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ABSTRACT

The relationship between the external environment and state appropriations to public higher education is analyzed, focusing on the following: (1) the extent to which environmental factors explain yearly appropriations outcomes for public four-year colleges and universities; (2) which environmental factors are most important and which are least important in determining annual appropriations; and (3) which comparisons among states are meaningful. Environmental factors include demographic, economic, political, and sociopolitical factors. Data were drawn from annual reports of the National Association of State Universities and Land Grant Colleges, "State Tax Funds for Operating Expenses of Higher Education"; from the U.S. Bureau of the Census reports; and from National Center for Education statistics reports. Results indicate the environment as a whole plays some part in the state appropriations process over time, at least as far as public universities are concerned, but that not all environmental factors are of equal importance either between or within states. There is no consistency in terms of the effects of the environmental factors between the states. The results imply a need to study the more abstract and less quantifiable aspects of state political systems as they relate to policy/appropriation outcomes for public higher education. An appendix lists environmental variables used in the research studies. Contains 14 references. (SM)

THE RELATIONSHIP BETWEEN ENVIRONMENTAL FACTORS AND STATE APPROPRIATIONS TO PUBLIC UNIVERSITIES

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THE RELATIONSHIP BETWEEN ENVIRONMENTAL FACTORS AND STATE APPROPRIATIONS TO PUBLIC UNIVERSITIES

Budgeting at the state level of government, like any other level of government, is undeniably a complex decision process, the direction of which is shaped by the multitude of forces acting upon it. Several factors enter into this process. Externally, there are environmental forces acting upon this system, such as the state's economy, demographic changes, and of course public opinion. Internally, legislators negotiate among themselves and with the governor over who get what and how much. State agency heads plead their case before legislative appropriations committees with regard to their upcoming fiscal year requests. Lobbyists for special interest groups around the state court key legislators (and often legislative staff) in order to gain favor in the legislature for their position and/or needs. The final outcome of these interactions is the appropriations act for the upcoming fiscal year or biennium, and as Wildavsky (1986) has noted, "If politics is regarded as conflict over whose preferences are to prevail in the determination of policy, then the budget records the outcomes of his struggle" (p. 9). Fiscal year to fiscal year then, the budget serves as a scorecard of political victories and political defeats.

Public higher education, although it performs a unique and important function in the life of a state, is not immune from the political economy of the state appropriations process. There is only a finite amount of state revenue to be allocated among state agencies for their operations. As a part of this process, public higher

education is subject to many of the same forces that other state agencies face and its leaders must play the same game the heads of other state agencies play. The political process that shapes the state appropriations outcome is a complex system involving legislative preferences, environmental factors, and other associated forces. It is the epitome of the human decision making process. Conflict leads to consensus (usually), followed by the appropriations outcome. Herbert Simon once noted that every decision is affected by "facts" and values" in varying degrees (cited in Lutrin and Settle, pp. 94-95). In a sense, environmental factors (e.g., demographics and the economy) are the "facts" acting upon the process while the various legislative policy preferences are the "values." To what extent does the environment affect the state appropriations outcome for public higher education? Further, like most systems this process is in a state of flux, changing from year to year as do the forces and factors acting upon and within it. Is there any relationship between changes in the environment and state appropriations outcomes for public higher education, or are these two events independent? Thus, change over time also becomes an important factor to consider as such questions are analyzed.

The research underlying this paper is drawn from two separate but related time series studies which analyze the relationship between the external environment and state appropriations to public higher education. We seek to answer three questions: 1) To what extent do environmental factors explain yearly appropriations outcomes for public four-year colleges and universities?; 2) Which environmental

factors are most important, and which are least important in determining annual appropriations?; and 3) Are there comparisons among states that are meaningful?

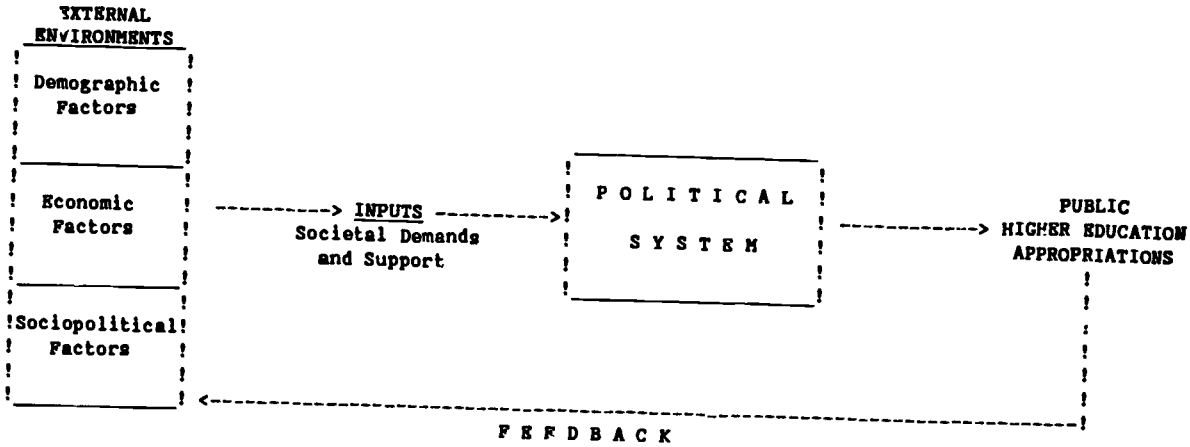
Conceptual Framework

The conceptual framework underlying this research is derived from a political decision making model originally proposed by David Easton (1965), This framework (see Figure 1) is composed of inputs, the political system, outputs, and feedback. Environmental factors shape societal demands (inputs) on the political system, and in turn these demands flow into this system. The political system is composed of the constitutional and statutory levels of government. The system in turn responds to these inputs through policy decisions culminating in policy outputs. Wildavsky (1986) has noted that budgets reflect the policy decisions of the political system. Therefore, being the chief policymaking instrument of state government, the budget serves as an excellent source of data in analyzing the effects of different variables on state policy efforts in different areas such as public higher education.

The literature on this topic as it relates to public higher education is sparse and generally inconclusive. The majority of studies have tended to be cross-sectional and/or use the same small number of standard environmental variables repeatedly (see for example, Lingenfelter, 1974; Peterson, 1976; and Garms, 1986). The questions of how changes in the environment over time affect changes in state appropriations to public higher education over time remains unanswered for the most part. In addition, there has been little

FIGURE 1

The Public Higher Education Appropriations Process



Source: Adapted from Easton(1965).

research of this type in the past ten years. The environment, like everything else, changes with time, and researchers in this field need to build on these past studies with a more conclusive, comprehensive, and current knowledge base regarding determinants of state appropriations to higher education.

Hines (1987) reported that percentage changes in state appropriations of state tax funds to higher education from 1986 to 1988 ranged from a high of 39.3 percent in Maine to a low of minus 33.5 percent in Alaska. It would appear that the states' external environment had some influence over these fluctuations. There is, however, a dearth of recent empirical evidence to support this assertion.

Another aspect of the literature is the studies of incrementalism in government spending. By now it is well accepted that budgeting is incremental. However, Wildavsky (1984) has suggested that the relationship between prior and current year spending may be changing due to shifts in environmental factors. The prior year appropriation can be expected to explain the largest share of each subsequent year's appropriations. However, the relationship is not entirely stable as it varies from time to time and from state to state.

Data Sources

The annual state higher education appropriations data were drawn from the annual reports of the National Association of State Universities and Land Grant Colleges, State Tax Funds for Operating Expenses of Higher Education. Data for the independent variables were drawn from U. S. Bureau of the Census reports and from Center for

Education Statistics reports. These data sources are relatively standardized and are reliable sources of information.

Method of Analysis

There are two separate but similar studies being reported. One is a study of environmental factors' effects on all 50 states and the other reviews in depth the environmental factors' effects on three states. In both cases the outcome variable was the annual appropriations for operations for public four-year colleges and universities adjusted for inflation (i.e., constant dollars). In both studies each state was analyzed separately utilizing the stepwise regression procedure. A list of the variables used in both studies is presented in the Appendix.

The first study looked at each of the 50 states separately during each fiscal year from 1960 through 1985. This study used a three-stage analysis. The first step used a piecewise regression procedure to analyze the relationship between current and prior year appropriations levels. This showed both how and when the relationship changed at different times during the period. Such changes were assumed to have been proxies for changes in environmental factors. The second step was to add, using stepwise regression, the economic, demographic and political variables to the model. Finally, the results of the stepwise procedure were used to conduct a cluster analysis of all 50 states together to determine if and how the states group in their responses to the environmental variables.

The second analysis looked separately at the states of Florida, Illinois, and Virginia in each fiscal year from 1965 through 1985.

First differenced data were utilized here as preliminary statistical analyses of the new data revealed a number of symptoms of multicollinearity (e.g. large standard errors and high intercorrelations). This study was a four-stage analysis. Stages one through three entailed conducting stepwise regressions for each set of independent variables (demographic, economic, or socio-political). The purpose of these three steps was to analyze the statistical significance and directional effect of the demographic, economic, and socio-political variables as predictors of public university appropriation outcomes in a disaggregated manner. It also provided a view of the relative importance of these variables within the separate models tested. The fourth stage involved conducting a stepwise regression using all of the variables. This provided results similar to those obtained in stages one through three, but with a larger view of the total environment than the first three parts of this analysis.

Fifty State Results

The analysis of all 50 states' relationships with environmental variables is divided into three parts. The first part analyses the relationship between prior and current year higher education appropriations by each state. The second part analyzes the relationship between the environmental variables and the total higher education appropriation. The third part is a cluster analysis of the state's relationships between environmental variables and their higher education appropriations. All were based on constant dollars.

Prior Year-Current Year Relationship

Previous studies of appropriations behavior have shown that the prior year is the best predictor of appropriations. This study found that the relationship between the prior year and the current year shifts slightly in most states. The relationship is not entirely constant, and piecewise linear regression (Neter, Wasserman & Kutner, 1985) provided the means of analyzing the statistical significance of the shifts. The technique identifies the points at which there are significant shifts in the relationship between the independent and the dependent variable. Here the points represent years in which there is a significant shift in the prior year-current year relationship. The predictors in this study include dummy variables which are all subsets of the prior year. All of them in addition to the full prior year were entered into a stepwise regression for each state.

The years in which a shift occurred are called breakpoints because the regression line changes at a given point. It is not a single straight line, but two (or more) straight lines linked at a point (or points).

Results of the Analysis. Two tests of the models' significance were performed. Both showed that the models are excellent predictors. The range of R-Square values was very high: .901 to 1.000. The standard error of the estimates expressed as a percentage of the constant dollar appropriation for 1984-85 ranges from 0.46 percent to 8.46 percent.

Eleven states had no breakpoints; that is, the relationship was constant within the statistical error over the entire period of the study. Five states had one breakpoint, six states had two

breakpoints, and 11 states had three breakpoints as predictors along with the prior year. Twenty-one states had four or more breakpoints. The situation in the states with breakpoints is not a simple linear relationship which is described better by the multiple regression. This phenomenon may be a result of the states' efforts to keep pace with higher education's demands and keep ahead of or even with inflation. In the latest years of the period, however, the states may then have been less able (or less willing) to keep up with demands and their spending fell behind.

Most states experienced shifts in the past-present relationship. Incrementalism's result was defined as ". . . the degree to which a state's annual increments are consistently equal to a fixed percentage of the previous year's total" (Feig, 1985, p. 185). The states do appropriate funds in amounts that are slightly different from the previous year. But the increment is not constant. If the difference were constant, that is, if the relationship were perfectly incremental, then the prior year alone would be the only predictor, and there would not be breakpoints.

The full prior year explains a very high percentage of the variation in the annual appropriations for each state. In all but a few cases, it explains 90 percent or more. For those states with breakpoints, the percentage of variation explained is higher when the breakpoints are included than when they are not. The difference, however, between a simple regression (with the prior year only) and a multiple regression (including the significant breakpoints) is small. The importance of the model using breakpoints can best be measured with the standard error of the model. When the breakpoints are

included, for those states that have them, the standard error is lower The usefulness of this in predicting future appropriations becomes clear when considering a likely error of five percent versus an error of one percent or two percent. The result could be a differential of thousands or even millions of dollars between the two models.

Environmental Variables' Relationships With Higher Education Appropriations

Previous studies of environmental variables' relationships with higher education appropriations have provided little clarity as to which variables have what relationship in each state. Because of the previous studies' lack of consistent guidance as to which specific variables would be significant the statistic used in this study was stepwise regression. Each state was regressed separately. The data set included seven economic, four political, and five demographic variables plus the prior year and any breakpoints that were significant. The economic variables, including prior year and breakpoint years and the dependent variable were all adjusted for inflation. The rank order of variables importance was based on the standardized beta coefficients.

Results of the Analysis. The R-Square values were high for all states with a range from .942 to .999 and a mean value of .986. This was just .006 higher than the mean value of R-Squares from the previous analysis (prior year and breakpoints). The standard errors of the models as percentages of appropriations show that the models fit tightly. As a percentage of constant dollar appropriations the

standard errors ranged from a low of 1.12 percent to a high of 5.77 percent. The range of percentages is slightly tighter than that from the previous analysis (0.46 percent to 8.46 percent compared with 1.12 percent to 5.77 percent in this analysis).

The 50 regressions had an average of 4.18 independent variables including breakpoints that were retained under this model as well as the full prior year if it was significant. The non-prior year and non-breakpoint variables average 2.26.

Retained Breakpoints. Breakpoints were hypothesized to be proxies for other events measured by one or more of the other variables used in the full model. Thus it was predicted that the breakpoints would largely drop out of the regression formulas and would be replaced by other variables (economic, demographic or political variables). For the most part the breakpoints dropped out. Of the 39 states which had breakpoints, 32 retained at least one as a significant independent variable even with the other variables included. Of the states which retained breakpoints, all but six had fewer of them when the other variables were included. For the 39 states, there were an average of 5.15 breakpoints without the other variables and 2.08 with them. The largest number dropped was from 15 breakpoints to three in this analysis. Twelve more retained just one breakpoint; including three which had one breakpoint in the previous analysis. Six more retained two breakpoints, including three which had two breakpoints in the previous analysis.

The fact that a number of breakpoint variables were retained in the regressions indicates that the environmental variables chosen for this study may not completely reflect conditions extant to those

states. The fact that most of the breakpoint variables did drop from the regressions in favor of one or more of the other environmental variables indicates that the variables do reflect most of the conditions. Further study of each individual state, including an examination of events in the years just before the breakpoint may reveal more about the environments of those states. Some of the examination might be statistical. More likely, an event might be something difficult or impossible to measure in a way which is meaningful in a statistical analysis.

For 23 states or more, breakpoints were included but not the full prior year. Another 18 states included the full prior year as a significant independent variable. Nine states had neither the full prior year nor a breakpoint as a significant independent variable. This is contrary to what was originally hypothesized. Nearly every other study had shown that the prior year was the most important predictor of appropriations, thus it was hypothesized for this one that the prior year or subsets of the prior year contained in breakpoint variables would continue to be statistically significant as well as the most important predictor. The other variables would be added and would slightly improve the model's fit. Stated another way, for most states the prior year (or its subset breakpoints) was a significant predictor of higher education appropriations. However, it was expected that the phenomenon would be universal, not selective. In some instances the phenomenon of the nonsignificance of the prior year may be a consequence of using the stepwise regression procedure rather than selecting variables individually for each state. In

previous studies the variables used in the analyses were chosen by hand and the prior year was almost always included. When forced into the stepwise regression model, it is significant. However, when the choice between the prior year and other variables includes the option of a variable which is both more highly correlated with the dependent variable and which better explains the remaining variance, the prior year might not suffice. It might be somewhat less correlated with the dependent variable than states' spending one some other item, or than states' total personal income, or another of the environmental variables. In this study the choices amount to extremely small differences in the correlations. The resultant equation if the prior year were to be forced into the equation would not produce a greatly different R-Square or standard error. It might produce a different mix of predictor variables, however.

Full Prior Year. The full prior year was the most important predictor for 13 states and the breakpoints were the most important predictor for 10 more states. For the majority of states, then, another variable was either more important and/or significant in place of the prior year. In 13 of the 16 states with the prior year included it ranked as the most important variable, in the rest it ranked as the second most important. There was no consistency as to which other predictor was more important than the prior year.

Economic Variables. There are seven economic variables in addition to the prior year and breakpoints. The most important of these variables, both in terms of frequency and relative importance, was state spending on elementary and secondary education (K12). Next

most important was total personal income (TPI). Federal aid to states (FED) and state spending on corrections (COR) were of similar importance to one another, but not as important as predictors as K12 or TPI. Value added by manufacturers (VAM) was relatively unimportant.

Demographic Variables. There were five demographic variables used in this study. They generally were of secondary importance both in terms of frequency of occurrence and in terms of their rank within the list of predictors for each state. Enrollment (ENR) was the most important demographic variable in terms of frequency of occurrence and relative importance. Percentage of age group enrolled in public colleges (ENP) was next and number of college age people (AGE) was third in importance. Total resident population (POP) was significant in the smallest number of states (five) in this group of variables and was of relatively modest importance in all but one. The number of colleges and universities (CU) was significant for six states. It was also of relatively modest importance.

Political Variables. For this study the two political variables were percentage of voter turnout (VOT) and the percentage of seats held by the majority party (DEM). Both variables performed poorly. Both ranked lowest in importance among the states for which they were significant.

Table 1 indicates the frequency and rank (based on beta coefficients) of each independent variable. The prior year is indicated by PY and all breakpoints are combined in one column labelled BP.

Clusters of States

It has long been evident that the states' environments themselves differ from one another. For example, income rises faster in one state than in others; unemployment rates fall in a state while elsewhere they remain the same; and population shifts from one locale to another. This section will turn to examining whether there are distinguishable patterns among the states themselves in terms of their relationships between the environment and their higher education appropriations. There is a body of literature on state's higher education governing structures, beginning with Berdahl (1971). No such grouping has been attempted in terms of the combinations of other variables. True, there are comparisons of states by their relative growth in higher education funding over the years, their funding levels per capita, their funding per thousand dollars of personal income, and other individual measures. However, there are not such systematic categorizations on the basis of the predictors of the funding levels. Hence, this paper seeks to show that such categorizations can be made.

Cluster analysis was used to analyze the states' responses to the environment. The first step was to run a new series of multiple regressions for all 50 states. The regressions for this set used all 15 of the environmental variables plus the full prior year. The beta weights (standardized coefficients with a mean of zero and a standard error of one) then formed the data set for the cluster analysis. This was to provide a standardized dimension on all attributes as suggested by Lorr (1983).

For this study the complete linkage method was used. Complete linkage produces clusters which are compact, globular clusters (Wilkinson, 1988) in which the members are more like every other member than they are like the members (states) in any other cluster (Lorr, 1983).

Enrollment (ENR) is the best discriminator between the states and the percentage of college age population enrolled in public colleges and universities (ENP) is next best. In other words, the groups are most different on these two variables than they are on the other variables. There is some overlap, but it is lowest for ENR than for any of the other independent variables. The resultant five groups can be described in terms of the relative relationship between enrollment and constant dollar higher education appropriations. They are: moderate positive relationship (+), high positive relationship (++), moderate negative relationship (-), high negative relationship (--), and positive/negative relationship (+/-).

The relationships are best described based on the range of coefficients and the mean of the coefficients of enrollment as an independent variable. For cluster 1 (moderate positive) the mean enrollment coefficient was 1.09 with a range from 0.1 to 2.13. For cluster 2 (high positive) the mean coefficient was 4.25 with a range from 3.31 to 5.09. There was no overlap for cluster 2. For cluster 3 (moderate negative) the mean coefficient was -0.81 with a range from -2.06 to -0.07. For cluster 4 (high negative) the mean coefficient was -3.06 with a range from -3.47 to -2.52. There was no overlap for cluster 4. For cluster 5 (positive/negative relationship) there was a mean coefficient of 0.08 with a range from -0.53 to 0.44.

Florida, Illinois, and Virginia Results

The analysis of Florida, Illinois, and Virginia's relationship with the environmental variables is divided into two parts. The first part are the stepwise regression results between the environmental variables and the total higher education appropriation to public universities. The demographic, economic, and socio-political variables were first regressed separately on the appropriations variable and were then grouped together as one model. In conducting the analyses, the significance level for retaining variables within the models was set extremely high (.99) so that all variables would be retained within the analyses. These results are summarized in Tables 3-5. The second part is an analysis of the partial R-Square values of the environmental variables, or in other words, to what extent these variables explain the appropriations outcome for each of the three stages. These results are presented in Table 6.

Variable Relationships With Higher Education Appropriations

The literature has suggested that total state population, college age population, enrollment levels, population density, and degree of urbanization all have positive effects on state appropriations to public higher education. See for example, Lingenfelter (1974). Therefore, it was hypothesized that all of the demographic variables would have a positive effect on state operating appropriations to public four-year colleges and universities. As is indicated by the results, Illinois was the only state for which any of the demographic variables had a statistically significant effect on state appropriations [degree of urbanization (URBAN), $p < 0.05$]. This

variable exhibited the hypothesized positive effect on state appropriations. Urbanization accounted for the majority of the total explained variables of this model for Illinois. The remaining variables added little or nothing to the explanatory value of the model in all three states. Illinois was the only state for which this model produced a large enough R-Square value (.584) to be statistically significant ($p < 0.05$).

For the economic model, all of the economic variables but state unemployment rate (UNEMP) were hypothesized to have a positive effect on the annual changes in state appropriations for public four-year colleges and universities. This also has been suggested in the literature. As is indicated by the results, none of the states had statistically significant economic variables within this model. The total model was statistically significant only for Virginia ($p < 0.05$), with state revenue level (REVLEV) accounting for all but about 12 percent of the variance explained by this model (.456).

For the socio-political model, all of the socio-political variables were hypothesized to have a positive effect on the annual changes in state operating appropriations to public four-year colleges and universities. None of the socio-political variables were shown to have a statistically significant effect on state appropriations to public universities for any of the states. The socio-political model R-Square was not large enough to be statistically significant for any of the states.

For the final part of this analysis all of the variables were combined as one model. It was hypothesized that all of the environmental variables but state unemployment rate (UNEMP) would have a positive effect on state operating appropriations to public four-year colleges and universities. For Florida state revenue level (REVLEV) was shown to have a statistically significant effect on annual changes in state operating appropriations for public four-year colleges and universities ($p < 0.05$). As indicated by the results, this variable exhibited the hypothesized positive effect on annual changes in state operating appropriations for public four-year colleges and universities in Florida. Neither Illinois nor Virginia had any statistically significant relationships within this model. The model R-Square was not statistically significant for any of the states.

The Explanatory Value of the Environmental Variables

Although a ranking of the environmental variables in the strict sense of the work would be impractical and of questionable value to researchers and policymakers, analysis of the partial R-Square values of the variables can furnish us with a sense of the relative importance of each of these environmental factors within the aggregate model, as well as within the component models (i.e., demographic, economic, and socio-political). F-statistics were calculated to test the significance of the partial R Square value of each variable for each regression that was run.

Given the results, what can be said regarding the relative importance of the demographic variables in relation to state

appropriation outcomes for public four-year colleges and universities? As is indicated by the results, Illinois was the only state which had variables that were statistically significant additions to the demographic model: degree of urbanization ($p < 0.01$) and college-age population ($p < 0.05$). Also, for Illinois these two variables accounted for the majority of the variance explained in annual changes in state appropriations for public four-year colleges and universities by the demographic model. When combined with the economic and socio-political variables, degree of urbanization was also a statistically significant addition to partial R-Square value of all variables in the model. The remaining demographic variables demonstrated no statistical importance within either model for any of the states, although as a block the demographic variables accounted for the largest portion of the overall R-Square of the combined model for Illinois, and the second largest in Virginia. These variables accounted for the smallest portion of the explained variance in Florida.

State revenue level was a statistically significant addition for both Florida ($p < 0.05$) and Virginia ($p < 0.01$) within the economic model. It also had the largest R-Square in both cases. Illinois had no variables which significantly added to the explanatory value of the economic model, although state unemployment rate had the largest partial R-Square value here. None of the remaining variables significantly added to the explanatory value of the economic model in accounting for annual changes in state appropriations for public higher education. When combined with the demographic and

socio-political variables, state revenue level again emerged as the primary predictor for Florida, and was the only economic variable that was a statistically significant addition to the combined model ($p < 0.05$). Virginia had no economic variables that were statistically significant additions to the explanatory value of the combined model.

Finally how did the socio-political variables fare in terms of explaining annual changes in state appropriation outcomes for public four-year colleges and universities? When controlling for these variables alone, median level of education (AVED) and participation rate (PART) were shown to be statistically significant additions to the explanatory value of this model for Florida and Illinois respectively (both at $p < 0.05$). As the results show, none of these variables were statistically significant for Virginia. None of the other variables were significant additions within the socio-political model for any of the states. When combined with the demographic and economic variables, voter turnout and degree of political party competition were both statistically significant additions to the explanatory value of this model for Florida (both at $p < 0.05$). None of the socio-political variables made a statistically significant contribution within the combined model for either Illinois or Virginia. As a block, these variables accounted for the second largest part of the model R Square for Florida and the smallest for Illinois and Virginia.

Implications of the Results

What do the results tell us about the relationship between the environment and state appropriations for public higher education? Primarily we have learned that each state is different in terms of how state appropriations to public universities are impacted by the environment. This is especially evident in the analysis of the fifty states where the results were more conclusive. However, although the results of the analyses of Florida, Illinois, and Virginia are generally insignificant and inconclusive, we do know that there are no similarities present in the limited significant results. It is evident that the environment as a whole plays a role in determining the appropriations outcome for public universities, however, the extent of the environment's importance in the formation of this outcome varies from state to state. Further, the significance of the specific variables comprising the environmental models and the relative importance of each variable within the model in explaining the appropriations outcome vary from state to state as well. There are some similarities between states, however by and large, states tend to remain unique units of analysis. In short, although we have seen evidence of a relationship between the environment and state appropriations for public higher education, the importance and composition of this relationship varies across state lines.

In truth, we expected to come to this conclusion, and would have been quite surprised had the results portrayed the states as a homogenous mass. Environmental conditions vary from state to state, just as they do from nation to nation. Most assuredly the economy in

Montana is different than the economy in California, and the demographic composition of Illinois is different than that of Alaska. One would assume that the relationship between the environment and the appropriations outcome would differ as wel. Unemployment rates might be an important consideration in West Virginia, but not in Florida and so on. However, the variance among the states in terms of environmental conditions does not completely explain the variance among the states as to the importance of the relationship between the environment and the public university appropriation outcome, nor does it completely explain why on one state specific variables are relatively important in explaining the outcome, whereas in other states they are not. We do not know exactly why states differ but we offer some possible explanations. One explanation may be found in the way that the systems of public higher education are set up in the states. Governance and coordination structure of public higher education vary from state to state. Perhaps the degree of centralization affects the way environmental factors impact on state appropriations to public higher education. Perhaps as a state's system of public higher education becomes more centralized it becomes more susceptible to changes in certain aspects of the external environment over time in relation to changes in appropriations outcomes and vice versa. There is no hard evidence to support this assertion, but the possibility remains.

A somewhat more plausible basis for explanation might be the political cultures and traditions of the three states. Political culture and tradition is defined here as the unique set of socio-political values, history and beliefs that underscore the

political system of a state. Wirt and Kirst (1972) have been particularly active in the study of the effect of political culture and tradition on state education policymaking in general, and have noted that it does indeed effect educational policy outcomes. As the budget is in effect a policy statement, one may infer that political culture and tradition effects the appropriations process as well. The external environment acts in concert with the political culture of a state. It would seem logical then that political culture and tradition would regulate, to some extent, the effect that certain environmental factors have on the appropriation outcome for public higher education Certainly, any additional value placed on public higher education over any or all of the other state-supported functions by a state's chief policymakers during the appropriations process would be affected by the political culture and traditions of the state. That is, the "value" accorded public higher education in a state is largely a product of traditions passed on from generation to generation, and this "value" is translated into monetary gain, stagnation, or loss by the political system. Given this, since each state has its own unique political culture and traditions, the effect and impact of the individual environmental factors and the environment as a whole on state appropriation outcomes for public higher education would be likely to vary from state to state. Again, the results of these studies provide no hard evidence to validate these assertions, however as an explanation for the interstate differences borne out in this study, political culture and tradition remain valid possibilities.

Of course, one would be unable to test these hypotheses with the quantitative techniques that were utilized in our studies in a

meaningful manner. Qualitative research techniques such as the case study method would provide a more in-depth view of the individual states and of the total process surrounding the appropriation outcomes for public universities specifically, and all of public higher education in general.

Conclusion

The results of these studies suggest that the environment as a whole plays some in the state appropriations process over time, at least as far as public universities are concerned. The results of these studies also suggest that the specific environmental factors which were analyzed are not all of equal importance either between or within states in regard to state appropriation outcomes for public higher education. There is no consistency in terms of the effects of the environmental factors between the states. However, these inconsistencies provide a basis for future research regarding the relationship between environmental factors and state appropriation outcomes for public higher education. Further, these results imply a need to also study the more abstract, and less quantifiable, aspects of state political systems as they relate to policy/appropriation outcomes for public higher education, such as the political culture and traditions of a state, as well as the roles played by the various parties involved in the process (e.g., governor, legislature, governing board, etc.). To this end, a research agenda employing a wider range of more qualitative kinds of research methods is suggested as a way of attacking the multitude of questions that remain to be

answered. Only through such an agenda will researchers in this field be able to develop a more complete picture of the various aspects of state political systems as they relate to policy/appropriation outcomes for public higher education.

TABLE 1

Frequency and Rank of Independent Variables
(Constant Dollars)

	Variables/Frequency															
Rank	TPI	VAM	U	PW	COR	FED	K12	POP	AGE	ENR	ENP	CU	DEM	VOT	PY	BP
1	4			2		2	9	1	3	6					13	10
2	5	2		2	1	1	4	3	3	6	2	2			5	12
3	1	1	1	1	2	2	5	1	1		5	3		1		15
4	1	1		1	3		1		1				1	2		16
5			2			1	1			1	3			1		12
6	1		2		1	1			1					2		5
7														1		7
8												1	1			
9																1
Total	12	4	5	6	7	7	20	4	9	13	10	6	2	7	18	72

TABLE 2

Cluster Compositions

Clusters/States				
1 (+)	2 (++)	3 (-)	4 (--)	5 (+/-)
Arizona	Alabama	Alaska	Kansas	Colorado
Arkansas	Nebraska	Connecticut	New Jersey	Hawaii
California	New Hampshire	Florida	Texas	Idaho
Delaware	Virginia	Georgia		
Illinois	Washington	Kentucky		
Indiana		Louisiana		
Iowa		Montana		
Maine		Nevada		
Maryland		New Mexico		
Massachusetts		North Dakota		
Michigan		Pennsylvania		
Minnesota		Rhode Island		
Mississippi		South Dakota		
Missouri		Utah		
New York		Vermont		
North Carolina		Wyoming		
Ohio				
Oklahoma				
Oregon				
South Carolina				
Tennessee				
West Virginia				
Wisconsin				
N=23	N=5	N=16	N=3	N=3

TABLE 3

Summary of Statistically Significant Stepwise Regression Results

Florida

	Environmental Model			
Variable	Demographic	Economic	Political	Combined
TOTAL	---			---
COLL	---			---
ENROLL	---			---
POPDEN	---			---
URBAN	---			---
INCOME		---		---
REVLEV		---		(a)
UNEMP		---		---
HITEC		---		---
AVED			---	---
PART			---	---
VOTER			---	---
DEMREP			---	---
Model R*2	.186	.305	.317	.805

(a) $p < 0.05$

Note: "---" means that relationship is not statistically significant at $p < 0.05$ or below.

TABLE 4

Summary of Statistically Significant Stepwise Regression Results

Illinois

	Environmental Model			
Variable	Demographic	Economic	Political	Combined
TOTAL	---			---
COLL	---			---
ENROLL	---			---
POPDEN	---			---
URBAN	(a)			---
INCOME		---		---
REVLEV		---		---
UNEMP		---		---
HITEC		---		---
AVED			---	---
PART			---	---
VOTER			---	---
DEMREP			---	---
Model R*2	.584(a)	.214	.409	.851

(a) $p < 0.05$

Note: "---" means that relationship is not statistically significant at $p < 0.05$ or below.

TABLE 5

Summary of Statistically Significant Stepwise Regression Results

Virginia

	Environmental Model			
Variable	Demographic	Economic	Political	Combined
TOTAL	---			---
COLL	---			---
ENROLL	---			---
POPDEN	---			---
URBAN	---			---
INCOME		---		---
REVLEV		---		---
UNEMP		---		---
HITEC		---		---
AVED			---	---
PART			---	---
VOTER			---	---
DEMREP			---	---
Model R*2	.145	.456(a)	.056	.667

(a) $p < 0.05$

Note: "---" means that relationship is not statistically significant at $p < 0.05$ or below.

TABLE 6

Comparison of the Explanatory Value (Partial R*2 Values) of the Environmental Factors

	Demographic Model			Economic Model			Political Model			Combined Model		
	Florida	Illinois	Virginia	Florida	Illinois	Virginia	Florida	Illinois	Virginia	Florida	Illinois	Virginia
Variable	Part. R*2	Part. R*2	Part. R*2	Part. R*2	Part. R*2	Part. R*2	Part. R*2	Part. R*2	Part. R*2	Part. R*2	Part. R*2	Part. R*2
TOTAL	0.0305	0.0199	0.0553							0.0029	0.0132	0.0625
COLL	0.0084	0.1123(b)	0.0101							0.0148	0.0000	0.0263
ENROLL	0.0073	0.0326	0.0080							0.0094	0.0762	0.0067
URBAN	0.1284	0.4172(a)	0.0712							0.0878	0.3818(a)	0.1257
POPDEN	0.0090	0.0024	0.0000							0.0145	0.0132	0.0385
INCOME				0.0119	0.0022	0.0063				0.0148	0.0218	0.0145
REVLEV				0.2801(b)	0.0460	0.3313(a)				0.2651(b)	0.0132	0.1299
UNEMP				0.0063	0.1639	0.0751				0.0005	0.1975(b)	0.0001
HITEC				0.0061	0.0008	0.0428				0.0582	0.0341	0.1377
AVED							0.2044(b)	0.0329	0.0338	0.0117	0.0568	0.0115
PART							0.0125	0.3061(b)	0.0001	0.0149	0.0239	0.0016
VOTER							0.0431	0.0573	0.0201	0.1524(b)	0.0190	0.1083
DEMREP							0.0574	0.0131	0.0024	0.1576(b)	0.0012	0.0037

(a) $p < 0.01$

(b) $p < 0.05$

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APPENDIX

Environmental Variables Used In The Research Studies

The environmental variables used in both the analysis of all fifty states as well as in the analysis of Florida, Illinois, and Virginia are presented below. All data are state level data.

Fifty States Analysis	Florida, Illinois, Virginia Analysis
Demographic Factors:	**Demographic Factors:**
Total state population	Total state population
College age population (18-24)	College age population (18-44)
Public university enrollment	Public university enrollment
Population density	Population density
Number of public four-year institutions	Degree of urbanization
Economic Factors:	**Economic Factors:**
Per capita income	Per capita income
Unemployment rate	Unemployment rate
Value added by manufacturers	State revenue levels
State spending on public welfare	Degree of high technology industrialization
State spending on corrections	
Federal aid to states	
State spending on K-12 education	
Political Factors:	**Sociopolitical Factors:**
Voter participation rate	Median level of education
Degree of political party competition	Participation rate in public higher education
	Voter participation rate
	Degree of political party competition