

State Higher Education Budgeting Mechanisms in the United States

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Abstract

(Purpose) The purpose of this study was to examine the correlation between certain characteristics of US states and their budgeting systems for higher education (HE), and to derive implications for Japanese HE budgeting policy from the results.

(Methodology) The US's State Higher Education Executive Officers (SHEEO) conducted a 30-item questionnaire survey on state higher education budgeting for all 50 states from January to March in 2008 (response rate: 78%). Following general and simple analyses, the following four hypotheses were formed and examined with empirical analyses: (H1) there is a significant correlation between the importance of HE budget in the overall state budget and the adoption of funding formulae; (H2) inflation and fluctuation in enrolment affect whether the funding formula approach or the baseline-incremental approach is selected; (H3) justifications of public financing to the state HE sector are influenced by the cost-sharing status between households and the state government; and (H4) the governors' budget proposal and the legislative passed budget are influenced by certain external factors.

(Results) H1 was proved with satisfactory statistical significance. However, H2 showed a result opposite to that originally expected, and H3 could not be proved statistically. These results indicate that the funding formula approach is used more frequently by states which recognize their HE budget as more important comparative to other states and which have experienced greater fluctuations in inflation than the other states over recent years. With regards to H4, the financial burden of households did not affect the justifications selected. Governors' proposals were significantly influenced by the budget volume of primary and secondary education, while legislative passed budgets were largely determined by state unemployment rate.

(Conclusions) The results show that funding formulae are in use in more unstable situations and that the decision makers in both the executive and legislative branches do not recognize the importance of the bases of budgeting requests and justifications on the providers' side.

(Recommendations) The budgeting system for Japanese national universities is simply dominated by fiscal reform measures, and has much to learn from the strategic decision-making involved in US state HE budgeting systems.

(Additional Data) Manuscript contains 16 tables, 13 figures and 35 endnotes.

1. Introduction

Japanese national universities completed the first 6-year cycle of their strategic plan at the end of March 2010, the first milestone set by the National University Cooperation Act (NUCA) enacted in 2004. The intended purpose of NUCA was to enhance the quality of research and instruction at national universities by granting more autonomy to institutions and liberating them from red tape and government bureaucracy. However, less involvement from the national government also carried with it the implication of less public funding for higher education. Although the language in the bill claimed developing a globally competitive higher education system as its primary purpose, it was clear from the beginning that NUCA was in fact part of the central government's much larger scheme to reduce the administrative costs of government operations in order to pay off massive amounts of national debt accumulated since the early 1990s.

The Ministry of Finance (MOF), which orchestrated the agenda of national fiscal reform backed by the strong leadership of the then Prime Minister Junichiro Koizumi, crafted reformation plans for higher education funding. One reform initiated by the MOF was to incorporate a new quantitative factor, the so-called "efficiency rule", in a funding formula for higher education. This mathematical coefficient represents the MOF's assumption that institutions should be able to operate in a more cost-effective manner because they were given more autonomy and were no longer part of government bureaucracy. The coefficient is designed to result in a 1% reduction in tax support for the national universities' general operating expenditures (without the minimum standard of human resource costs) from the previous year's budget. The MOF also decided to adopt a new rule in a funding formula for university hospitals. Under the new rule, university hospitals are expected to increase their service revenues by an annual average of 2% in the nominal term in order to maintain the previous year's budget. However, the MOF apparently overestimated what the institutions could do in the market. The changes were simply too drastic and overwhelming for many national universities that had been government agencies since they were initially established. Institutions were literally thrown into a competitive market and required to navigate the new environment without adequate experience and skills in institutional leadership. Consequently, the majority of national universities have experienced a continuous decline in institutional revenues, without seeing much improvement in institutional productivity and effectiveness.

In order to cover the loss of general operating revenues, some national universities have fiercely sought out competitive funding such as research or special program grants, intending to allocate some portions of external grants to general operating functions. However, the competition has obviously favored institutions with robust research infrastructures and reputations, serving gradually to widen the gap in fiscal capabilities among national universities. Mizuta and Yanagiura (2008) observed that national universities have been already dichotomized into two groups within a short period of time—institutions with external research funding and institutions without such funding—indicating that this dichotomization was fiscally driven and not an expected consequence. Amano (2008) coined this phenomenon as "passive dichotomization" of Japanese higher education, arguing that the current situation is failing to reflect public needs for Japanese higher education. These scholarly works suggest that a misalignment of fiscal and educational policies might be occurring and needs to be addressed in order to maintain the economic competitiveness and stability of the nation.

In the face of these challenges for higher education, a multi-year project was launched to identify the optimal funding mechanism for Japanese national universities. Funded by the Japan Society for the Promotion of Science (JSPS) in 2007, the research project examined higher education funding issues from the following three perspectives. 1) What are the

rationales assumed by Japanese public institutions in making a budget request? 2) How much does it cost to undertake the basic operation of institutions, such as instruction and research, in Japanese public institutions? 3) What kind of policies have other countries employed for public funding allocation to higher education? The present study concerns the last perspective, paying particular attention to the US system of public higher education.

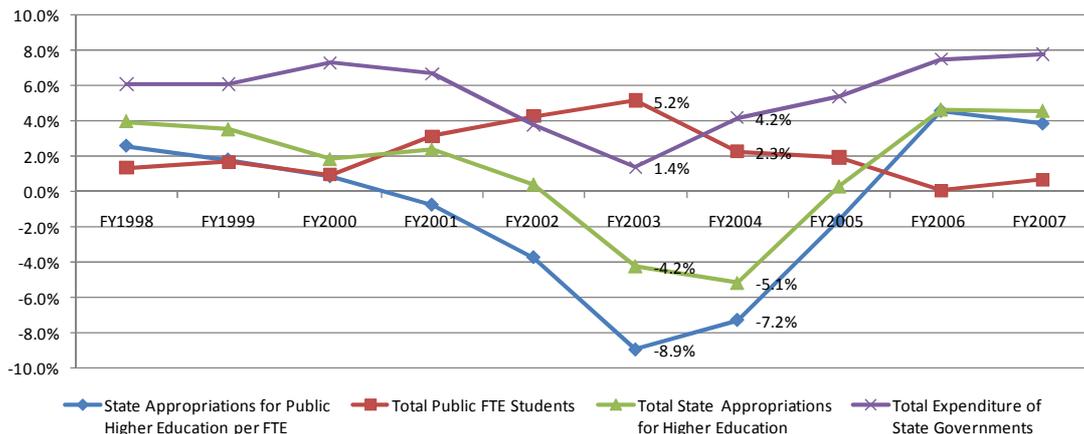
In conducting this study, we consulted the results of a survey collected from chief financial officers at state higher education agencies in 50 states in 2008 with aid received from the State Higher Education Executive Officers (SHEEO). This survey, "State Budget Process for Public Higher Education", intended to examine in 50 states budgetary practices such as the methodological approach taken to a budget request, budget-making procedures, and influential factors in the entire budget development process. This article introduces the remarkable findings of our wide-ranging analyses of the data collected by this survey and finishes by summarizing the implications for the Japanese higher education budget system.

2. Recent Trends in State Higher Education Finance and Literature Review

2.1. Recent Trends in State Higher Education Finance

Figure 1 shows percent changes from the previous year between FY 1998 and FY 2007¹ in 1) state appropriations for public higher education per FTE in the U.S. (blue line), 2) total public FTE students in the US (red line), 3) total state appropriations for higher education in the US (green line), and 4) total general operating expenditure of state governments in the US (purple line). All 50 states except the District of Columbia are represented in the data. It is evident from this graph that tax expenditures for higher education have moved along with total state budget². When the economy declines, higher education has tended to be a primary target for budget reductions because the state's spending priority is often given to K-12, Medicaid, and Medicare areas (Layzell 2007, 1-5). Moreover, institutions have their own income sources such as tuition and fee revenues, a fact which makes higher education an easier target for budget cuts than other public service functions (Zumeta 2008, 90).

Figure 1.



Sources: SHEEO, NASBO³

2.2. Literature Review

Studies on state budgeting for higher education date back to the 1950s. One of the classic studies that set the course for later scholarly works is that by Millet (1952) and Miller (1962).

In the latter study, Miller conducted a comparative analysis of funding formulae for higher education employed in selective states such as California, Florida, Indiana, Kentucky, Texas, New Mexico, Oklahoma, and Tennessee, utilizing a methodology commonly employed in public finance theory at that time. The approach used in his study subsequently become the prevalent methodology in higher education finance. Furthermore, some subsequent studies pursued a more sophisticated use of cost accounting methodology, and as a result contributed to Bowen's (1980) significant work⁴.

While Miller's methodology closely examined the design of funding formulae employed in selected states, Gross (1979, 1982) developed another analytical framework which is still in use by higher education researchers. In his study, he categorized each state's funding formula according to its characteristics, such as types of functional expenditure included, the calculation method used to estimate the cost of each function, and types of variables included in a formula. McKeown-Moak's studies on funding formula (1996, 2001, 2006), whose original framework was conceived by Gross, detailed funding methodologies and strategies adopted in 50 states. In her most recent study on higher education funding formula (2006), McKeown-Moak closely examined not only the methodological characteristics of formulae but also the procedural attributes of the budget-making process in 50 states⁵. Table 1 shows her analytical framework used to group funding formulae and budget processes.

Table 1.

Categories	Types
Reported Manner of Allocating Funding	Funding Formulae/Enrollment, Formulae Benchmark or Peer, Performance Funding, Performance Contracting, Vouchers, Base Plus Increment, Hybrid
Funding Formulae	
Sectors to Which Formulae Apply	All, All but Different, Research Universities, State Colleges/Universities, Community Colleges, Voc/Tech Colleges, Private Institutions, Special Institutions, Other
Reported Uses of Formulae/Guidelines	Recommend to Governor Legislative, Governor Budget, Legislative Budget, Lump-Sum Appropriations, Direct Appropriations, Allocation, Mid-year Reduction, Other
Functional Areas ⁶	Instruction, Research, Public Service, Academic Support, Student Services, Institutional Support, Scholarships & Fellowships, Plant Operations
Calculation Methods	Rate per Base Factor Unit (RBFU), Percentage of Base Factor (PBF), Base Factor/Position Ratio with Salary Rate (BFPR/SR)
Bases	Instruction (Academic Support, Student Service, Institutional Support): Head Count, FTE/FTEF, Credit Hours Research: FTE/FTEF, Credit Hours, Sponsored Research Public Service: FTE/FTEF, Credit Hours, Expend Mission Operation and Maintenance of Plant: NSF/GSF ⁷ , Replacement Cost, Acres, FTE/FTEF, Credit Hours Scholarships and Fellowships: Head Count, FTE/FTEF, Tuition Revenue
Other	Approach: All Inclusive, Itemized Differentiation: Discipline, Level, Type of Institution Costs: Fixed, Valuable

Sources: McKeown-Moak (2006) & MGT of America (2001)

Other recent studies on funding formula include the one-time, national survey conducted by the Senate Fiscal Agency of the State of Michigan in 2000 (Jeffries and Smith-Tyge, 2000). This study analyzed higher education budgeting practices in 50 states with respect to: 1) the type of funding formula employed, 2) the responsible agency (or agencies) in funding

allocation, 3) the governance structure of public four-year universities, 4) the number of campuses within the state, 5) types of revenues raised from non-tax income sources, 6) financing capital improvement, and 7) the availability of public support for independent institutions. Its results revealed that some regional tendency existed in budget-making practices, indicating as one example that Southern states tended to rely heavily on their funding formulae in the development of a budget request. The study also recognized that the most popular calculation method at the time was a formula that incorporated a base plus/minus approach.

When it comes to performance funding practices, Burke has conducted a series of studies since 1997 and summarized historical trends of performance funding in the nation from 1997 to 2003 (Burke and Minnassians, 2003). Efforts to link institutional performance and funding allocation in the US have attracted the attention of many Japanese higher education researchers, including Yoshida (2007b) who comprehensively summarized current conditions of performance funding in the US.

3. Methodology and Data

In pursuing the goal of this study, the survey was sent out by State Higher Education Executive Officers (SHEEO) to membership agencies in 50 states. The survey consists of a total of 30 questions, inquiring about state budgeting practices for higher education (see Appendix A for detailed survey items). Thirty-nine states responded to the survey (response rate: 78%). As Table 2 shows, this survey attempted to identify common characteristics in budget requesting methods at state level. This paper shares the results of the descriptive analyses of the survey responses.

Table 2.

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| <ol style="list-style-type: none">1) The State Budget Cycle: Annual, Biennial, etc.2) The Locus of Authority: Set Tuition Level, Retain Unspent State Appropriations, etc.3) Operating Budget Request<ol style="list-style-type: none">3-1. General Approach: Funding Formula, Base Plus/Minus, Mixed, etc.3-2. Main Factors: Enrolment, Levels of Instruction, Inflation, General Salary Increase, Productivity, etc.3-3. Justification: Performance Measures, Benchmarking, Internal HE Priority, External State Priority, Maintain Tuition Level, Increasing Financial Aid, etc.4) Executive Budget & Legislative Appropriation<ol style="list-style-type: none">4-1. Main Factors: the same factors as in 3-24-2. Justification: the same items as in 3-35) Distribution of Operating Appropriations to Institutions<ol style="list-style-type: none">5-1. Design: Lump-sum, Line-items or Other5-2. Main Factors: the same factors as in 3-25-3. Justification: the same items as in 3-36) The Dollar Amounts of the Operating Request of HE, the Executive Budget, and the Enacted Appropriation7) What Mechanisms are Used to Assess Institutional Patterns of Spending Relative to Budget Priorities |
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The survey also collected information regarding influencing factors in the decision-making process. The relationship between the survey results and the following variables were examined in this study:

- a) *State Higher Education Priority (State Tax Appropriations for Higher Education as a Percent of the State Total Budget (General Fund Only)*

- b) State Tax Appropriations for Higher Education per FTE and its longitudinal trend
- c) Net Tuition Revenues per FTE and its longitudinal trend
- d) Total Student FTEs in public institutions and its longitudinal trend
- e) Average Faculty Salary at Public Four-year Institutions and its longitudinal trend
- f) Higher Education Price Index and its longitudinal trend
- g) Others (unemployment rates, K-12, Medicare, and Medicaid expenditures, the Political Party of the Governor, the Majority Party in State Legislature, College Rankings, and Region)

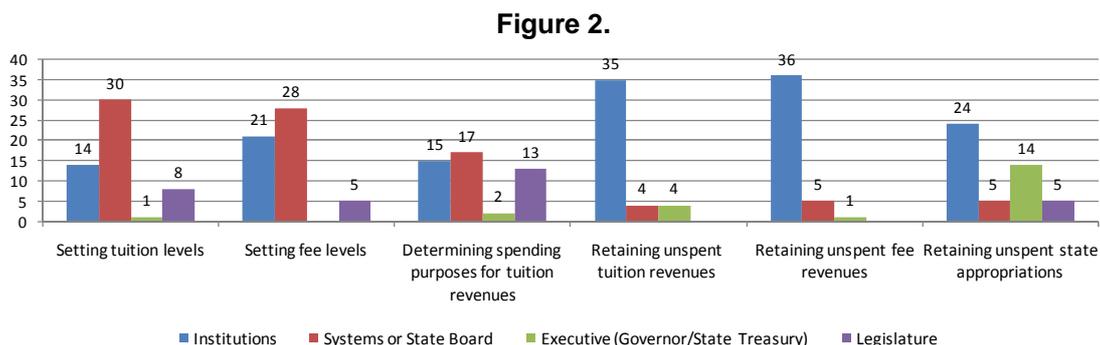
4. Survey Results

4.1. The locus of authority

First, the survey attempted to identify where decision making occurs in the following fiscal matters:

- 1) Setting tuition levels
- 2) Setting fee levels
- 3) Determining spending purposes for tuition revenues
- 4) Retaining unspent tuition revenues
- 5) Retaining unspent fee revenues
- 6) Retaining unspent state appropriations

Figure 2 illustrates responses to the questions on where the authority resides in the matters listed above. Because more than one entity could be involved in one subject as the final decision maker, each question allows multiple answers. Concerning setting tuition and fee levels, more than half of the respondents indicated that the authority resides with a state-level agency or system-level governing board. Meanwhile, most of the states allow institutions to carry forward unspent tuition and fee revenues to the next fiscal year. Interestingly enough, legislative involvement is minimal for most of the states in matters related to tuition and fees. It does not necessarily imply, however, that state legislature is completely excluded from the decision-making process. At the end of the day, the level of student contribution is determined by the amount of tax appropriations allocated to institutions. It is fair to say that legislative branches maintain their influence over tuition and fees by being the decision maker on the main factor of a tuition setting function.



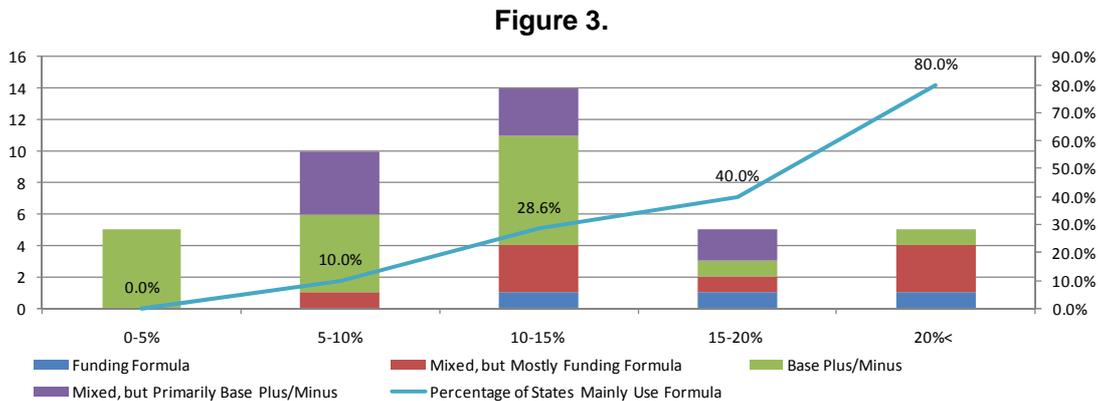
In some states, however, legislative branches are more visibly involved in the process for setting tuition and fees. For instance, Ohio and Oklahoma's legislatures can set a state tuition cap in order to secure access to higher education. Similarly, North Carolina mandates that the governing board of systems cannot set tuition rates without consent of the legislature. In Maryland, Minnesota, and Missouri, the state legislature is not legally authorized to set

tuition rates, but the survey indicated that legislative influences are still important factors. In Florida, the governing board has filed a lawsuit against the state's General Assembly, claiming that the tuition setting authority belongs with the board and not with the legislature.

Regarding the use of unspent tax appropriations, 24 states (61.5% of the respondents) allow institutions to carry forward the remaining budget to the next fiscal year. Fourteen states (35.9%) do not grant such authority to institutions, although institutions in Louisiana and North Carolina can keep unspent budget up to 2.0% and 2.5%, respectively, of their total state appropriations.

4.2. Calculation Methods Used to Develop Budget Request

The survey also inquired about the general approach to an operating budget request, asking respondents to identify their methodology from the following four conventional categories: 1) Funding Formula, 2) Base Plus/Minus, 3) Mixed, but Mostly Funding Formula, and 4) Mixed, but Primarily Base Plus/Minus (see Figure 3). Only three states identified themselves as a purely formula-driven state (Arkansas, North Dakota, and Tennessee), while almost half of the respondents (19 states) answered that they adopt base plus/minus, incremental approaches.

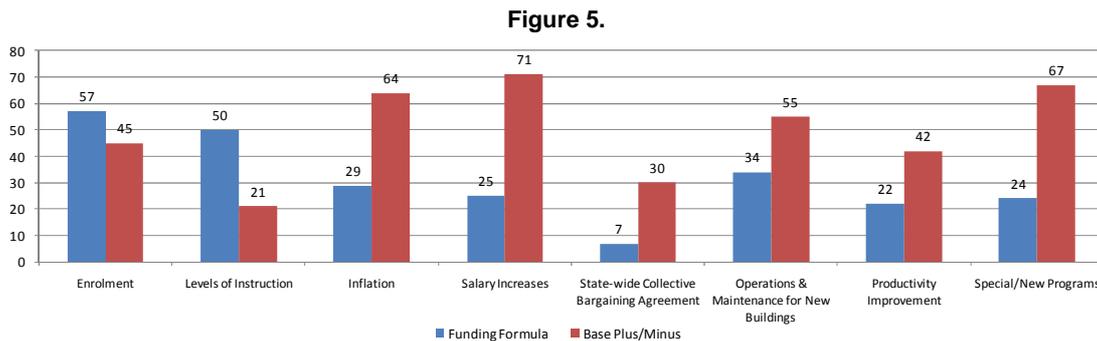
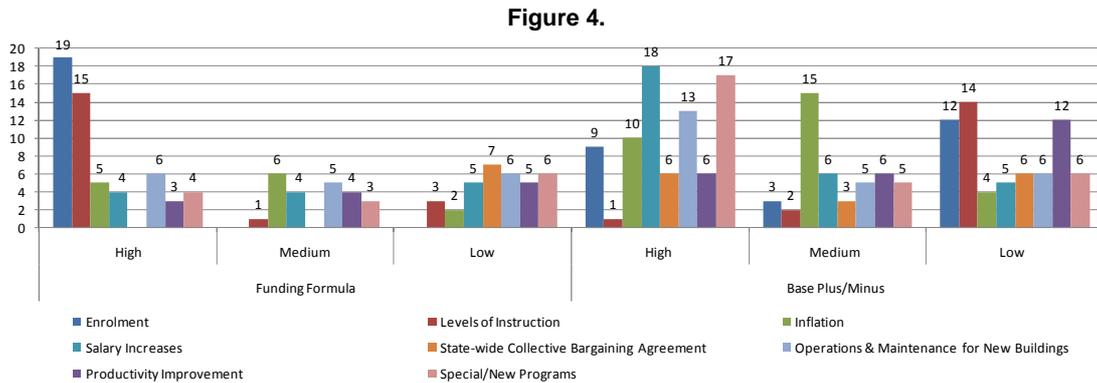


A high correlation exists between the methodology used for budget request and the share of state higher education appropriations in state total expenditure⁸. This study found that states with a higher share tend to rely on more systematic, formula-based approaches. For instance, no state in the group with the lowest share (0-5%) employs a funding formula, whereas 80% of the states in the highest share (20% and above) have their budgeting practice primarily relying on funding formula. In reality, states with a large higher education budget need to involve many stakeholders in the budget-making process. In such states, fairness must be secured during policy discussions, which may explain why a systematic approach such as that which uses a formula is necessary.

There are particularly noteworthy facts mentioned in the written responses: Kentucky shifted away from a baseline approach to the use of a formula that benchmarks against other states for 2006-08; Minnesota and Ohio, on the contrary, abandoned the use a formula because of computational complexities and deviations from available funding; and Maryland and Nebraska use a formula only for their community colleges. Notably, several states (such as Colorado, Kansas, and Kentucky) take into account funding levels of other states. Colorado, for instance, has announced that based on the result of an investigation by the National Center for Higher Education Management Systems (NCHEMS), a fundamental change will be made to its model starting with the 2009-10 budget.

4.3. Main Factors in Formulating Budget Request

This question was asked to determine what factors were deemed important in formulating a budget request in the funding-formula approach or baseline-incremental approach. For each of the eight factors listed, the respondents were asked to evaluate its importance by choosing one of three levels: "high", "medium", or "low" (see Figure 4). To provide an overall picture, 3 points, 2 points, and 1 point are assigned to "high", "medium", and "low", respectively, and total points are compared in Figure 5.



Among the states that responded to the survey, 20 (51.3%) use a formula in some way to formulate their budget request, and student enrollment and levels of instruction are the most important factors in the computation. No state assigns the importance level "medium" or "low" to student enrollment; that is, with the exception of one state that did not provide its answer, all states using a formula consider student enrollment as highly important. This leads to a hypothesis that states for which computing a recurrent budget request based on the number of users of educational services is deemed rational (or simply, states with an increasing number of students) tend to adopt a formula-based computation method with student enrollment as a cost driver. In contrast, most of the respondents, that is, 36 states (92.3%), use the baseline-incremental approach entirely or partially, and main computational factors are revisions on salary levels, new programs initiated, inflation, and operations and maintenance costs of new facilities. Clearly, since causes for changes in cost are different for each cost category, different methods are needed in formulating a budget request. Thus, it can be hypothesized that it is relatively easy to raise the baseline with a fixed rate or add new costs to a budget request in handling supply-side cost increases attributed to factors that rise universally and uniformly (e.g., salary revisions, inflation) or to new factors that did not exist in the previous year (e.g., new facilities and programs), and that the use of a formula is effective for cost categories that are driven by demand-side factors (e.g., student enrollment). (Both hypotheses are examined in Section 5.) In other words, the necessary

amount of funds can be calculated by the multiplication of unit cost and quantity. As such, the use of baseline approach is appropriate if unit cost changes frequently, but the formula approach is suited for responding to changes in quantity.

Such hypotheses are backed by written responses from some states. For example, adjustments to inflation and energy costs are main factors in computing a requested budget in Delaware which does not use a formula, whereas salary revisions are important for New Jersey. On the contrary, for Kentucky and Mississippi, which put an emphasis on the use of a formula, education and general costs per FTE are major factors. Even Virginia, which attaches greater importance to a baseline approach, uses a formula when computing the amount requested for increased student enrollment.

4.4. Justifications for Requesting Public Funds

This question was asked to identify factors that were deemed important in terms of institution- and system-level strategies as well as the basis for justifying requests made to the government for public funds. For each of the nine factors listed, the respondents were asked to evaluate its importance by choosing one of three levels: "high", "medium", or "low" (see Figure 6). To provide an overall picture, 3 points, 2 points, and 1 point are assigned to "high", "medium", and "low", respectively, and total points are compared in Figure 7.

Figure 6.

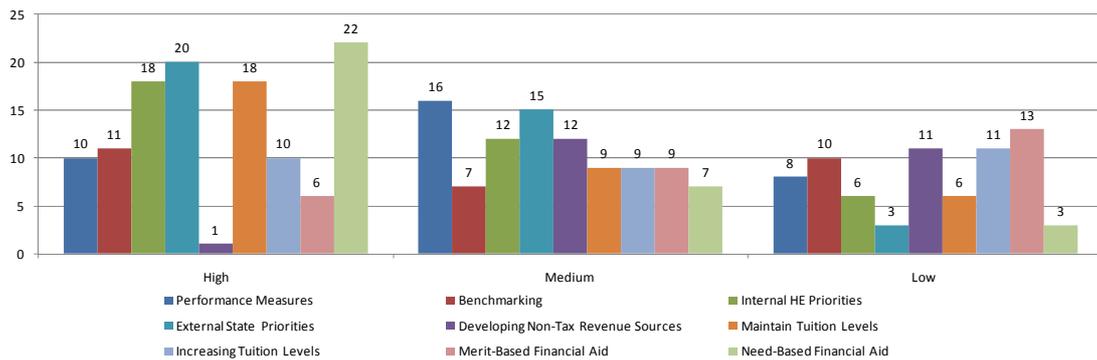
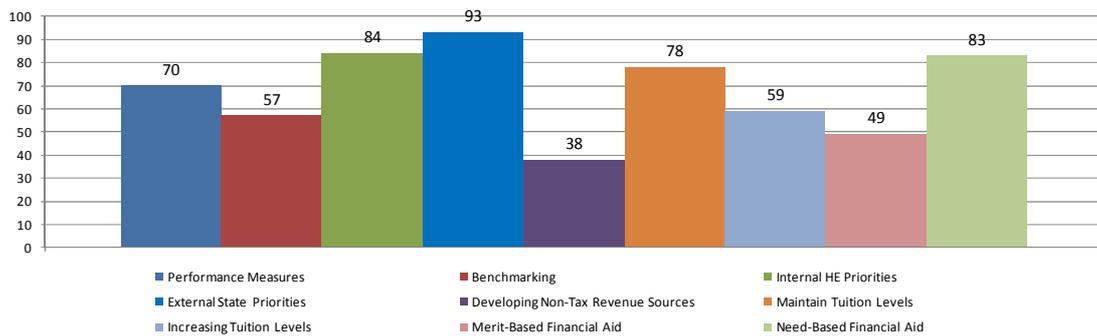


Figure 7.



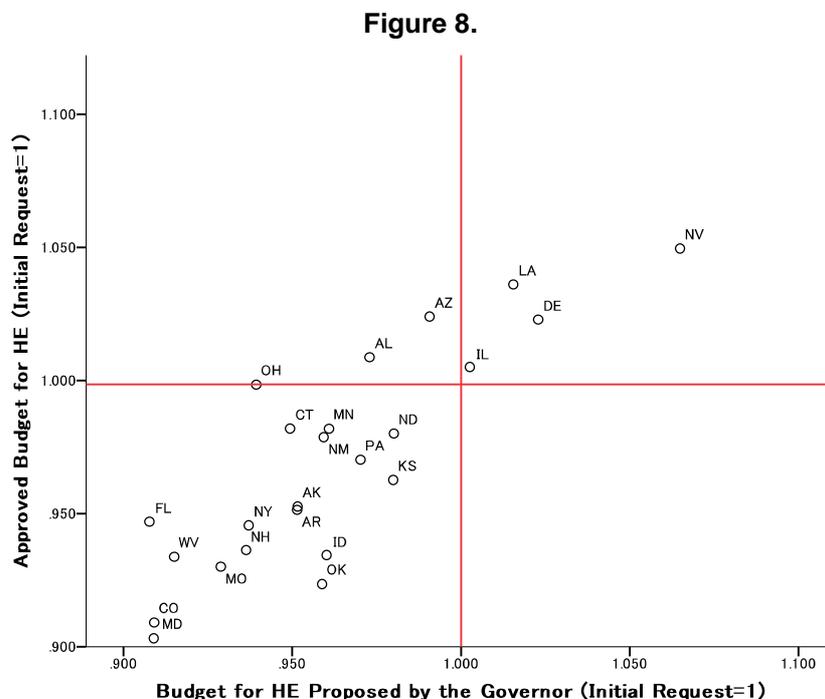
Internal and external priorities are most strongly recognized as important in terms of institutional strategies and the basis for requesting funds. Internal priorities include competitive advantages in salaries to attract excellent professors while external priorities involve contributions to the state economy or the supply of human resources to areas experiencing high demand. Emphasizing external priorities is particularly essential in making budget requests to the state government or legislature, and Alabama and Louisiana are the

only two states assigning a "low" importance level to them. (Also, New Jersey's non-response is taken as assigning a "low" importance level.) As to the factors that are deemed highly important, the greatest number of states (22 states, 56.4%) indicates increases in need-based assistance to students, and a decent number of states (18 states, 46.2%) point out the maintenance of tuition levels.⁹ This is a reflection of the situation that budgets are requested for improving access to higher education as the funds appropriated by the states per FTE declined by 7.7% while the students' and households' net tuition burden rose by 21.9% during the 2002-07 period (SHEEO 2008a, 26-29). It is considered that correlations exist between differences in emphasized categories and factors such as (1) net tuition burden per FTE, (2) funds appropriated by state government, and (3) a states' position relative to the US average of state assistance to students (see SHEEO 2008a, 36-38), an issue which is examined in Section 5.

As for performance-based allocations using performance measures and budget requests based on comparisons with levels of other state governments' burden (i.e., benchmarking), a limited number of states (10 or 11, about 25%) consider them as highly important. However, 16 states regard the importance level of performance measures as "medium", which implies that such measures cannot be ignored. Given the evolution of funding mechanisms discussed by Salmi and Hauptman (2006), the two aforementioned factors are both considered highly important by Kentucky, Mississippi, Oregon, Tennessee, and Virginia, which can suggest that they are more advanced than other states.¹⁰

4.5. Acceptance of Requested Budgets

This question was asked to ascertain how much of a budget request submitted by the public institutions of higher education to the executive branch of state government through university systems or SHEEO agencies is included in the governor's budget by the executive budget office and is ultimately approved in the state legislature. The result is shown in the graph in Figure 8, where the initially requested amount is set to 1 because the use of the dollar amount is inconvenient in this analysis.¹¹



On average, 89.3% (max = 123.4%, min = 26.7%) of a budget request is included in a state government budget proposal. The percentage for an approved budget after deliberations in the state legislature is, on average, 90.8% (max = 121.2%, min = 34.9%), which shows a slight recovery of the eliminated amount. In five states—Delaware, Illinois, Louisiana, Nevada, and Wisconsin—the amount in the executive branch's budget proposal exceeds the requested amount, and particularly in Delaware and Illinois, the amounts in both the recurrent executive branch budget proposal and approved budget are greater than the requested amount. However, the data for Louisiana reflect its unusual circumstances in 2007-08, and Wisconsin also reports that it faced a special situation involving debt repayments and a jump in utility costs. As to Nevada's data, the state reports that such a result can occur when revenues significantly increase and surpass expected revenues.

In Alabama and Arizona, the requested amount is ultimately met, with the reduced amount in the executive branch budget recovered during deliberations in the legislature. Both states, however, comment that such an event does not happen regularly. For the rest of the states, the executive branch budget and approved budget are both below the requested amount, but 15 states report that this is a normal pattern.

As mentioned in Section 2.1 regarding the observation by Zumeta and Layzell, the budget for state appropriations tends to be influenced by states' economic conditions and other costs for prioritized policies. Researchers including Kane and Orszag have conducted empirical analyses on the effect of external factors on changes in the budget for higher education (Kane and Orszag 2003a, 2003b, 2004; Kane, Orszag, and Gunter 2003; Kane, Orszag, and Apostolovl 2005). Based on the framework used in these studies, this paper examines the impact of external factors on the budget processes in the state executive and legislative branches in Section 5.

4.6. Main Factors for the Executive Branch Budget and Approved Budget

This question was asked to see how the states consider the main factors of a budget request, which are examined in Section 4.3, at the preparation stage for the executive branch budget that the governor submits to the legislature and the budget approval stage in the legislature. As in Section 4.3, for each of the 8 factors listed, the respondents were asked to evaluate its importance by choosing one of three levels: "high", "medium", or "low" (see Figure 9). To give an overall picture, 3 points, 2 points, and 1 point are assigned to "high", "medium", and "low", respectively, and total points are compared in Figure 10.

Figure 9.

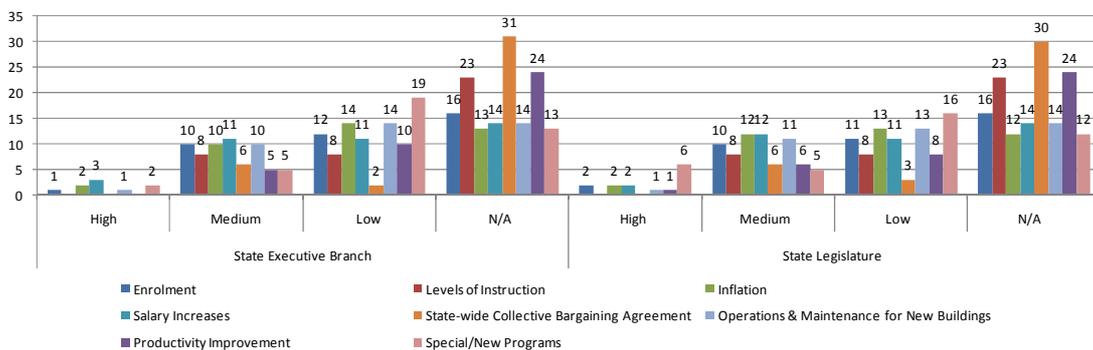
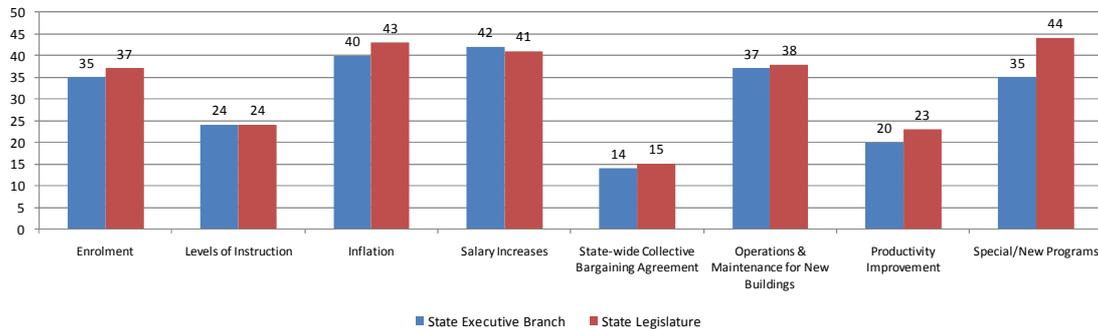


Figure 10.



Regarding this question, it should be noted that there are many responses indicating "low" and missing values (no answers: N/A). An examination of all evaluations (8 factors x 39 states) reveals that 26.0% report a "low" importance level for both the state executive and legislative branches, 46.5% provide no answer, and combined, 72.5% report either "low" importance or provide no answer. In other words, only 27.5% receive a "medium" or "high" importance level in at least one of the two stages. One reason can be that it is SHEED agencies that were surveyed, and therefore that the question was not asked directly to the executive branch or legislature regarding which factors were important in determining the budget size. In fact, written responses suggest that the SHEEO agencies of Connecticut, Ohio, and Pennsylvania had difficulties in answering the question, and that deliberations in the executive branch or legislature focus on factors differing from those considered in the computation of a requested budget.

Table 3 shows Spearman's rank correlation coefficients calculated with score values used for Figure 5 in Section 4.3 and Figure 10. The result reveals the following points. The variables deemed important for the formula approach to the computation of a requested budget are not considered as influential factors in the state executive and legislative branches. These government branches rather show a significant interest in factors affecting deviations from the baseline, and, particularly, priorities of the state legislature have greater commonality with those for requested budgets than priorities of the executive branch. This supports the "slight recovery of the eliminated amount" in deliberations at the legislature, which is mentioned in Section 4.5. However, the position of the executive branch is rather harmonious with that of the legislature, and they are not at odds with each other. Given the bias resulting from the fact that survey respondents are on the requesting side as mentioned earlier, it can be considered that SHEEO agencies have an impression that the executive branch and legislature are sensitive to rises in unit costs and overall prices rather than increases in formula variables.

Table 3. (N=8)

		Budget Request (Formula)	Budget Request (Baseline)	State Executive Branch	State Legislature
Budget Request (Formula)	Correlation Coefficient		-.048	.395	.214
	Significance Probability		.911	.333	.610
Budget Request (Baseline)	Correlation Coefficient			.826*	.857**
	Significance Probability			.011	.007
State Executive Branch	Correlation Coefficient				.790*
	Significance Probability				.020
State Legislature	Correlation Coefficient				
	Significance Probability				

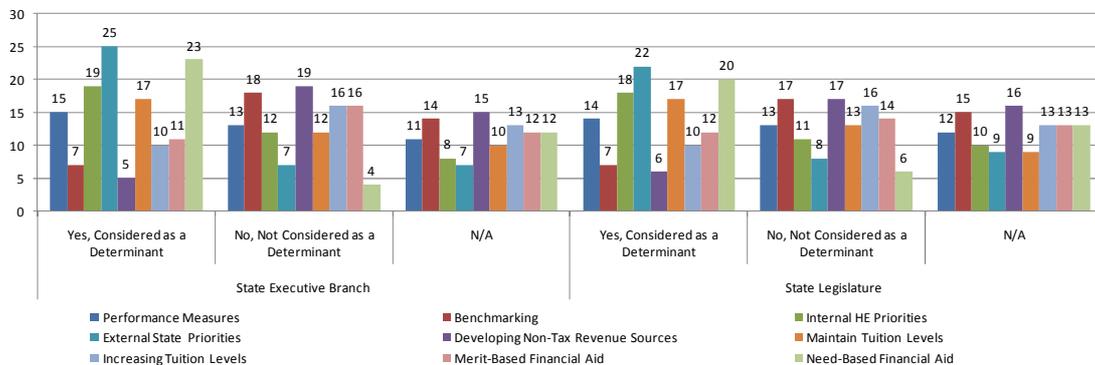
*p<.05, **p<.01

Some states provided exceptionally clear responses. In the state of New York, both the state executive and legislative branches attach weight to changes in student enrollment, and in 2007-8 an additional budget of \$10 million was approved to respond to an increase in the number of students. (The legislature of the state of Washington also considers the significant changes in student enrollment.) Also, as Figure 10 shows, relatively high importance is attached to influential factors for determining the level of a budget request in the baseline-incremental approach, namely, salary increases (the executive branch and legislature of Arizona and Illinois), special/new programs (the executive branch and legislature of New York and Washington and the legislature of Texas), new facility management and maintenance (the executive branch and legislature of Illinois), and inflation (the executive branch and legislature of New York and Wisconsin). As shown in parentheses, the statement applies to the administration and legislature of only a limited number of states. As to salary revisions, Arizona and South Dakota report that the relevant budget is determined by the state executive branch regardless of institutions' budget requests to maintain consistency in the salaries of all state employees. It can be surmised that there are other states in the same situation.

4.7. Justifications for Public Expenditure in the Executive Branch Budget and Approved Budget

This question was asked to see whether the justifications for a budget request examined in Section 4.4 are considered as determinants in budgeting at the stages of budget preparation by the state executive branch and budget approval by the legislature. The respondents were asked to choose either "yes" or "no" for each of the same 9 categories discussed in Section 4.4 (see Figure 11).

Figure 11.



Similarly to Table 3 in Section 4.6, Table 4 shows Spearman's rank correlation coefficients between the score values in Figure 7 in Section 4.4 and the number of states considering justifications for a budget request (seen in Figure 11) as determinants in their budgeting processes. As Table 4 implies, government justifications and positions in using taxes and other revenues for higher education coincide between the executive branch and legislature and show little differences from the justifications used for budget requests. It is certainly difficult to provide a decisive interpretation of the result as the responses in Figure 11 are based on conjectures of those who request budgets about the position of those who approve them. Also, it is unclear what elements are considered for general categories such as "internal priorities" and "external priorities". However, it can at least be said that the requesting side sees little differences in values and objectives regarding higher education between itself and the state executive branch and legislature.

Table 4. (N=9)

		Budget Request	State Executive Branch	State Legislature
Budget Request	Correlation Coefficient		.933**	.933**
	Significance Probability		.000	.000
State Executive Branch	Correlation Coefficient			1.000**
	Significance Probability			.
State Legislature	Correlation Coefficient			
	Significance Probability			

**p<.01

A further examination of the compatibility between the requesting side and approving side reveals the following. Regarding the link between performance measures and funding, while it is deemed to have a "medium" or "high" importance level by 26 states (66.7%) as a basis for a budget request, the number falls to only 14 or 15 when a budget is prepared and approved by the state executive branch and legislature. This situation is detailed in Table 5. The table shows that 12 states (30.8%) consider performance measures as a basis for all stages: budget request by institutions, budget preparation by the executive branch, and budget approval by the legislature.¹² It should be noted, however, that in 10 states (25.6%), a "medium" or "high" importance level is assigned to performance measures in the request stage, but they are disregarded in the executive branch or legislature. Among them, in Kansas and Tennessee, performance measures are used by only those who request budgets. Especially, the well-known performance funding in Tennessee is a funding scheme used only by the institutions side and a buffer body (Tennessee Higher Education Commission: THEC).

Table 5. (N=39)

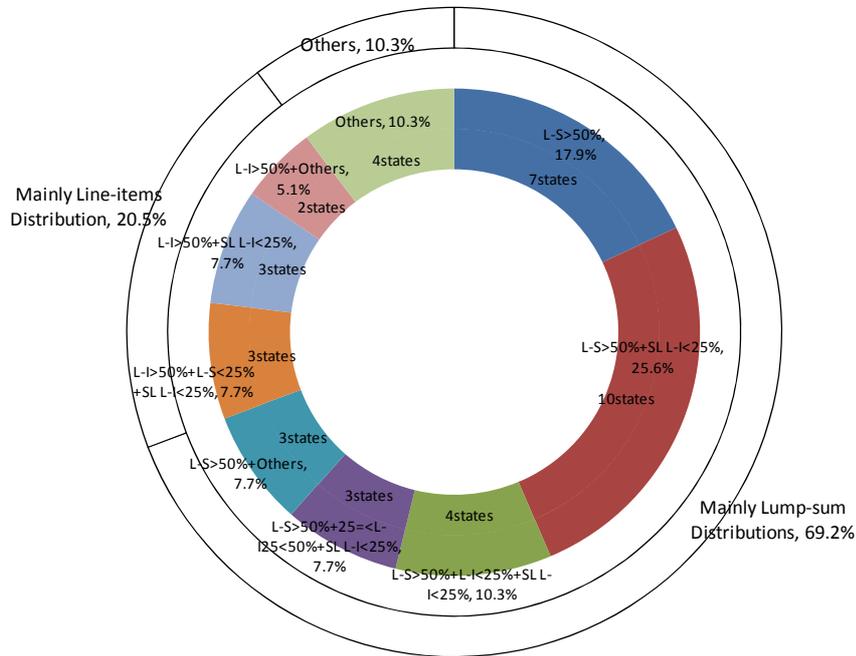
State Executive Branch	Considered as a Determinant		Importance in Budget Request				Total
			N/A	High	Medium	Low	
N/A	State Legislature	N/A	1	1	5	3	10
		Yes	0	0	1	0	1
	Total		1	1	6	3	11
Yes, Considered as a Determinant	State Legislature	N/A		1	0	1	2
		Yes		6	6	0	12
		No		0	1	0	1
	Total			7	7	1	15
No, Not Considered as a Determinant	State Legislature	Yes	0	1	0	0	1
		No	4	1	3	4	12
	Total		4	2	3	4	13

Also, 22 states (56.4%) attach weight to external priorities such as the influence on the state economy in both the executive branch and legislature. In addition, the maintenance of the tuition levels and need-based assistance to students are treated in the same manner in 15 states (38.5%) and 20 states (51.3%), respectively. That is, the improvement in access to higher education is considered as an important factor in all stages of the budgeting process, from the budget request to deliberations in the executive and legislative branches.

4.8. Methods of Allocating Budget to Institutions

This question was asked to see what combination of lump-sum distribution, line item distribution, and special legislative line item distribution is used by the states in allocating approved budget to institutions (Figure 12).¹³

Figure 12.



Note: L-S: Lump-sum Distributions
 L-I: Line-items Distributions
 SL L-I: Special Legislative Line-items Distributions

The highest number of states—27 states (69.2%)—use lump-sum distribution for more than 50% of total budget, and 20 of them combine it with other methods. The use of line item distribution for more than 50% of the total budget is seen in 8 states (20.5%): Illinois, New York, Louisiana, North Carolina, Nevada, South Dakota, Wisconsin, and West Virginia. Four of these eight states are also among the seven states where the amount in a budget request is fully met by the approved budget. This can be considered to imply that budgets with line item distribution, which are more controllable for the state executive branch and legislature, are more likely to be approved. Table 6 thus shows correlations between the use of line-items distribution and what percentage of the initial budget request was approved by the state executive branch and state legislature.¹⁴ The table shows statistically significant positive correlations, supporting the above hypothesis to some extent. In passing, among the eight states, which mainly adopt line item distribution, Illinois, Louisiana, and West Virginia also use lump-sum distribution simultaneously, although the method is applied to less than a quarter of the total budget.

Table 6. (N=35)

		Approval Rate of State Executive Branch	Approval Rate of State Legislature	Use Level of Line-item distribution
Approval Rate of State Executive Branch	Correlation Coefficient		.798**	.462**
	Significance Probability		.000	.005
Approval Rate of State Legislature	Correlation Coefficient			.399*
	Significance Probability			.018
Use Level of Line-item distribution	Correlation Coefficient			
	Significance Probability			

*p<.05, **p<.01

5. Empirical Analyses: State Characteristics and the Budgetary System and Process

Section 4 gave an overview of the survey results and discussed its remarkable findings. Based on these, the following four hypotheses are proposed. [[Please confirm the edit]]

Hypothesis 1 (from Section 4.2)

The method used in formulating the initial recurrent budget request is correlated with the share of higher education expenditures in total state government expenditures. Specifically, states with a larger share of higher education budget tend to rely on the formula approach, which enables them to formulate budget requests mechanically, although the coordination of various interests is burdensome.

Hypothesis 2 (from Section 4.3)

Given that the budget request for higher education is obtained by multiplying unit price (p) by quantity (q), the baseline-incremental approach is mainly used for spending categories with large changes in p , and the use of formula approach is considered rational for categories with large variations in q . That is, states that pay attention to price changes on the supply side (e.g., increases in salaries of professors) tend to consider the baseline-incremental approach as more appropriate, and states that are interested in quantity variations on the demand side (e.g., increases in student enrollment) tend to prefer the formula approach.

Hypothesis 3 (from Section 4.4)

Justifications to seek public funds for higher education are influenced by the position of each state relative to US averages. More specifically, judging from the relative size of net tuition burden per FTE, state appropriations per FTE, and state student aid per FTE, public institutions request budgets, citing below-average spending categories as main reasons.

Hypothesis 4 (from Section 4.5)

The approval rates of initial budget requests by the state executive branch and state legislature are significantly affected by factors outside higher education. Such factors include the state economy, expenditures related to social security, public safety and other policy priorities, and the political affiliation of the governor and state legislature.

In Section 5, these four hypotheses are examined empirically and the findings from these empirical studies then summarized.

(1) Hypothesis1: The methods used in formulating a recurrent budget request are correlated with the share of higher education expenditures in total state government expenditures.

Let us first analyze the four methods to formulate a recurrent budget request and average share of higher education expenditures. The pattern observed in Figure 3 of Section 4.2 can also be seen in Table 7: the greater the weight attached to the formula approach, the higher the average share of higher education expenditures. The average shares are significantly different across the different methods at the 1% level.

Table 7.

Calculation Methods	HE Expenditure as a % of State Total Expenditure		States	Standard Deviation
Funding Formula	0.179	0.161	3	0.052
Mixed, but Mostly Funding Formula	0.154		8	0.052
Mixed, but Primarily Base Plus/Minus	0.106	0.099	9	0.041
Base Plus/Minus	0.095		19	0.053
Total	0.116		39	0.056

$p < .01$, $\eta^2 = .253$

Jefferies and Smith-Tyge (2000, 4-6) pointed out that the states using only formula approach are located south of the Mason-Dixon Line. Table 8 was created for the purpose of briefly examining whether such a regional determinant can be identified in our survey. The results show that the majority of southern states use a formula approach, and that all northeastern states mainly use the baseline-incremental approach. Statistically, Cramer's V was calculated to prove a correlation between calculation methods and regions (i.e., the South, Northeast, and other regions—the West and Midwest), and the result was examined by a chi-square test; a certain level of correlation (Cramer's $V = 0.496$) was found to exist at the 1% significance level.

Table 8.

Calculation Methods	Southern Area		North-Eastern Area		Others		Total	
Funding Formula	2	8	0	0	1	3	3	11
Mixed, but Mostly Funding Formula	6		0		2		8	
Mixed, but Primarily Base Plus/Minus	4	6	1	6	4	16	9	28
Base Plus/Minus	2		5		12		19	
Total	14		6		19		39	

$p < .01$, Cramer's $V = .496$

(2) Hypothesis 2: The methods used in formulating a recurrent budget request are correlated with changeable valuables in the demand side or supply side.

This hypothesis assumes that the degree of an increase in student enrollment or inflation affects the decision-making about which method to choose to formulate a recurrent budget request. Table 9 shows the relationship between the coefficient of variation for student enrollment—a demand-side variable—and calculation methods.¹⁵ Contrary to our initial expectation, it seems that states with higher demand-side variation are more likely to use the baseline-incremental approach; however, it cannot be concluded that the means of the coefficient of variation for student enrollment are significantly different across the different calculation methods.

Table 9.

Calculation Methods	Coefficient of Variation (Student Enrolment FY2003-07)		States	Standard Deviation
Funding Formula	0.02408	0.02495	3	0.01775
Mixed, but Mostly Funding Formula	0.02527		8	0.01352
Mixed, but Primarily Base Plus/Minus	0.04266	0.03187	9	0.02705
Base Plus/Minus	0.02676		19	0.01554
Total	0.02992		39	0.01922

$p = .318$, $\eta^2 = .027$

Table 10 shows the relationship between calculation methods and inflation—a supply-side variable—which is obtained based on the combined price adjustment factor.¹⁶ Contrary to our initial expectation, states with greater inflation tend to use a formula, and price increase in states that use mainly the baseline approach is relatively mild. The result shows that the mean values are significantly different across the methods. That is, given that a budget request is calculated as unit price (p) multiplied by quantity (q), the formula approach tends

to be used when the variation in p is large, and it is somewhat likely that when q varies largely the baseline-incremental approach is used.

Table 10.

Calculation Methods	Combined Price Adjustment Factor (FY2007 relative to FY1997)		States	Standard Deviation
Funding Formula	1.47446	1.46379	3	0.10535
Mixed, but Mostly Funding Formula	1.45978		8	0.07108
Mixed, but Primarily Base Plus/Minus	1.39675	1.34087	9	0.12106
Base Plus/Minus	1.31440		19	0.11750
Total	1.37554		39	0.12402

$p < .01, \eta^2 = .204$

Table 11 shows which formula or baseline-incremental approach has more steadily secured state appropriations over the years.¹⁷ Ordinarily, it would seem that the formula approach, which calculates a budget mechanically with unit prices being fixed, provides steadiness. In reality, however, the variation for the baseline approach is significantly lower at the 1% level.¹⁸ With the trend identified over the years in Figure 1 in Section 2.1 taken into account, since state appropriations per student for the 5 years exhibit declining variations, it can be stated that formula approach is more likely to decrease state appropriations.

Table 11.

Calculation Methods	Coefficient of Variation (State Appropriations FY2003-07)		States	Standard Deviation
Funding Formula	0.06998	0.07850	3	0.03176
Mixed, but Mostly Funding Formula	0.08169		8	0.02344
Mixed, but Primarily Base Plus/Minus	0.05937	0.05310	9	0.01865
Base Plus/Minus	0.05013		19	0.01605
Total	0.06026		39	0.02248

$p < .01, \eta^2 = .265$

(3) Hypothesis 3: Justifications to Use Public Funds and Cost-Sharing

This hypothesis assumes that if students and households bear a greater share of educational costs, the maintenance of tuition level and financial assistance for students become main reasons for requesting funds, and that if the share of public expenditure is large, attention shifts to performance measures and policy priorities. Also, regarding budget request, a state's position relative to other states is assumed to be important.¹⁹

Before examining the hypothesis, let us discuss Table 12 which shows correlations among the 9 justifications for requesting public funds that were listed in the survey.²⁰

Table 12.

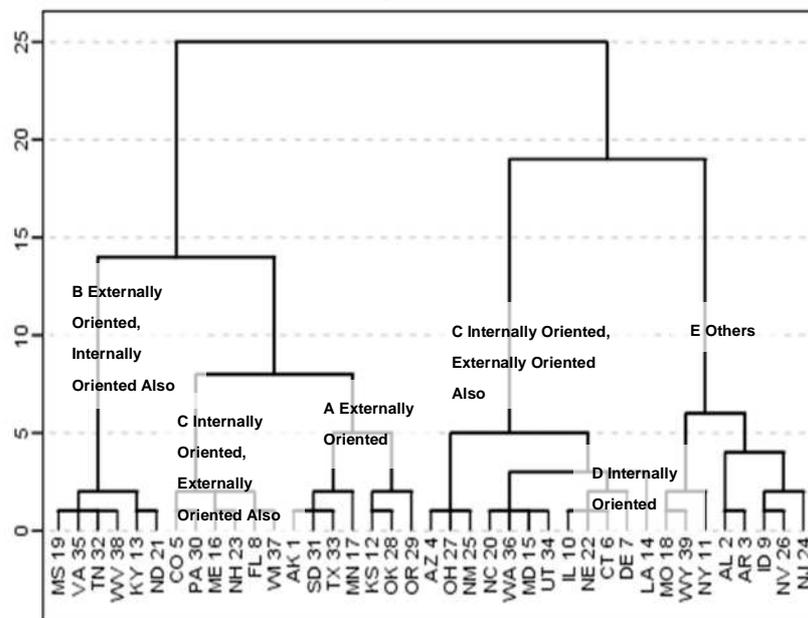
	Performance Measures	Benchmarking	Internal HE Priorities	External State Priorities	Developing Non-Tax Revenue Sources	Maintain Tuition Levels	Increasing Tuition Levels	Merit-Based Financial Aid	Need-Based Financial Aid
Performance Measures	Correlation Coefficient	.333*	.342*	.471**	0.292	.335*	.434**	-.05	0.138
	Significance Probability	0.039	0.033	0.002	0.071	0.037	0.006	0.761	0.402
Benchmarking	Correlation Coefficient		.420**	0.298	0.306	0.276	0.134	.347*	-.409**
	Significance Probability		0.008	0.065	0.059	0.089	0.417	0.03	0.01
Internal HE Priorities	Correlation Coefficient			.392*	0.278	0.268	.340*	0.065	.332*
	Significance Probability			0.014	0.087	0.099	0.034	0.696	0.039
External State Priorities	Correlation Coefficient				.327*	0.031	0.198	0.106	0.212
	Significance Probability				0.042	0.85	0.227	0.519	0.195
Developing Non-Tax Revenue Sources	Correlation Coefficient					.363*	0.091	-0.077	0.103
	Significance Probability					0.023	0.58	0.643	0.535
Maintain Tuition Levels	Correlation Coefficient						0.292	0.269	0.14
	Significance Probability						0.071	0.098	0.397
Increasing Tuition Levels	Correlation Coefficient							0.177	0.069
	Significance Probability							0.281	0.678
Merit-Based Financial Aid	Correlation Coefficient								.402*
	Significance Probability								0.011
Need-Based Financial Aid	Correlation Coefficient								
	Significance Probability								

* $p < .05$, ** $p < .01$

As the table shows, the category "performance measures" is positively and significantly correlated with external priorities and tuition increases at the 1% level. Conversely, the category is not significantly correlated with either merit-based or need-based assistance for students, and it even potentially has a negative correlation with merit-based assistance. That is, in states where budget requests are made based on performance measures, those which request budgets are "externally oriented", emphasizing contributions to the state economy and not showing concern over tuition increases. On the contrary, need-based assistance for students is positively and significantly correlated with benchmarking at the 1% level and with internal priorities and merit-based assistance for students at the 5% level. In other words, in states where need-based assistance for students is emphasized, budgets are requested based on "internally oriented" issues such as equal opportunities in higher education, fairness among state public institutions, and the improvement in competence.

Figure 13 shows a dendrogram generated by a cluster analysis that was conducted to ascertain the states' tendency regarding these two types of emphasis.²¹

Figure 13.



Based on the survey responses, clusters are formed as seen in Figure 13. The categorization can be explained largely with five interpretations: the externally oriented states (Type A, 7 states), states that are externally oriented and, equally, are concerned with internally oriented issues (Type B, 6 states), states that mainly consider internally oriented issues, but are also externally oriented (Type C, 13 states), states that attach weight to internally oriented issues (Type D, 5 states), and other states (Type E, 8 states). In analyzing correlations with the situation of cost-sharing in a state, the existence of statistically significant differences across these five clusters is examined.

As an index measuring the cost-sharing, it is considered appropriate to use the proportion of net tuition for students and households (Net-Tuition Rate).²² The reason is that it reflects the three elements discussed in Section 4.4 as seen in the following equation.

$$\text{Net-Tuition Rate} = \frac{\text{Tuition per Student} - \text{Student Aid}}{[\text{State Appropriations per Student} + (\text{Tuition per Student} - \text{Student Aid})]}$$

Table 13 shows the results. A tendency opposite to our conjecture is slightly observed. That is, in states with greater burden on students and households, budget requests are more reliant on externally oriented justifications. (Group E's stance in requesting budgets is excluded from the analysis.) However, burden on students and households does not differ in a statistically significant manner across different stances in requesting budgets. Therefore, the hypothesis that the cost-sharing situation in a state influences justifications for requesting budgets cannot be supported.²³ As Table 14 shows, the stance in requesting budgets is rather correlated strongly with the share of higher education expenditures in the total state government expenditures (at the 10% significance level), which shows a tendency that externally oriented reasons are needed in states where the higher education budget is relatively large.²⁴ Also, even stronger correlations exist with the salary level of professors, and the means of professors' salaries at the four-year public colleges and universities are significantly different across states' stances in requesting budgets at the 1% level (Table 15).²⁵ It can be interpreted that once professors' salaries surpass a certain level, public expenditures for the demand side such as financial assistance for students are required, or that a strong emphasis on competence, an internal factor, leads to the maintenance of high salary levels.

Table 13.

Stances	Net-Tuition Rate (FY2007)	States	Standard Deviation
A Externally Oriented	0.39570	7	0.10309
B Externally Oriented, Internally Oriented Also	0.42361		
C Internally Oriented, Externally Oriented Also	0.40437	13	0.16862
D Internally Oriented	0.37948		
Overall	0.40212	31	0.12867

$p=.817, \eta^2=.002$

Table 14.

Stances	Expenditure for HE as a % of Total State Expenditure (FY2007)	States	Standard Deviation
A Externally Oriented	0.14143	7	0.05122
B Externally Oriented, Internally Oriented Also	0.15500		
C Internally Oriented, Externally Oriented Also	0.11000	13	0.05259
D Internally Oriented	0.10680		
Overall	0.12529	31	0.05617

$p<.10, \eta^2=.119$

Table 15.

Stances	Averaged Salary for Professors in 4 years Universities (FY2006 US\$)	States	Standard Deviation
A Externally Oriented	64,533	7	5,668
B Externally Oriented, Internally Oriented Also	61,571		
C Internally Oriented, Externally Oriented Also	70,161	13	6,205
D Internally Oriented	71,940		
Overall	67,514	31	7,951

$p<.01, \eta^2=.223$

(4) Hypothesis 4: The approval rates of initial budget requests by the state executive branch and state legislature are significantly affected by factors outside higher education.

For the last hypothesis, it is examined which factors increase or decrease approval rates of budgets requests from the institutions side at the governor's office and the state legislature. As discussed in Section 4.5, Kane and Orszag and others have empirically shown that state government budget for higher education is affected by factors associated with the state economy and other policy priorities. Using annual time series data, they have shown that changes in unemployment rate due to varying economic conditions as well as changes in expenditures for social security programs such as Medicaid affect the budget for higher education. With the framework used in their studies in mind, the following linear regression analysis is conducted for Hypothesis 4.²⁶

A. Approval Rate of the Executive Branch for Institutions' Budget Request

$$ABR_i = OBR_i + \sum_{j=1}^m \beta_j f_{ij} + \varepsilon_i$$

$$(i=1 \dots n, m=8)$$

ABR_i = approval rate of executive branch for institutions' budget request in state i

OBR_i = institutions' budget request in state i (=1)

f_{i1} = rate of change in enrolment (FTE) in the public higher education institutions in state i (FY2002-07)²⁷

f_{i2} = share of expenditures for elementary and secondary education in total state government expenditures for state i (FY2007)²⁸

f_{i3} = rate of change in Medicaid expenditure in state i (FY2006)²⁹

f_{i4} = dummy for the governor's authority in setting limits on budget requests for state i (2008)³⁰

f_{i5} = dummy for the difference in political affiliation between the governor and the majority in the upper house for state i (January 2007)³¹

f_{i6} = dummy for the difference in political affiliation between the governor and the majority in the lower house for state i (January 2007)³¹

f_{i7} = score of the top campus in state i according to the US New & World Report's Best Colleges 2009³²

f_{i8} = location dummy for state i (Southern states = 1)

ε_i = error term

Let us briefly discuss the independent variables (f_{i1}, \dots, f_{i8}) that are used to explain variations in the dependent variable ABR_i . Increases in demand for higher education in a state and the effects of other policy priorities are reflected in the variables f_{i1} , f_{i2} , and f_{i3} . As NASBO (2008b, 4) indicates, the share in total state expenditure on elementary and secondary education and on Medicaid is 21.2% for both and is the largest, followed by expenditure for higher education (10.5%). Therefore, the demand for elementary and secondary education is included as a factor influencing budget for higher education along with Medicaid which is examined by Kane and Orszag and others. The variables f_{i4} , f_{i5} , and f_{i6} show the power balance in the state budgeting process, and the variable f_{i4} measures to what extent the state governor can cap the institutions' budget request. The variables f_{i5} and f_{i6} are included to ascertain the effect of the political power balance in state decision-making. With the variables f_{i7} and f_{i8} , the influence of the reputation and of the location of state colleges and universities in the United States as indirect factors is examined. The estimated regression equation is as follows ($n = 34$, F-value = 5.536, adjusted $R^2 = 0.516$).

$$ABR_i = 1.003(OBR) + .292 \cdot f_{i1} - 1.116 \cdot f_{i2} + .168 \cdot f_{i3} + .054 \cdot f_{i4} - .072 \cdot f_{i5} + .115 \cdot f_{i6} + .002 \cdot f_{i7} - .051 \cdot f_{i8}$$

(18.782) (1.875) (-3.845) (1.665) (2.234) (-3.227) (4.910) (3.897) (-2.477)

The estimated constant term is close to 1, which coincides with *OBR*. Roughly speaking, at the stage of the governor's revision of the initial budget request, a downward pressure on the budget can easily result from an increase in the demand for elementary and secondary education (unstandardized partial regression coefficient = -1.116). As far as the survey results for this research is concerned, elementary and secondary education has a more obvious and larger impact as a non-higher education policy area than Medicaid. Additionally, the effect of the political power balance is of interest: if the majority of the upper (lower) house differs from the governor, it puts a downward (upward) pressure on budget. As mentioned earlier, there is a general tendency that budgets shrunk by the executive branch are recovered in the legislature, and it can be conjectured that if the majority is held by the opposition party in the lower house, which has relatively strong authority in passing laws, the executive branch tends to make budget cuts smaller before their proposal reaches the legislature. In states with highly reputed campuses, the executive branch may have a slight incentive to make budget reductions smaller. Southern states show a slight tendency to make budget reductions.

B. Approval Rate of the Legislature for the Executive Branch's Budget Proposal

$$LPB_i = \gamma + \delta_{ABR} ABR_i + \sum_{j=1}^m \delta_j g_{ij} + \varepsilon_i$$

$$(i=1 \dots n, m=6)$$

LPB_i = approval rate of legislature for the executive branch's budget proposal

γ = constant term

ABR_i = approval rate of executive branch for the institutions' budget request in state i

g_{i1} = share of expenditures for elementary and secondary education in total state government expenditures for state i (FY2007)³³

g_{i2} = rate of change in Medicaid expenditure in state i (FY2006)³⁴

g_{i3} = dummy for the difference in political affiliation between the governor and the majority in the lower house for state i (January 2007)

g_{i4} = unemployment rate in state i ³⁵

g_{i5} = price index for state i

g_{i6} = location dummy for state i (Southern states = 1)

ε_i = error term

Regarding the above setup, the variables g_{i1} and g_{i2} reflect the demand for non-higher education policies in a state and are the same as the variables f_{i2} and f_{i3} in examination A. The variable g_{i3} shows the power balance in the state government's budgeting process and is the same as the variable f_{i6} in examination A. For the approval rate of the legislature for the executive branch's budget proposal, the state's unemployment rate (g_{i4}) and inflation (g_{i5}) are included as state economic environment factors since their effects are clearly observed (g_{i6} and f_{i8} in examination A are the same variable). The estimated regression equation is as follows ($n = 34$, F-value = 15.494, adjusted $R^2 = 0.749$).

$$LPB_i = .381 + .617 \cdot ABR_i - .319 \cdot g_{i1} - .219 \cdot g_{i2} + .034 \cdot g_{i3} - 1.597 \cdot g_{i4} + .144 \cdot g_{i5} - .035 \cdot g_{i6}$$

(2.727) (6.401) (-1.859) (-3.089) (2.259) (-2.827) (2.630) (2.362)

If the executive branch submits its budget proposal to the legislature without revisions to the initial budget request from the institutions side ($ABR_i = 1$), the first two terms on the right-hand side of the equation yield $\gamma + \delta_{ABR} = 0.381 + 0.617 = 0.998$, and, according to the mathematical structure, the initial budget request is directly deliberated in the legislature. The non-higher education policy areas—elementary and secondary education and Medicaid—are significant budget-reducing factors, but a state's unemployment rate, an economic environment factor, has a greater influence. Its unstandardized partial regression coefficient implies that a 1% increase in a state's unemployment rate reduces, in the legislature, the executive branch's budget proposal for higher education by approximately 1.6%. It can be interpreted that the legislature is more attentive to the state's economic conditions, the lives of the state residents (voters), and the employment conditions. Also, the legislature seems to respond to changes in the price level more flexibly. As for a state's location and the difference of the ruling party in the lower house from the governor, a similar tendency is observed as in examination A.

6. Overall Summary

Table 16 shows a summary of the facts identified and examined in our study.

Table 16.

Initial Budget Request from Institutions Side	Methods	Comparative Items	Formula Oriented	Baseline Oriented
		States (N=39)	11 (28.2%)	28 (71.8%)
		Influential Factors	Enrolment and Levels of Instruction	Inflation and Staff Salary
		Price Index	Relatively Changeable	Relatively Unchangeable
		Share of HE Exp.	Relatively Large	Relatively Small
		State App.	Relatively Changeable	Relatively Unchangeable
		Regionality	Southern States Prefer	North-eastern States Prefer
	Justifications	Comparative Items	Externally Oriented	Internally Oriented
		States (N=31)	13 (41.9%)	18 (58.1%)
		Justifications	Performance Measures and External Priorities	Student Aid and Internal Priorities
		Share of HE Exp.	Relatively Large	Relatively Small
		Faculty Salary	Relatively Low	Relatively High
Household Burden		No Significant Difference		
Executive Branch and Legislature	Against Initial Budget Request	Comparative Items	Executive Budget Proposal	Legislative Approved Budget
		Influential Factors	Coherent with Baseline-Oriented Budget Request	
		Justification	Coherent with Budget Request from Institutions Side	
		Allocation Methods	Line-items Approach Tends to be Approved More	
	Determinants of Approval Rate	Executive Approval Rate= Initial Request (1.003) + 0.292*Enrolment Change - 1.116*Prim & Second Ed Exp. + 0.168* Medicaid + 0.054*Gov's Cap. Authority - 0.072*U- Hs. Party + 0.115*L-Hs. Party + 0.002*Ranking - 0.051*South	Legislative Approve Rate= 0.381+0.617 · Ex. App. Rate - 0.319* Prim & Second Ed Exp - 0.219*Medicaid + 0.034*L-Hs. Party - 1.597*Unemployment + 0.144*Inflation - 0.035*South	

6. Conclusion (Implications for Japanese Higher Education)

Throughout the five sections, this paper has discussed methods to formulate budget requests and factors in selecting the basis for budget requests used by higher education institutions. This paper has also examined states' characteristics influencing the budget preparation by the state executive branch and the budget approval by the state legislature. As a result, it is reconfirmed that the classical method of requesting budgets based on the previous year's budget amount is continually used by states where changes in various factors are relatively small and stable, and that in those states the basis for increasing or decreasing a requested budget is shared by the governor and legislature and can be easily accepted. Also, if budgets are allocated not through lump-sum distribution but through line-items distribution, budgets tend to be more easily secured. That is, from the standpoint of securing budgets for US public higher education institutions, the evolution of funding mechanisms discussed by Salmi and Hauptman (2006) has a paradoxical aspect that securing budgets becomes difficult and unstable as funding mechanisms evolve. However, it needs to be confirmed whether the funding mechanism adopted is the cause of the instability, whether a funding mechanism evolves as the institutions' self-defense mechanism or as an incentive mechanism provided by the legislature when securing budgets becomes difficult, or whether both factors are entangled.

In addition, one should not forget that such declines in stability are influenced by New Public Management (NPM) introduced in the 1980s, as well as increases in necessary resources for non-higher education policy areas such as elementary and secondary education to which the executive branch attach more weight and external factors like macroeconomic changes (unemployment rate) about which the legislature is concerned. NPM in higher education tends to be introduced by having institutions pursue efficiency with limited resources, promise to achieve a certain level of results, and report their performance, in return for the discretion over funding and administrative issues. In this context, the funding mechanism has come to take the form of competitive funding plus a formula, and the pressure on the executive and legislative branches in making decisions has reduced (Marginson 2009, 43). In other words, there is a confirmed dilemma that institutions' achievements in education and research depend on their entrepreneurial efforts, whereas the executive and legislative branches merely concern possible input reduction in a separate way from the institutions' efforts.

Our macro-perspective survey captured a snapshot of higher education funding at the beginning of 2008 and thus does not provide dynamic analysis. As to an extension of this research, a future research agenda should include an examination of the correlation between states' main policies and economic conditions and between funding mechanisms and the history of, for example, government reforms.

The provision of public funds by Japanese government to national universities also follows the evolutionary process discussed by Salmi and Hauptman (2006), and the abandonment of line-items budgeting and the introduction of lump-sum appropriation (Operating Grants) can be regarded as reducing pressure on budgetary decision-making in the government administration and parliament. The calculation method for Operating Grants, which is intended to fill the shortfall, is not observed in other countries. It is characterized by its double structure that while the total amount of funds is determined actually by the baseline-incremental approach, on the surface the formula approach, which entails large fluctuations in government expenditures, is adopted. Put another way, compared to the situation before the incorporation of national universities, the current mechanism increases the degree of uncertainties for universities due to the formula approach being used on the surface in

addition to external factors affecting the amount of available funds (especially, the government's fiscal reforms in case of Japan), as seen in examples from the US.

The state budget for higher education in the US, however, did not shrink in terms of its total amount as discussed at the beginning of this paper. Instead, the amount of funds per student declined for only a 5-year period. The approach used for Japan's national universities, which "uniformly reduces previously available, path-dependent funds", is not seen at all in the US. Therefore, it can be perceived that the Japanese government has abandoned strategic decision-making regarding the budget for higher education.

In Japan, the second medium-term management period for national universities has just started (April 2010). Regarding the system of appropriating Operating Grants, the government provides a guideline for measures such as institutional reforms and stresses the promotion of mutually beneficial competition by making resource allocation appropriately reflect the assessment of efforts and performances in each national university corporation and by developing a competitive environment, the promotion of diversity and functional division in national universities by supporting reforms at each of them, and the promotion of efficiency in university management while heeding the characteristics and conditions of each university (Ministry of Education, Culture, Sports, Science and Technology 2009). By regaining such strategic directions, the government must rebuild necessary incentive schemes in the system for appropriating Operating Grants and move immediately away from the passive division of functions caused by the size, large or small, of path-dependent funds that emerged during the first medium-term management period. The authors hope that this study's macro-perspective analysis of the state budgeting process for higher education in the US will contribute to enhance higher educational policy in Japan.

Acknowledgment and Notes

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This paper is a result of revising the authors' previous work (Mizuta and Yoshida 2009), with focus on the results of the joint survey with SHEEO and analysis of these results. The opinions expressed in this paper are those of the authors and not those the organizations the authors belong to. The authors are responsible for all errors in this paper.

Appendix A. Survey Sheet Sample

State Budget Processes for Public Higher Education

Background Information

Please read the survey instructions, attached to your email, before completing the survey on line.

Questions 1 - 12 ask you to provide contact and contextual information.

*** 1. Please provide contact information (responses to each box are required):**

Name:

SHEEO Agency or Higher Education System:

Title:

State/Province: ▼

Email Address:

Phone Number:

2. The State budget cycle is:

Annual

Biennial -- annual adjustments are infrequent, minor, or technical

Biennial -- annual adjustments are common and justified by changes in institutional needs, economy, major budget components, etc.

3. Additional clarification about your budget cycle if needed:

4. For each sector, choose the response that BEST describes your system/agency role in the operating request to the state:

	4-year Sector	2-year Sector
No Role -- institutions submit budget requests directly to the state	<input type="checkbox"/>	<input type="checkbox"/>
Advisory -- review the requests	<input type="checkbox"/>	<input type="checkbox"/>
Aggregate Request -- institutions submit formal requests to the agency/system	<input type="checkbox"/>	<input type="checkbox"/>
Aggregate Request -- institutions do not submit formal requests to the agency/system	<input type="checkbox"/>	<input type="checkbox"/>

5. Please provide additional clarification or other variations (e.g. are there additional statewide organizations that have a role in higher education budgeting?):

6. Has your agency/system role in the budget request process recently changed or expected to change?

Yes

No

State Budget Processes for Public Higher Education

7. Those changes or expected changes include:

8. Material differences in the budget process for four-year and two-year institutions include (only answer if applicable to your agency/system):

9. Please respond to all remaining questions as they relate to four-year (or most four-year) institutions.

Identify the locus of authority for the following (if authority is shared, check all that apply):

	Institutions	Systems or State Board	Executive (Governor/State Treasury)	Legislature
Who has legal authority to set tuition levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who has legal authority to set fee levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who sets spending authority for tuition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who retains unspent tuition revenue at the end of the year?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who retains unspent fee revenue at the end of the year?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who retains unspent state appropriation at the end of the year?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. Relevant, changes, qualifications, limitations, or informal influences that affect the exercise authority from above include:

11. The general approach to your operating budget request is best characterized as:

Funding formula (used to calculate needs, justify changes, etc.)
 Base plus/minus (adjustments to current spending/appropriations based on cost, salary increases, enrollment changes, etc.)
 Mixed, but mostly funding formula
 Mixed, but primarily base plus/minus

12. Recent changes to this approach or additional clarification:

State Budget Processes for Public Higher Education

Part I: Developing the Higher Education Operating Request

Questions 13 to 16 focus on how the higher education operating budget request is developed prior to an executive budget or legislative enacted appropriation.

Consider the last, completed budget cycle in answering the following questions.

13. For each approach (column) that applies to the development of your operating request identify the importance of the factor (select low, medium, high or blank for not applicable)

If you use both columns the implication is a mixed approach.

	Importance in Funding Formula	Importance in Base Plus/Minus
Funding for Enrollment (e.g. credit hours, FTE)	<input type="text"/>	<input type="text"/>
Funding for different levels of instruction (e.g. lower division, upper division, GI, GII)	<input type="text"/>	<input type="text"/>
Inflationary cost increases (e.g. cost of living, utilities)	<input type="text"/>	<input type="text"/>
General salary increases	<input type="text"/>	<input type="text"/>
Statewide collective bargaining agreement	<input type="text"/>	<input type="text"/>
Operations and Maintenance for new buildings	<input type="text"/>	<input type="text"/>
Strategies to improve productivity	<input type="text"/>	<input type="text"/>
Special/new proposals for program enhancement or quality improvement (e.g. salary competitiveness, technology, program expansion, research, public service)	<input type="text"/>	<input type="text"/>

14. Additional important features, not captured in the previous question, that characterize the development of an operating request in your system/state:

State Budget Processes for Public Higher Education

15. Identify the IMPORTANCE of the following in justifying or strategically advancing the higher education operating request (one answer per row):

	No Role/Not Applicable	Low	Medium	High
Performance measures or metrics (e.g. system/institution goals, past performance)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Benchmarking to peer institutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"Internal" higher education priorities (e.g. salary competitiveness)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"External" state priorities (e.g. economic development, high-need employment areas)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developing non-tax revenue sources of funding to support higher education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintain tuition levels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing tuition Levels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing merit-based financial aid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing need-based financial aid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

16. Recent changes or additional clarification:

State Budget Processes for Public Higher Education

Part II: Negotiating a Higher Education Appropriation

Questions 17 to 24 focus on the impact and importance of the political context and processes during the last completed budget cycle.

17. The dollar amounts in the next three items are intended to gauge the differences among the relative positions of higher education, governor and legislature. Please estimate if necessary and round to the nearest millions (these are text boxes).

The operating request for higher education was approximately (in millions):

The executive request for higher education operations was approximately (in millions):

The enacted appropriation for higher education operations was approximately (in millions):

18. Is this a typical or expected pattern? How has it varied or changed -- either historically or in the current budget cycle?

19. Compare, for each factor, the higher education budget request to the proposed funding levels in the executive request and legislative appropriation using the budget development factors (lower, same, higher or blank for not applicable).

For example: If the executive request did not fund projected enrollment increases and the legislative appropriations enrollment funding was higher you'd select "lower" in the first column and "higher" in the second column.

	Compared to the higher education operating request, the EXECUTIVE budget was...	Compared to the higher education operating request, the LEGISLATIVE appropriation was...
Funding for Enrollment (e.g. credit hours, FTE)	<input style="width: 50px;" type="text"/>	<input style="width: 50px;" type="text"/>
Funding for different levels of instruction (e.g. lower division, upper division, GI, GII)	<input style="width: 50px;" type="text"/>	<input style="width: 50px;" type="text"/>
Inflationary cost increases (e.g. cost of living, utilities)	<input style="width: 50px;" type="text"/>	<input style="width: 50px;" type="text"/>
General salary increases	<input style="width: 50px;" type="text"/>	<input style="width: 50px;" type="text"/>
Statewide collective bargaining agreement	<input style="width: 50px;" type="text"/>	<input style="width: 50px;" type="text"/>
Operations and Maintenance for new buildings	<input style="width: 50px;" type="text"/>	<input style="width: 50px;" type="text"/>
Strategies to improve productivity	<input style="width: 50px;" type="text"/>	<input style="width: 50px;" type="text"/>
Special/new proposals for program enhancement or quality improvement (e.g. salary competitiveness, technology, program expansion, research, public service)	<input style="width: 50px;" type="text"/>	<input style="width: 50px;" type="text"/>
Other (please specify)	<div style="border: 1px solid #ccc; height: 40px; width: 100%;"></div>	

State Budget Processes for Public Higher Education

20. The Governor and Legislature used the following in presenting or justifying state funding for higher education (yes, no, or blank for not applicable):

	Executive Budget	Legislative Appropriation
Performance measures or metrics (e.g. system/institution goals, past performance)	[]	[]
Benchmarking to peer institutions	[]	[]
"Internal" higher education priorities (e.g. salary competitiveness)	[]	[]
"External" state priorities (e.g. economic development, high-need employment areas)	[]	[]
Developing non-tax revenue sources of funding to support higher education	[]	[]
Maintain tuition levels	[]	[]
Increase tuition levels	[]	[]
Increase merit-based financial aid	[]	[]
Increase need-based financial aid	[]	[]

Other justifications or strategies used by the Governor or Legislature:

21. What legislative entities does your agency/system interact with during the budget process? (select all that apply)

- Separate senate / house appropriations committees
- Joint legislative budget or appropriation committee
- Separate education/program committee(s)
- Other (please identify):

Please provide additional comments about "other" legislative entities as well as any interesting aspects of your interaction with these committees:

22. Other key features (e.g. key areas of conflict, important steps or processes, key players) of the legislative process:

State Budget Processes for Public Higher Education

23. What actions did the Governor take during the last budget cycle with respect to the enacted legislative appropriation? (select all that apply)

- Signed or sustained without changes
- Vetoed line items
- Reduced line items
- Suspended spending authority
- Other, please describe:

Please provide additional comments about "other" actions taken by the Governor:

24. Other important considerations to the process of finalizing an operating appropriation:

State Budget Processes for Public Higher Education

Part III: Allocating Operating Resources to Four-Year Institutions

Questions 25 to 31 ask you to answer questions, where relevant to your situation, with respect to the process of distributing those resources to four-year institutions.

25. Operating appropriations are designated to:

	Yes	No
Individual institutions	<input type="radio"/>	<input type="radio"/>
Multiple governing systems for distribution to institutions	<input type="radio"/>	<input type="radio"/>
Unified/Comprehensive state level agency	<input type="radio"/>	<input type="radio"/>
Other (please specify) or provide additional clarification:	<div style="border: 1px solid #ccc; height: 40px; width: 100%;"></div>	

26. Operating appropriations are designated as (estimate):

	Not applicable	25% or less	Between 25 and 50%	More than 50%
Lump sum distributions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Line item distributions (e.g. object of expenditure, organizational unit)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Special legislative line items	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) or provide additional clarification:	<div style="border: 1px solid #ccc; height: 40px; width: 100%;"></div>			

27. If your agency/system distributes operating appropriations to institutions, identify the importance of the following factors in that distribution:

	No Role/Not Applicable	Low	Medium	High
Funding for Enrollment (e.g. credit hours, FTE)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Funding for different levels of instruction (e.g. lower division, upper division, GI, GII)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inflationary cost increases (e.g. cost of living, utilities)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
General salary increases	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Statewide collective bargaining agreement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operations and Maintenance for new buildings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strategies to improve productivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Special/new proposals for program enhancement or quality improvement (e.g. salary competitiveness, technology, program expansion, research, public service)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<div style="border: 1px solid #ccc; height: 40px; width: 100%;"></div>			

State Budget Processes for Public Higher Education

28. If your agency/system distributes operating appropriations to institutions, identify the importance of the following strategies or justifications in the distribution of operating appropriations to institutions:

	No Role/Not Applicable	Low	Medium	High
Performance measures or metrics (e.g. system/institution goals, past performance)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Benchmarking to peer institutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"Internal" higher education priorities (e.g. salary competitiveness)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"External" state priorities (e.g. economic development, high-need employment areas)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developing non-tax revenue sources of funding to support higher education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintain tuition levels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase tuition levels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase merit-based financial aid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase need-based financial aid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) or provide additional clarification	<div style="border: 1px solid #ccc; padding: 2px;"> ▲ </div> <div style="border: 1px solid #ccc; padding: 2px;"> ▼ </div>			

29. What mechanisms, at what point in a fiscal year, are used to assess institutional patterns of spending relative to budget priorities?

30. Final comments regarding the budget process:

State Budget Processes for Public Higher Education

31. Reference List -- please provide a list of references to more detailed documents about the budgeting practices and processes in your state/system -- include web links and send electronic or hard copy documents not available on the web to: budgetsurvey@sheeo.org or to SHEEO, c/o Kelli Parmley, 3035 Center Green Drive, Boulder, CO, 80301.

#1	
#2	
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Endnotes

¹ In this paper, for instance, FY2007 means 2007-08 or the term started from September 1, 2007 and ended on August 31, 2008.

² Discussing annual data covering a period up to FY2004, Heller (2006, 219) points out that "since FY1987, in every year with the exception of three, states have increased their overall spending more than they have increased their higher education spending, or have cut overall spending less than they cut higher education spending."

³ The data on state appropriations for higher education, the number of students (FTE) at the public colleges and universities, and state appropriations per FTE are obtained from a database provided by SHEEO (<http://www.sheeo.org/finance/shef/2008%20tables/SHEF%20Data%201997-2007%20by%20state%20constant%20dollars.xls>). Also, the data on total state expenditures (percentage changes from the previous fiscal year) came from the tables provided by the NASBO (1999, 7), NASBO (2000, 7), NASBO (2001, 7), NASBO (2002b, 7), NASBO (2003, 7), NASBO (2004, 7), NASBO (2005, 7), NASBO (2006, 7), NASBO (2007, 7), and NASBO (2008b, 7).

⁴ The Illinois Board of Higher Education calculated unit costs for different majors at public colleges and universities in cooperation with audit firms since 1965 (Illinois Board of Higher Education, 1995). Well-known nationwide cost surveys include the Delaware Study by the National Center for Education Statistics (NCES) on the cost and productivity of four-year colleges and universities and the Kansas Study by the National Higher Education Benchmarking Institute on the cost and productivity of community colleges.

⁵ Regarding approaches to the allocation of the U.S. state governments' higher education budget, Jones (1984, 41-62) discusses a multipurpose budget component and single-purpose components, considers an incremental approach and formula approach as applicable to the former and an incremental approach, categorical/competitive approach, and formula approach to the latter, and compares their advantages and disadvantages. Layzell (2007) uses five approaches (incremental, formula, performance funding, performance contracting, and voucher), which are almost the same as those discussed in Table 1 that is based on the studies by McKeown-Moak (2006) and MGT of America (2001), and summarizes their pros and cons in terms of 14 attributes (fairness, appropriateness, focus on objectives, sensitivity to missions, response to scale, use of effective and reliable data, response to changes, adaptability to economic conditions, stability, understandability, adaptability to special situations, flexibility, incentives, and balance in budget). Salmi and Hauptman (2006) provide a comparative evaluation of such allocation mechanisms, using international examples.

⁶ This is based on the definition of functional categories by the National Association of College and University Business Officers (NACUBO).

⁷ NSF stands for "net square feet"; GSF, for "gross square feet".

⁸ NASBO (2008b, 24)

⁹ There are cases, however, in which, like in Pennsylvania, need-based assistance is separated from budget for higher education institutions.

¹⁰ The evolutionary process considered is one in which negotiation-based budgeting evolves into budgeting based on a funding formula and into performance-based budgeting.

¹¹ The graph in Figure 8 has the maximum and minimum values of 1.1 and 0.9, respectively, for the ease of viewing. The state abbreviations are as follows: AK (Alaska), AL (Alabama), AR (Arkansas), AZ (Arizona), CO (Colorado), CT (Connecticut), DE (Delaware), FL (Florida), ID (Idaho), IL (Illinois), KS (Kansas), KY (Kentucky), LA (Louisiana), MD (Maryland), ME (Maine), MN (Minnesota), MO (Missouri), MS (Mississippi), NC (North Carolina), ND (North Dakota), NE (Nebraska), NH (New Hampshire), NJ (New Jersey), NM (New Mexico), NV (Nevada), NY (New York), OH (Ohio), OK (Oklahoma), OR (Oregon), PA (Pennsylvania), SD (South Dakota), TN (Tennessee), TX (Texas), UT (Utah), VA (Virginia), WA (Washington), WI (Wisconsin), WV (West Virginia), and WY (Wyoming).

¹² The twelve states that consistently attach weight to performance measures, from initial budget request through legislative budget approval, are Arizona, Kentucky, Maryland, Minnesota, Ohio, Oregon, South Dakota, Texas, Utah, Virginia, Wisconsin, and Wyoming.

¹³ In addition, this survey actually asked about main factors and justifications used in allocating budget to institutions, providing the same choices as those for formulating budget request. However, since the response rate was low, the results for these questions were not analyzed.

¹⁴ For the use level of line-items distribution, the relevant category data, which indicate ranges of values, are not directly used. Instead, the middle point of each range is used as a representative value for the range, i.e., 50-100% = 0.75, 25-50% = 0.375, and 0-25% = 0.125.

¹⁵ The coefficient of variation was calculated using data on “non-medical FTE” for FY1997-2007 in a database provided by SHEEO (<http://www.sheeo.org/finance/shef/2008%20tables/SHEF%20Data%201997-2007%20by%20state%20constant%20dollars.xls>).

¹⁶ The inverse of the FY1997 combined price adjustment factor (base year = FY2007) found in a database provided by SHEEO was used (<http://www.sheeo.org/finance/shef/2008%20tables/SHEF%20Data%201997-2007%20by%20state%20constant%20dollars.xls>). The combined price adjustment factor is calculated for each state, taking into account three elements: (1) “higher education cost adjustment (HECA; white-collar employment cost index (75%) + GDP deflator (25%); common to all states), (2) “enrollment mix index (EMI; index incorporating varying costs per student across different institution types), and (3) “cost of living adjustment (COLA; cost-of-living index centering on housing costs for different states).

¹⁷ The coefficient of variation was calculated using data on “educational appropriations per [non-medical] FTE” for FY2003-07 (real value obtained using the combined price adjustment factor (base year = FY2007)) in a database provided by SHEEO (<http://www.sheeo.org/finance/shef/2008%20tables/SHEF%20Data%201997-2007%20by%20state%20constant%20dollars.xls>).

¹⁸ The correlation between the methods used in formulating budget request and cost sharing indicator (proportion of net tuition burden on students and households = 1 - proportion of state appropriations), but the result did not show statistically significant differences ($p = 0.206$, $\eta^2 = 0.43$).

¹⁹ The basis for requesting public funds include benchmarking. It refers to benchmarking against other institutions, but not comparisons among states.

²⁰ The points for the importance levels, which are used to construct Figure 7 in Section 4.1 (1) (“high” = 3 points, “medium” = 2 points, “low” = 1 point, non-response = 0 point) are again used.

²¹ Based on the result of the correlation analysis, six justifications for requesting public funds are examined: (1) performance measures, (2) external priorities, (3) tuition increases, (4) need-based assistance for students, (5) benchmarking, and (6) merit-based assistance for students. (The second and third are correlated with the first at the 1% significance level; the fifth and sixth, with the third at the 1% significance level.) In order to separate the clusters clearly the weights for the importance levels are modified so that “high” = 5 points, “medium” = 3 points, “low” = 1 point, and no response = 0 point. The Euclidean distance is used as the distance measure, and Ward's method is used for clustering. For the state abbreviations used in Figure 13, see endnote 11.

²² The net-tuition rate was calculated using data on “net-tuition and educational appropriations per [non-medical] FTE” for FY2007 in a database provided by SHEEO

(<http://www.sheeo.org/finance/shef/2008%20tables/SHEF%20Data%201997-2007%20by%20state%20constant%20dollars.xls>).

²³ In this analysis, a significant correlation cannot be observed even if the states' stances in requesting budgets are grouped into two (A combined with B and C with D); the stances are decomposed into the nine justifications; the cost-sharing situation is decomposed into net-tuition burden; state appropriations, and assistance for students; the values of these three variables are converted to reflect their position relative to the relevant US averages (i.e., deviation = 50 + 10 * (state value - US average)/standard deviation).

²⁴ The eight states in Group E (other states) were eliminated for the analysis.

²⁵ NEA (2008, 21)

²⁶ States with extremely low approval rates against initial budget requests (North Carolina, Pennsylvania, South Dakota, and Virginia) are excluded from the analysis. The analysis considers 34 states as Nebraska did not provide a response. In passing, Nebraska is the only state with a unicameral legislature.

²⁷ SHEEO (2008a, 25)

²⁸ NASBO (2008b, 17)

²⁹ NASBO (2008b, 49)

³⁰ NASBO (2008a, 30)

³¹ Political party maps are obtained from the following websites. (The information on political parties relevant to the most recent budget deliberations as of January through March 2008, which is the period considered by the survey respondents, is used.)

Political affiliation of the governors (as of April 2008):

http://upload.wikimedia.org/wikipedia/commons/archive/0/0c/20080722023925%21United_States_Governors_map.svg

Majority party in the state upper house (as of January 2007)

http://upload.wikimedia.org/wikipedia/en/archive/f/f3/20071108045239%21States_upper_house_political_majority.png

Majority party in the state lower house (as of January 2007)

http://upload.wikimedia.org/wikipedia/en/archive/c/c4/20080701211141%21States_lower_house_political_majority.png

³² The score for a given state is the score for the campus that is ranked highest among the state campuses labeled as “national universities” in the following website. (The score for a state with none of its university campuses being in the ranking is set to zero.)

<http://colleges.usnews.rankingsandreviews.com/college/national-top-public>

³³ NASBO (2008b, 17)

³⁴ NASBO (2008b, 49)

³⁵ The 2005-07 mean of the unemployment index U-6 published by the US Department of Labor, Bureau of Labor Statistics for each state is used.

U-6 = total unemployed (those who are not employed, but want to work and are searching for a job) + all marginally attached workers (those who are not employed and are not searching for a job, but want a job, are readily available for work, and were searching for a job in the past) + total employed part time for economic reasons (those who want a full-time job and are readily available for work, but have no choice except for working part-time due to slowed economy).

This explanation of U-6 is based on information available from the following website.

http://www.works-i.com/flow/lm/university/university17_1.html