in a state with bachelor's degrees or higher. We tested for the influence of state demography and postsecondary enrollment mix as indicated by the total number of high school graduates in a state, percent of college students enrolled at public institutions, and average amount of Pell Grant dollars awarded (per FTE) to students attending public institutions.

Political influences on the dependent outcomes are measured by indicators of legislative professionalism, institutional powers of the governor, party affiliation of the governor in office each year, party control of the state legislature, electoral competition, and citizen political ideology. We measure legislative professionalism using the Squire Index (2007), with higher values indicating more legislative staff resources available for policy development. Gubernatorial powers are measured using Thad Beyle's (2008) Governor's Institutional Powers Score, where higher values indicate greater power. Party control of the governor (i.e., a dummy variable indicating the presence in a state of a Republican governor) and party strength in a state's legislature (i.e., share of the legislature that is Republican) measure the influence of partisanship in these institutions.

For the study's political competition variable, we use the measure that Doyle, McLendon, and Hearn (2010) formulated. It is based on the degree to which a governor from either party won the previous election. The formula is expressed as follows:

$$\text{competition} = - \left| .5 - \text{proportion Republican} \right|$$

where *competition* indicates electoral competition and *proportion Republican* is the proportion of the population that voted for the Republican candidate for governor in the previous election. According to these analysts, "the opposite of the absolute value of the difference of this percentage from .5 forms the basis for the measure. In short, as the election grows more competitive, the difference between the vote share and a perfect 50–50 split will grow smaller, with a maximum value of 0" (pp. 671–72).

Citizen ideology is an index that represents the mean position on a liberal-conservative continuum of the electorate in a state (e.g., Berry et al. 1998). This index measures the ideological preferences of a state's citizens based on the roll call voting of the members of Congress who represent the state. Higher scores indicate more liberalism.

To test the policy attributes of a state's postsecondary education system, we include measures of tuition levels at public four-year and two-year institutions and the type of postsecondary governance structure in place in a state. The governance variable is dichotomous, where consolidated governing boards receive a value of 1 and other types of state boards (i.e., coordinating boards and planning agencies) receive a value of 0.

Analytical strategy

We expect that a state's decision to invest in higher education is a function of its economic, demographic, political, and policy climates for higher education. In addition, we expect a state's prior-year investment in higher education to be highly predictive of current-year spending levels. Using previous-year spending levels as a predictor of current-year spending introduces endogeneity into a model, which in turn produces inefficient and biased parameter estimates under OLS (ordinary least squares) or fixed-effects methods (Kiviet 1995). Since we expect prior-year spending to be an important predictor, we implemented an Arellano-Bond generalized method of moments regression model, also known as GMM, which enabled us to include the lagged value of an outcome variable itself as a predictor (Blundell, Bond, and Windmeijer 2000; Bond 2002; Roodman 2006). With use of GMM techniques, we produced consistent and efficient estimates that are robust to model endogeneity.

Two-stage least squares (2SLS) is a common strategy for addressing model endogeneity, but it is often difficult to execute because of challenges associated with finding appropriate instruments. In general, instruments must be both strong and valid for the 2SLS technique to produce consistent and efficient estimates (Baum, Schafer, and Stillman 2003; Halaby 2005). As Wooldridge (2002) observed, if an instrument fails to meet these conditions, then the "cure" of using 2SLS can be worse than the "disease" of model endogeneity. The underlying challenge in the 2SLS framework is finding an instrument that is correlated with the endogenous predictor but orthogonal to the error term. Under the GMM method, we created instruments from our existing dataset (rather than relying on identifying an external one) through the process of first-differencing the equation. The basic model we used is as follows:

$$y_{i,t} = \alpha y_{i,t-1} + \gamma X_{i,t} + \left(\eta_i + u_{i,t} \right) \tag{1}$$

where y represents state spending on higher education (need-based aid, merit-based aid, and appropriations) for each state (i) in each year (t).

In this basic model the lagged value of y ($y_{i,t-1}$) represents prior-year spending. The symbol γ represents parameter estimates for the predictor variables (X), while η is the unobserved time-invariant state-specific effect and u is the error term. Because our lag ($y_{i,t-1}$) is correlated with our error term ($\eta_i + u_{i,t}$) through the subscript i, our estimates would be inconsistent under the OLS framework (Bond 2002).

To generate instruments from within the model, GMM is implemented in two stages. We initially take the first-difference of equation 1 to eliminate the unobserved state-specific effects (η_i):

$$y_{i,t} - y_{i,t-1} = \alpha \left(y_{i,t-1} - y_{i,t-2} \right) + \left(\gamma X_{i,t} - \gamma X_{i,t-1} \right) + \left(u_{i,t} - u_{i,t} \right) \tag{2}$$

Next, the lagged values of the endogenous predictor are instrumented in subsequent first-differences. This procedure results in new instruments that are correlated with the predictor variable, yet are orthogonal to the error term.

The final equation is expressed as follows, where the error term, u, is robust to small sample sizes (Windmeijer 2005):

$$y_{i,t} = \alpha + \beta_1 y_{i,t-1} + \gamma_2 \left(X_{i,t} - X_{i,t-1} \right) + \left(u_{i,t} - u_{i,t-1} \right) \tag{3}$$

Robustness checks. While the ability to generate instruments from within the dataset is an appeal of the GMM technique, it can come with limitations. For GMM to yield consistent and efficient estimates, these new instruments must introduce variation into the model and the lagged values must produce exogenous variation in the model (Roodman 2006). To measure the extent to which the instruments have introduced variation into the model (i.e., strong instruments), we use the first-stage F-value. If such a value is greater than ten, it is generally considered to be strong (Bound, Jaeger, and Baker 1995; Stock and Yogo 2002). In each model, our first-stage F-values are greater than twenty, as displayed in Table 2, suggesting that our instrumentation technique meets this condition.

To measure the extent to which the instruments produced exogenous variation and can be considered valid instruments, we use the Hansen test of instrument exogeneity. In the event the Hansen test yields a significant value, the instruments are invalid because they will have been shown to be correlated with the error term. This value is nonsignificant in each of the models; our instruments, therefore, meet validity conditions.

We also tested for autocorrelation in our estimates (Drukker 2003). The Arellano-Bond technique allows us to model AR(1) and AR(2) error structures.

TABLE 2
Regression Results, Various Funding Outcomes, 1990–2010

	Need-Based Aid per FTE	Merit-Based Aid per FTE	Appropriations per FTE
Dependent variables			
Need-based grant aid per FTE	0.700***	–0.369***	–1.237
	(0.082)	(0.053)	(0.941)
Merit-based grant aid per FTE	–0.371***	0.849***	1.879***
	(0.059)	(0.027)	(0.652)
Higher education appropriations per FTE	0.057***	0.006	0.487***
	(0.011)	(0.006)	(0.117)
Economic conditions/fiscal capacity			
Per capita GSP (in thousands)	–2.627	6.716***	64.425***
	(2.149)	(2.408)	(15.911)
Unemployment rate	–3.605	–3.816	17.775
	(10.97)	(6.079)	(53.77)
Percent of adults with baccalaureate or higher	–12.771**	–18.280***	–24.757
	(4.838)	(2.932)	(56.604)
Demographic/postsecondary enrollment profile			
Total high school graduates (in thousands)	2.500***	2.651***	–1.714
	(0.513)	(0.807)	(5.938)
Percent of students enrolled in public higher education	–4.381**	–1.466	4.576
	(1.872)	(2.495)	(27.25)
Pell grants awarded per FTE	0.013	–0.004	–1.125***
	(0.049)	(0.04)	(0.323)
Political climate			
Legislative professionalism	0.040	–9.002**	34.950**
	(2.06)	(3.588)	(16.634)
Powers of governor	40.229	–161.135***	108.53
	(45.508)	(29.765)	(409.753)
Republican governor	0.938**	–0.361	–13.395***
	(0.418)	(0.294)	(3.236)
Republican strength of legislature	3.321*	–2.769	–43.484***
	(1.977)	(2.479)	(15.151)
Electoral competition	5.191***	–13.783***	–34.520**
	(1.543)	(2.25)	(15.671)
Citizen ideology	1.277*	–0.24	–4.449
	(0.688)	(0.842)	(8.175)
Policy climate for higher education			
Tuition, public four-year (in thousands)	21.976	–4.622	–400.347**
	(17.321)	(16.896)	(191.569)
Tuition, public two-year (in thousands)	47.146	79.625***	1093.512***
	(34.983)	(28.374)	(397.127)

(continued)

TABLE 2 (CONTINUED)

	Need-Based Aid per FTE	Merit-Based Aid per FTE	Appropriations per FTE
Postsecondary governance structure	6.438	−154.911***	1411.507*
	(64.222)	(56.902)	(736.67)
Intercept	−162.595	984.726***	2750.766
	(230.271)	(264.204)	(2913.721)
Number of observations	1,029	1,029	1,029
Number of groups	49	49	49
Number of instruments	39	39	39
Robustness checks			
First-stage *F*-value	21.5	24.9	32.2
Hansen test of exogeneity of instrument	0.440	0.524	0.157
Hansen test of overidentification	0.491	0.530	0.048
Arellano-Bond test for AR(1)	0.001	0.004	0.000
Arellano-Bond test for AR(2)	0.188	0.846	0.950

*$p < .1$. **$p < .05$. ***$p < .01$.

In all models we can reject the null hypothesis that the model has AR(2) autocorrelation (Arellano and Bond 1991).

Finally, because it is possible to over-identify models by including too many instruments (and thus artificially improve the consistency of one's estimates), we followed Roodman's (2009) guidance that the number of instruments not exceed the number of groups. In our analysis, each state represents a "group," resulting in forty-nine groups with a total of thirty-nine instruments, as displayed in Table 2.

Findings

This study is one of the first to have accounted empirically for predictors of public investment in the three principal forms of state financial support for higher education. We distill and discuss six main findings, with respect to the sources of influence on these forms of state investment in higher education from 1990 through 2010.

First, we find some degree of explanatory power in each of the categories of hypothesized influences, although, as we discuss later, a prior year's funding levels, political climates, and certain policy attributes of states appear to be particularly important. Our analysis detected statistically significant relationships ($p < .05$) between the funding outcomes of interest and seventeen of the eighteen variables we tested. Eleven of the eighteen variables demonstrated a significant relationship with at least two of the three funding outcomes.

A second finding is that state spending on need-based financial aid appears to have been influenced by a variety of state-level conditions that were distinct from conditions that influenced merit aid or state appropriations. For three of the six variables where our analysis detected statistically significant effects for state spending on need-based and merit-based aid, the course of those effects ran in opposite directions. While higher levels of electoral competition in a state seem to be tied to increases in state spending on need-based aid for students, competition is negatively related to merit scholarship funding and to state appropriations.

Perhaps most importantly, higher levels of merit-based aid allocated in a previous year are shown to have a strong positive relationship with current-year spending on merit aid and a negative relationship with public spending on need-based student aid. Consequently, we do find evidence of a "crowding out" effect in state funding for higher education, whereby state investment in merit aid appears to displace funding in need-based aid for students.

A third finding involves relationships between states' economic and fiscal climates and their funding behaviors over time. As anticipated, we find higher levels of per-capita wealth in a state positively associated with higher spending both on appropriations and merit-based student aid, although wealth appears not to influence state spending on need-based aid. The relationship involving merit aid appears to evidence the claims by some that states with wealthier populaces may choose to invest more in merit-aid programs because these programs disproportionately benefit students from higher socioeconomic backgrounds (e.g., Dynarski 2002; Heller 2002). Our finding related to the percent of adults with a baccalaureate or higher is less easy to interpret, as having a baccalaureate or higher is negatively associated with both need- and merit-based aid. While our expectation was that higher educational attainment would make the population of a state more supportive of financing of higher education, our analysis did not detect any significant effects of employment levels on state spending for any one of the three outcomes.

Fourth, our study points to relationships between the demographic and policy climates of the states and governmental spending. With respect to demography, we find that the total number of high school graduates in a state is positively related to levels of state investment in both need aid and merit aid, while the percent of students enrolled in public higher education bears a negative relationship with state spending on need-based aid. As Pell Grant awards per FTE rise, state appropriations to institutions decline. Considering that states with low appropriations tend to have high tuition levels, students in these states would expect to have high levels of Pell Grant funding.

Our analysis indicates the existence of distinctive connections between state policy climates and public spending on merit aid and appropriations. Tuition levels at public four-year universities are associated with lower levels of state appropriations. The relationship is reversed, however, at public two-year institutions, where higher tuition at two-year colleges is positively associated with state appropriations. This finding is more difficult to interpret because of the ambiguous direction of causality; it may be that legislators have more urgency around

tuition increases at lower-priced two-year colleges. Higher tuition in the two-year sector is also associated with higher state spending on merit-based aid. To the extent that states index merit aid programs with tuition levels, we would expect to find a positive relationship between tuition and aid. Interestingly, this relationship is only found for merit-based, rather than need-based, programs.

A fifth set of results relates to statewide structures providing for the coordination and governance of higher education. The results ran counter to our hypothesis in that states with consolidated governing boards invest less heavily in merit-based aid for students. The results, however, confirmed our hypothesis, with respect to general fund appropriations. Overall, the findings suggest that consolidated governing boards may seek to influence policy outcomes that advance the interests of public systems of higher education as whole, rather than any particular segment of that system. This combination of findings adds to the weight of empirical evidence suggesting that a state's postsecondary governance practices can hold important implications for the design of policies that promote (or hinder) college opportunity, affordability, and attainment.

Sixth, the results are broadly suggestive of the influences of political system characteristics. In our modeling of need-based student aid and state appropriations, four of the six indicators of state political systems are statistically significant, whereas in the instance of merit-based aid, three of the political indicators are significant. In addition to the results for electoral competition, which demonstrate a significant relationship between competition and all three of the policy outcomes and which confirm earlier research regarding redistributive policy areas and greater electoral competition, we find a negative relationship between gubernatorial power and state spending on merit aid for students. This is an interesting, unanticipated finding. It is not altogether clear why governors with stronger institutional powers might use their influence to limit spending on merit aid, which we assume is a popular program among voting citizens. We find a positive relationship between political liberalism and state investment in need-based aid, again confirming earlier research regarding increased liberalism and redistributive spending. Legislative professionalism is negatively related to merit aid, yet positively related to general appropriations for higher education.

Additionally, the two partisanship variables are statistically significant, but at times counter to the directions we had anticipated. For instance, the presence of a Republican governor and the strength of Republican representation in statehouses each is associated with increased—rather than decreased—state spending on need-based financial aid. On the other hand, we find a negative relationship between Republican office holding and state appropriations. Indeed, the presence of a Republican governor and stronger Republican representation in the legislature are each associated with lower levels of state appropriations for higher education over the period 1990 to 2010. Our analysis did not detect any partisan influences on state spending for merit aid. Thus, overall, stronger Republican electoral presence at the state level is associated with higher levels of public investment in need-based student aid, but with lower levels of spending on general fund appropriations to campuses; partisanship appears to be unrelated to merit-based aid.

Although we would caution against drawing too strong of a causal inference, our analysis indicates that legislative design, gubernatorial power, partisanship, the competitiveness of state elections, and the ideological proclivities of a citizenry do appear to shape state funding patterns for higher education in discernable, measurable, and substantively important ways. A once-conventional view concerning the irrelevance of "state politics" to public funding of higher education seems to be giving ground (e.g., Archibald and Feldman 2006; Lowry 2001; McLendon, Hearn, and Mokher 2009; Tandberg 2010b).

Conclusion

Despite the improving economic conditions in many states, governors and legislators will continue to face the daunting challenge of making wise resource allocations in an era of fiscal constraint and instability (Doyle and Zumeta, this volume). Because of the near- and long-term economic importance to states of increased higher education participation and attainment, the decisions elected officials make about their state's financial investment in higher education are critical. The "crowding-out" pattern our analysis detected in aid programs, where annual gains in merit aid are associated with reductions in need-based student aid, and vice versa, is particularly noteworthy for state policy-makers.

As our findings make clear, state decisions regarding the financing of public higher education are not made in a vacuum. A number of different types of conditions can impact the ways in which states direct fiscal resources to their postsecondary institutions. Perhaps most importantly, we find that these decisions are inherently political ones. Each of our political variables appeared as significant in predicting at least one of our funding outcomes; however, in each case, the nature of the relationships varied across the outcomes. This means that, while these decisions to support merit-based aid, need-based aid, and direct appropriations to colleges and universities are consistently influenced by systemic political forces, the specific forces underlying such decisions are, at root, quite different across the three types of public investment.

Research stands largely in agreement that, although merit-aid programs may motivate students to enroll in college in the state in which they live, the majority of such awards flow to students who would have otherwise enrolled in and paid for college even without the aid. Meanwhile, need-based financial aid tends to promote enrollment of students who would not have attended college were it not for the availability of such aid (e.g., Cornwell, Mustard, and Sridhar 2006). As policy-makers consider how best to allocate finite public resources in the context of heightened efforts in their states to increase higher education attainment, they should heed findings such as the ones we report, indicating the trade-offs that could be at work in the various forms of state investment in higher education. At a minimum, policy-makers should pay close attention to ensuring that students have the proper information about applying for financial aid, simplifying eligibility requirements, making earlier commitments to students, and aligning the

state's financial aid programs with its policy goals (Hillman and Orians 2013; Perna 2010). Combining these kinds of policy commitments with more predictable patterns in state appropriations would help to mitigate the potential adverse trade-offs we have documented. More importantly, such coordination among need, merit, and appropriations could help states to advance their goals of increasing postsecondary opportunity and success for all students.

Notes

1. We acknowledge that, although some policies may achieve the effect of redistributing resources from lower-income to middle- and upper-income citizens, we follow the convention in viewing *redistributive* policies as those that shift resources toward lower-income citizens.

2. *Grapevine's* annual State Higher Education Finance reports available from http://grapevine.illinois-state.edu/.

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