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STATES' INVESTMENT IN HUMAN CAPITAL: HIGHER EDUCATION
FUNDING EFFORT

States' Investment in Human Capital: Higher Education Funding Effort
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Dissertation

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Abstract

Diminishing state support for higher education threatens human capital development. This quantitative study undertook to determine the state factors that influence higher education funding and to what degree they do so, what level of funding is required to satisfy higher education expenditure need, and what can help to ensure that those funding needs are met. The focus of the study was the 15 WICHE states, with special attention to the situation in Montana. The states in the study varied dramatically in their fiscal capacity to generate the revenue needed to support public services, a capacity influenced by state resource endowment, tax structure, and the ability and will of public officials to expand that capacity.

Utilizing data from 2001 to 2009, the fixed effects method was employed for panel analysis of socioeconomic, higher education and budgetary factors of WICHE states and their level of influence on funding for higher education. Effective tax rate and per capita personal income were found to have a strong positive influence on the level of state higher education support, while tuition was determined to exert a strong negative influence.

Descriptive statistics was employed to estimate expenditure need for higher education support and the extent to which states satisfied that need. Three nonconsecutive years were analyzed: 2002, 2006, and 2010, with 2010 showing a marked decline in satisfaction of expenditure need in the WICHE region when only five of 15 states exceeded the 100% benchmark and Montana satisfied only 64% of its higher education expenditure need, ranking 13th among WICHE states and 46th in the nation.

Both panel and descriptive analyses supported the conclusion that increasing state tax revenue would not necessary bring relief to higher education as state budgetary priorities may lie elsewhere. The panel analysis led to the conclusion that to compare and evaluate state resources and spending priorities among states other methods may prove more appropriate. The representative revenue and expenditure systems are recommended as alternatives.

Finally, human capital theory was proposed as a way to unite decision makers in their pursuit of sustainable state development through investment in higher education.

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Chapter One

Introduction to the Study

The cost of college in real dollars has been steadily rising for decades while the state government contribution to higher education has been steadily declining (SHEEO, 2010). Scholars have debated for years whether higher education primarily serves students or society at large and who, accordingly, should bear the major share of the costs. The recent economic downturn has expanded and intensified this debate (Smith, 2011, May 1), with some advocating that students be required to shoulder a larger portion of their educational costs (Leef, 2008; Rogge, 1979) while others argue that higher education is already unjustifiably overpriced and unaffordable for individuals (Perna & Li, 2006). Amid increased demands by politicians for higher education fiscal accountability, state governments are scrambling to balance their budgets, often by cutting appropriations for higher education (Orkodashvili, 2008). As a result, institutions are, perforce, increasing tuition in order to maintain their budgets (Bell, Carnahan, & L'Orange, 2011; Boatman & L'Orange, 2006; Rasmussen, 2003).

In the latest effort to slow the rising costs of higher education, the Obama administration has outlined plans to reward colleges and states that contain tuition growth while maintaining their higher education budgets (The Whitehouse, 2012). However, as King Alexander (2003) pointed out, states differ in their fiscal capacity and effort to invest in higher education. While this disparity among states may be obscured during times of economic prosperity, it dramatically manifests itself during economic downturns, when tax collections are generally lower. Montana, late to suffer the effects of the recession of 2007, saw its tax collections drop ten percent below the previous year in 2010 and neighboring Wyoming suffered a 23.4 percent decline while other

member states of the Western Interstate Commission for Higher Education (WICHE) experienced tax revenue growth (U.S. Census Bureau, 2010c). North Dakota collected 9.6 percent more tax revenue, followed by South Dakota's 4.8 percent, Nevada's 4 percent, and California's increase of just under 4 percent (U.S. Census Bureau, 2010c). But while some states can grow their tax capacity during economic downturns, their effort to finance higher education—measured as state funding per \$1,000 of personal income—has been declining for more than thirty years (Archibald & Feldman, 2006). In fact, aggregate state effort has fallen by 30 percent since the late 1970s (Archibald & Feldman, 2006). During economic slowdowns, higher education faces fierce competition with other state-funded programs for dwindling resources (Hossler, Lund & Ramin, 1997; Layzell & Lyddon, 1990; Okunade, 2004; Rizzo, 2006; The Lewin Group & The Nelson A. Rockefeller Institute of Government, 2004). Medicaid, for example, continues to rise as a percentage of total state expenditure and appears to represent the most persistent competition to education for state funding both during favorable economic conditions as well as economic slowdown (NASBO, 2010).

This panel and descriptive analysis quantitative study explored the differences in higher education funding among all 50 states, concentrating on Montana and its WICHE partners. It demonstrated that for any funding policy agenda to bear positive results, the unique socioeconomic and budgetary characteristics of states must be considered as the public financial burden varies significantly from state to state.

Focus of the Study

Shortly after his election, President Obama announced a goal for the country in 2009: increase the proportion of college graduates in the U.S. by 2020 and restore American leadership in higher education (The Whitehouse, 2009). However, without policy adjustments and increased

financial resources at the state level as well as the federal, his goal will remain an unattainable ambition (Taylor et al., 2011). Daunting issues face current higher education policy including declining governmental financial support for higher education, declining affordability, and a widening participation gap between low and high and middle socioeconomic status populations (Paulsen & St. John, 2002; Ruppert, 2003). Even more important is the erosion of public trust in and support for higher education. Questions are being raised over whether higher education is a valuable investment, with some criticizing it as an overpriced commodity in an economy where fully one third of college graduates hold jobs that do not require a college education (Smith, 2011, May 1). Smith (2011, May 1) declared that “the notion that a college degree is essentially worthless has become one of the year’s most fashionable ideas (p. 1),” putting the onus of proof for the value of an ever-growing investment in higher education squarely on the shoulders of the individuals and states that invest in it.

During periods of rapid growth, social and economic problems appear less pressing as more accessible funding masks the necessity for full-blown reform (Callan, 2002; Hauptman, 2001). During periods of reduced economic activity and an approaching election cycle, the same problems assume a prominent position in the political agenda as politicians seek to economize or lay blame (Gross, 2012). Because higher education draws on sources of revenue such as tuition in addition to state appropriations, it is easily targeted in belt-tightening measures and its institutions are often forced to justify increased expenditure of taxpayer dollars despite increases in college and university enrollment that routinely occur during economic slowdowns (Fry et al., 2010; SHEEO, 2010). In particular, people tend to go to less expensive local colleges and universities as it becomes harder for them to pay out-of-state tuition or tuition at private institutions (Fry et al., 2010). By absorbing many working-class students and the unemployed

seeking to improve job skills, such publicly funded colleges and universities contribute to social stability as well as grow human capital as people retrain to reenter the workforce and, in so doing, contribute to the economic recovery—something that would not be possible without government support for higher education both at the institutional level as well as the giving of grants, scholarships, work-study opportunities and low-interest government-backed loans to individuals.

In 2008, the average income of Americans with a four-year degree is \$43,000 per year compared to \$27,000 for those with a high school diploma (U.S. Bureau of Economic Analysis, 2010). Montana had a per capita personal income (PCPI) of \$34,622 in 2008, ranking it 39th in the nation. Seventeen percent of the state's children live in poverty, thus reducing the pool of likely state college enrollees (U.S. Bureau of Economic Analysis, 2010). This fact cannot be ignored when the state of Montana's higher education contributions are analyzed, as the state's capacity to collect taxes is limited by the wealth of its citizens and businesses, especially in today's trying times. The reduced tax capacity of the state also affects the affordability of in-state higher education by reducing the revenue pool from which appropriations are drawn.

The current recession has had a greater negative impact on people who did not have postsecondary education than on those with a postsecondary education. In 2010, the unemployment rate in the U.S. for individuals with a bachelor's degree was 5.4 percent, while it was 10.3 percent for those with a high school diploma and 14.9 percent for those without one (U.S. Department of Labor, 2011). Moreover, according to the Georgetown University Center on Education and the Workforce 2010 study, by 2018 some 62 percent of jobs in the state of Montana will require postsecondary education (Carnevale, Smith & Strohl, 2010). The U.S. labor market shows that real wages paid to highly skilled and educated workers have been increasing even as those paid to low skilled and less educated workers have been steadily

declining, thereby increasing the socioeconomic gap in society (Ackoff, 1994).

This chronic disparity in income owes much to the gap in educational attainment and is likely to increase if states do not provide adequate support to higher education. What economic stratification data obscure, however, is a more important gap—a social gap. The argument that a college education is unnecessary if one's job does not require a college degree reduces the significance of higher education to its economic benefits while ignoring the intellectual growth that it promotes and the social benefits stemming from such growth. The economic stratification of American society will continue to grow unless the issue of underinvestment, due to ongoing cuts in human capital through higher education is addressed at the state level (The National Center for Public Policy and Higher Education, 2002).

Problem Statement

While the cost of higher education is steadily rising (SHEEO, 2010), the state of Montana higher education appropriations per student have been steadily declining for most of the last 25 years (The National Center for Public Policy and Higher Education, 2008). According to the results of *Measuring Up 2008*, a study conducted by The National Center for Public Policy and Higher Education, Montana received an *F* for affordability as higher education has become less and less affordable for students and their families in the state. In Montana, “poor and working-class families must devote 47% of their income, even after aid, to pay for costs at public four-year colleges. Financial aid to low-income students is low” (The National Center for Public Policy and Higher Education, 2008, p. 3).

In Montana, as in other states where the cost of higher education is rising, this decreasing affordability not only means reduced opportunity for the state's students; it impacts the socioeconomic prosperity of the state for years to come (Baum & Payea, 2010). Already

Montana is 37th on the New Economy Index, behind eleven of its WICHE partner states: Washington, California, Colorado, Utah, Oregon, Arizona, Idaho, Nevada, Alaska, New Mexico, and North Dakota (Atkinson & Andes, 2010). Although higher education is a state's investment in its own economic prosperity and social equality, Montana appears to be failing to make that investment.

National trends in public funding for higher education, while providing important information on the overall state of higher education in the country, are limited in their usefulness as they fail to reflect the uniqueness of regions or individual states. The majority of higher education funding decisions occur at the state level. As states differ considerably in their fiscal capacity, effort, and achievement in support of higher education, it is important to concentrate on a specific state and the region, of which it is a part, to better understand higher education funding dynamics. These funding dynamics relate to state competitiveness within that region, not only in attracting students, but also in improving socioeconomic development.

In addition to the considerable differences in fiscal capacity, effort, and achievement among the states in support of higher education there are also varying degrees of public support and distinctive budget preferences. Variations in higher education appropriations are illustrative examples of such differences. In the five years from 2005 to 2010, the change in educational appropriations per FTE student varied throughout the United States from -27 percent to +27 percent (SHEEO, 2010). Doyle (2007) points out that "first [state policymakers] need to know how their state compares with others" (p.101). "Provided certain precautions are observed, interstate comparisons may be used to aid in identifying existing deficiencies and determining realistic goals" (Halstead, 1974, p. 45).

There are three major financial differences among the states: differences in tax systems,

differences in spending needs, and differences in economic growth (Hovey, 1999). Historically, state tax burdens have fallen throughout the United States over the past 30 years by 0.6 percent (Robyn & Prante, 2011). The impact of higher education funding policies must be considered in the context of state economic conditions including the socio-economic status of each state's citizens. It is important to understand the disparities in state tax effort and spending for higher education and their impact on college affordability. "Using tax effort to adjust for states' wealth is particularly relevant when comparing how governments invest in human capital through education" (Alexander, 2003, p. 14).

State financial support is a powerful tool. Higher education appropriations contribute to an institution's ability to provide quality education by attracting the best faculty, ensuring that equipment is up to date, facilities are conducive to learning, classrooms are not overcrowded, and selection of subjects is on par with the needs of the community served. The role of the state in financing higher education requires examination if a successful plan is to be formulated to deal with shrinking state higher education appropriations and the concomitant increasing portion of institutional budgets that must be met by increases in tuition and fees.

Shifting the cost of higher education to students disenfranchises lower income students. Shifting the financial burden in this way has been shown to have a negative impact on social mobility (Paulsen & St. John, 2002; Ruppert, 2003). Where parental education is limited or students come from broken homes the unit costs of education are significantly higher, but the value added by education is also proportionately higher (Carneiro & Heckman, 2003; Heckman & Krueger 2004; McMahon, 2006). However, the same lower income populations can be affected more severely if the higher education appropriations level is raised at the expense of state programs designed to help those in need. That is to say shifting resources in a zero-sum

situation from state welfare programs for the underprivileged into higher education can result in a worsened state of affairs for low socioeconomic status families and students. As investment in higher education is but one item on a state's expenditure list, it cannot be considered as a stand-alone item.

State budgetary trends signal both state and country priorities. In 1990, Medicaid surpassed higher education as the second largest state program, and in 2003 it became the largest, displacing elementary and secondary education throughout the nation (Kane, Orszag, & Gunter, 2003). The rising cost of health care and increasing poverty levels are contributing factors to this trend. While education is still perceived to be the way out of poverty (Bowen, 1997), increasing poverty is threatening educational opportunity for many. Martinez (2004) pointed out that variations in racial, ethnic, economic, geographic, and historical state characteristics are not easily controlled by state policy, neither is state fiscal capacity. However, state fiscal effort is somewhat different, as it depends on the state population's willingness to support various state programs through tax contributions.

State colleges and universities perpetually face the need to secure government financing to preserve academic quality and extend educational opportunity. While Obama (The White House, 2012) has pledged more federal support to be equitably distributed, state contributions to higher education should be reevaluated in terms of state budgetary priorities.

Purpose of the study

Public funding of higher education is a political budgetary process. As such, it requires investigation within various frameworks in order to more fully understand the factors that influence decisions to allocate resources. Understanding the state factors affecting appropriations makes it possible to determine the areas that can be influenced to improve funding of higher

education in a state. The purpose of this quantitative study, therefore, was: first, to examine the various factors affecting higher education funding policy; second, to evaluate the fiscal capacity of states to support higher education, the need for this support, and the actual effort to support higher education that states were able to attain; and finally, to employ the human capital theoretical lens in order to both focus the attention of policymakers on their states' higher education funding effort and as means of reaching the consensus between politicians and educators that is necessary to justify sustained public support for higher education.

The study concentrated on WICHE states and more specifically on the state of Montana, for the following reasons. One of WICHE's goals is to provide extended access to students from member states to programs unavailable in their home states without incurring the expense of establishing such programs in each state when demand is not sufficient to justify the costs. As WICHE sets benchmarks for various public policy agendas including access to higher education, participation, and affordability, treating its member states as one big family, it is natural to treat it as a unit of this research, especially considering that Montana was one of the first states to recognize the benefits of regional cooperation by joining WICHE in 1952. But dealing with a population can obfuscate the issues faced by individual states. This research concentrates on Montana, the home state of the researcher, to elucidate some of those issues.

Research Questions

This research examined the influence of state socioeconomic, state higher education and financial characteristics on the level of higher education appropriations among WICHE states. This study also examined data related to the need for public funding of higher education for all 50 U.S. states, further concentrating on WICHE states in general and Montana in particular. The following research questions guided the study:

1. What is the influence of a state's socioeconomic climate and competing priorities within the state on its support for higher education?
2. What is the relationship between a state's higher education characteristics and its contributions to higher education?
3. What is the relationship between a state's fiscal capacity and effort and its contributions to higher education?
4. What is the relationship between state higher education expenditure need and state higher education appropriations?
5. Where is Montana relative to other WICHE states in terms of higher education support?

Definitions of Terms

While some terms utilized in this research might appear self-explanatory, in fact, various authors have attached different meanings to the same terms. In order to avoid confusion, some terms are presented below with further explanations of the terms utilized in the analysis presented in Appendices A and B.

Actual tax revenue (ATR). General revenue derived from taxation by state and local governments (U.S. Census Bureau, 2010c).

Appropriations. State funds devoted to a specific use, here, higher education operational expenses. These funds are for meeting current operating expenses and not for specific projects or programs. The most common example is a state's general appropriation (NCES, 2011). States report their appropriations for higher education both in whole dollars and the percentage of the state budget.

Budgetary tradeoff. This occurs when aggregate expenditures in one budget category negatively affect aggregate expenditures in another budget category (Nicholson-Crotty, Theobald, and Wood, 2006).

Capacity. Capacity is an inherent economic characteristic of a state government, determined by its economic resources and economic activities, and represents options for states to raise revenue (Mikesell, 2007).

Consumer price index (CPI). CPI is a measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services (U. S. Department of Labor: Bureau of Labor Statistics, 2012).

Effective tax rate (ETR). Actual Tax Revenue per capita divided by Total Taxable Resources per capita, expressed as a percentage. It is indexed to national average by dividing the state's effective tax rate by the national average effective tax rate (SHEEO, 2010).

Expenditure need. The amount that a state would have to spend on its residents to provide services on par with the national average is its expenditure need. It is calculated across seven spending categories: K–12 education, higher education, public welfare, health and hospitals, highways, police and corrections, and “other” expenditures covering environment and housing, interest on general debt, governmental administration, and all other direct general expenditures (Hoo et al., 2002).

Expenditure need for higher education. This is a measure of how much a state must spend per capita on its residents to provide the basic higher education services typically offered by states across the country. “A state’s expenditure need gauges the extent to which its state and local governments face conditions that raise or lower the cost of and need for public services” (Hoo et al., 2002, p. v).

Externalities. Externalities occur when the production or consumption of a good affects people other than the decision-makers. In the case of schooling, the common view is that it produces positive external effects, namely, the benefits of education to others in the society and future generations (McMahon, 2009, p. 52).

Full-time-equivalent (FTE) enrollment. For institutions of higher education, the enrollment of full-time students, plus the full-time equivalent of part-time students as reported by institutions, equals the FTE. In the absence of an equivalent reported by an institution, the FTE enrollment is estimated by adding one-third of part-time enrollment to full-time enrollment (NCES, 2012).

Higher education cost adjustment (HECA). HACA index is a tool used to assess inflation in higher education and adjust for it over time.

Higher education population or state higher education workload is the same as FTE enrolments.

Human capital. The sum total of the knowledge, skills, and attributes acquired by investment in education and health throughout the lifecycle is human capital (McMahon, 2009).

National total direct expenditures (NTDExp) includes state and local government expenditures for education services, social services and income maintenance, transportation, public safety, environment and housing, governmental administration, interest on general debt, and other general expenditures (National Center for Education Statistics, 2012).

Net Tuition Revenue, or Tuition and Fees (Tuition). It is the gross amount of tuition and fees, less state and institutional financial aid, tuition waivers or discounts, and medical student tuition and fees. This is a measure of the resources received from students and their families

through tuition and fees and available to support instruction and related operations at public higher education institutions (SHEEO, 2010).

Nominal dollars or current dollars. Monetary value of goods and services in a given year is expressed in nominal or current dollars.

Per capita personal income (PCPI). PCPI represents the total personal income of the state's residents (e.g., wages and salaries, interest income, social security benefits, cash assistance and pensions, but not food stamps, housing vouchers divided by the state's total population (The Lewin Group & The Nelson A. Rockefeller Institute of Government, 2004).

Real or constant dollars. Nominal monetary value of goods and services in a given year adjusted to remove effects of general price level changes over the years due to inflationary processes expressed in real dollars for the purposes of comparison. The term *constant dollars* is used to indicate that the value of goods and services is linked to a specific year. For example,
$$2010 \text{ constant dollars} = 2009 \text{ nominal dollars} * (\text{CPI } 2009) / (\text{CPI } 2010).$$

Representative Expenditure System (RES). The RES is the collection of per capita average expenditures that prevail in the entire nation over the standard bundle of services. They include six major spending categories—K–12 education, higher education, public welfare, health and hospitals, highways, and police and corrections—and a lump-sum category of “other” expenditures—environment and housing, interest on general debt, governmental administration, and all other direct general expenditures (Hoo et al., 2002).

Representative Revenue System (RRS). The RRS is the collection of information needed to calculate revenue capacity for each state by applying the representative rate to the standard base for each revenue source item and adding all the revenue item capacities (Hoo et al., 2002).

Revenue adequacy. The ability of a state economy to support current state needs through available tax revenues.

Standard level of services. This is the nationwide average of the per capita spending for the provision of standard services that are typically provided by state and local governments as indicated by the Census of Governments.

State government. The state government in each case consists of the legislative, executive, and judicial branches of government and all departments, boards, commissions, and other organizational units. It also includes any semi-autonomous authorities, institutions of higher education, districts, and other agencies that are subject to administrative and fiscal control by the State through its appointment of officers, determination of budgets, approval of plans, and other devices (U. S. Census Bureau, 2012).

Tax Capacity. State tax capacity measures the ability of state governments to obtain resources for public purposes through various combinations of taxes (Halstead, 1974, 1999). The taxes a state would have collected if it were to tax every potentially taxable item (Hoo et al., 2002). With regard to education, it is a measure of a state's underlying ability to raise revenues that can be allocated to higher education (The National Center for Higher Education Management Systems, 2009).

Tax Effort. State tax effort is the ratio of actual amount of state tax revenue collected to tax capacity (Halstead, 1974, 1996).

Tax Revenue. State general *revenue* includes both own-source revenue (e.g., taxes) and intergovernmental revenue from the federal government. It does not include liquor store, utility, or insurance trust revenue (Hoo et al., 2002).

Total Taxable Resources (TTR). The measure equals gross state product less flows that are not available for the state to tax plus income flows that are not included in gross state product (Mikesell, 2007).

Tuition and Fees, or Net Tuition Revenue. It is the gross amount of tuition and fees, less state and institutional financial aid, tuition waivers or discounts, and medical student tuition and fees. This is a measure of the resources received from students and their families through tuition and fees and available to support instruction and related operations at public higher education institutions (SHEEO, 2010).

Western interstate commission for higher education (WICHE). WICHE is regional higher education organization of fifteen member states: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming.

Delimitations

Delimitation is any factor within the researcher's control that may affect external validity. At the outset of research several delimitations must be noted, among which are the objectives of the research, the variables under study, and the states included in the research.

The objective of this research is to estimate the level of influence of various socioeconomic, demographic and financial variables across WICHE states with the understanding that the role each of these factors play at the state level may vary. Additionally, objectives of the research itself limited the number and context of variables under study. The variables utilized in this research have been shown by previous research to influence the level of state appropriations to higher education, yet the results have shown various levels of influence. As the role of local governments in funding higher education is limited, state and local funding

for higher education are considered together. Moreover, only support for higher education operational expenses is utilized in this research.

While Halstead (1974) recommends matching the states that are socio-economically and demographically compatible, no attempt is made to do so. The reasons for this are threefold: First, WICHE states are used because they represent the region of interest. Second, even socio-economically similar states vary in their policy approaches to higher education, making it difficult to find two states alike. Third, matching socio-economically and demographically compatible states would result in a sample that is too limited for quantitative research. Varying environmental, economic, and operational state conditions preclude the exact matching of states, yet the differences among WICHE states highlight the unique character of their conditions with regard to higher education.

Limitations

This study was limited in its interpretation due to some underlying assumptions. It was assumed that social-financial correlations were stable over time. The further apart the observations are spaced in time, the more likely it is that there will be changes in the underlying social, political, and economic structure. Since the data in this quantitative research are limited to a few consecutive years, major shifts in the underlying processes are less likely than in a longitudinal study that spans several decades. Additionally, as this research utilizes data provided by governmental agencies and higher education professional organizations, it fully relies on the accuracy of the data reported to and by these agencies and organizations.

Significance of the Study

Higher education produces political, cultural, and economic benefits for both individuals and society. It is imperative to connect higher education research and higher education policy.

While quantitative studies do not allow for a full picture of the importance of investing in higher education, they do speak to politicians and others of the complexity of higher education.

Understanding the influence of state budgets on investment in higher education is important, especially during times of economic uncertainty that make it more difficult for institutions of higher education to plan their future. Institutions facing financial problems are often forced to compensate for appropriation shortfalls by increasing tuition, even when such increases are especially painful for those, already marginalized, who struggle to pay bills and may opt out of higher education altogether due to the increased expense of enrolling. Unfortunately, these trying times are also accompanied by decreased public belief in the benefits of higher education. If economic prosperity is to be achieved and a greater public good is to be served, policymakers need to be reminded of the benefits of higher education to society and of how well—or poorly—their states are doing in serving their citizens. While state investment in higher education is not a new area of the research, this study contributes to the existing body of literature by virtue of concentrating on the importance of higher education in state budgets considering states' socioeconomic and demographic characteristics, fiscal capacity, and tax effort to support higher education.

Overall, the study of the magnitude of the differences among the fifty states and the WICHE states, in particular, can inform policymakers aimed at funding higher education as well as improving its affordability, access, and participation. Analysis of the relative effort and interrelationships of the factors influencing the financing of public higher education in the WICHE states can assist in understanding of both current and future trends. Additionally, it can point out areas of concern and opportunities for improving Montana's competitiveness when universities face harsh financial times. As a comparison of the actual level of higher education

support achieved in any particular year can be misleading due to different socio-economic conditions in the various states, it is essential to focus on state fiscal efforts to understand the extent of state capacity to invest in its human capital through higher education.

Summary

President Obama (The White House, 2009) called for the United States to have the highest proportion of students graduating from college in the world by 2020. He further stated that all Americans should be prepared to enroll in at least one year of higher education or job training to better prepare our workforce for a 21st Century economy. But he has also expressed concern about college affordability (The White House, 2009). As student demographics, state economic and financial conditions, and state commitment to support higher education all impact college affordability and access, a systematic review, comparison, and benchmarking of state data can help states more accurately assess their contribution in creating national human capital. Investment in human capital for reasons of expected economic progress alone is shortsighted. A vision of social progress based solely on the satisfaction of material wants is unsustainable when resources are limited. Beyond a certain point, “continued pursuit of economic growth doesn’t appear to advance and may even impede human happiness” (Jackson, 2009, p. 5), nor are the purely economic benefits of higher education the only ones worth considering. The following literature review shed light on existing theories, factors, and findings that have been used to help states justify and improve their efforts to fund higher education and contribute to human capital formation.

Chapter Two

Literature Review

This study examines higher education funding policies. The literature review is designed to ensure that the context of this study is comparable to similar studies and to provide an in-depth review of higher education finance policy. “One of the important tasks of a literature review is to identify the key conceptual frameworks, theories, models, and methods within a field and examine their relationship” (Heck, 2004, p. xxiii).

A *framework* helps to identify the elements and relationships that guide an analysis. A *theory* makes assumptions and identifies the elements of a framework relevant to answering research questions, explaining processes, and predicting outcomes. “[A] *model* makes precise assumptions about the variables related to a limited set of outcomes” (Ostrom, 2007, p. 40).

Because conceptual frameworks, theories, and models help structure the research process, a significant portion of this literature review is dedicated to them. It also deals with the methodology employed to justify them. The first section of the literature review considers the essential issues related to the study of state financial policy, including the economic and political context that shapes state policy formation. It contains an overview of the stakeholders—policymakers, the leaders of institutions of higher education, students, and the public at large—as well as a consideration of their relative influence on policy formation. An attempt is made to identify the major dimensions of socioeconomic structure within the states that have bearing on state policy toward and support of higher education. The relationship between policy research, theory, and methodology is also examined here in order to elucidate differences in research approach, research findings, achievements, and shortcomings and to guide the present research. Other methodological differences are addressed in the last part of this review.

The second section of the literature review is devoted to the various rationales for public support of higher education, both historical and contemporary. Following Heck's observation that "framing the policy study is the key to providing results that are compelling and useful" (Heck, 2004, p. X), pertinent articles dealing with frameworks are also discussed here.

The third section reviews higher education funding policies and financial strategies. It addresses the rationale behind and the appeal of performance-based funding. It will also review the issue of productivity in higher education funding. Finally, it addresses some proposed comprehensive financial strategies that are designed to address higher education funding problems.

The last two sections of this review discuss frameworks describing what influences the policy environment. Interstate comparison issues are also addressed. The last part deals with various methodological issues impacting the scientific rigor of the research.

Through examination of the various philosophical, political, and economic underpinnings of state higher education funding and, where possible, the consequences of the strategies employed, it is argued that a more informed policy can be developed to deal with the financial shortfalls that state colleges and universities regularly face due to decreased or insufficient appropriations, one resulting in a comprehensive long-term plan for financial sustainability rather than a series of ad hoc tuition increases in response to the vicissitudes of economic uncertainty.

Higher Education Funding Policy Conditions

The first section of the literature review deals with works devoted to explaining what influences state public policy in general and higher education funding policy in particular. Because policy context is viewed from both political and economical perspectives, political and economic theories that inform and guide policy analysis and implementation are reviewed.

State Fiscal Conditions and Higher Education

Hovey (1999) offered a comprehensive analysis of state economic and political realities that have bearing on higher education financing policy design and implementation. He asserted that state finances are influenced by economic conditions, state demographics, changes in federal policy, and the political environment in the state, with economic conditions being the single most critical factor. While national and state economies both critically impact state funding of higher education, these effects are more immediate at the state level because it is the states that are charged with providing higher education opportunities for their residents (AASCU, 2011). Both economic growth and slump affect a state's tax revenues and expenditures (The Lewin Group & The Nelson A. Rockefeller Institute of Government, 2004). At the time of this study the main concern of state postsecondary institutions is to mitigate the effects of state funding cuts. Although the health of state government finances is closely tied to the health of the country's economy as a whole, not all states are impacted by recession at the same time and to the same degree. All states do experience revenue reductions during an economic downturn, however; forty-nine states now operate under provisions, making cuts mandatory when revenue is reduced (Center on Budget and Policy Priorities, 2010). But while states have different priorities resulting in a variety of trade-offs among public spending programs, they appear to be united in their treatment of higher education: during an economic slowdown, state politicians tend to treat higher education funding as a discretionary item and a budgetary "balance wheel" (Hovey, 1999; Delaney & Doyle, 2007).

Hovey (1999) and Delaney (2011) stated that in times of significant fiscal deficit, higher education faces increased scrutiny. There are increased demands for improved performance just to maintain the existing level of funding, and many states curtail their funding of services, using

state higher education appropriations as a “balance wheel”. Under the “balance wheel” approach, colleges and universities do well when state coffers are replete and disproportionately poorly in tight budgetary times (Hovey, 1999; Rizzo, 2006; Russell, 2008; Zameta, 2004).

The research of Delaney and Doyle (2007) supported Hovey (1999) and Rizzo (2006), stating that cuts in higher education funding during hard economic times surpass the increases enjoyed during good economic times. They also provide evidence suggesting the predictability of the “balance wheel model” to inform policy research on how higher education is treated in state budgets (Delaney & Doyle, 2007).

There is general agreement that higher education does disproportionately poorly during economic slowdowns (Delaney & Doyle, 2007; Rusk, Leslie, & Brinkman, 1982). Lingenfelter (2008), however, argued that while it does disproportionately better during booms, higher education does so only in terms of percentage change based on the previous economic period, not over a longer historical perspective. In other words, increases never return appropriations to pre-reduction levels. He pointed out that while the U.S. became richer and federal higher education spending grew from 2.0 percent of Gross Domestic Product (GDP) to 2.6 percent between 1970 and 2005, increases in public spending for higher education lagged public spending in other areas. This finding leads one to see the need to consider higher education as a single item in the state budget, one that must compete with other state spending priorities when evaluating the conditions affecting higher education.

As tax revenue dwindles when businesses lose revenue and jobs are lost, the need for public assistance services increases. Entitlement programs such as Medicaid can place great stress on state budgets as they expand to satisfy increasing needs during prolonged periods of economic distress or stagnation in which state revenues themselves are declining and the

competition limited state appropriations stiffens (Hoo et al., 2002; Hossler, Lund & Ramin, 1997; Layzell & Lyddon, 1990; Okunade, 2004; The Lewin Group & The Nelson A. Rockefeller Institute of Government, 2004; Rizzo, 2006).

Research has also found that states have redirected funds to other needs, mainly K-12 education and corrections (Hossler, Lund & Ramin, 1997; Layzell & Lyddon, 1990; The Lewin Group & The Nelson A. Rockefeller Institute of Government, 2004; Rizzo, 2006). These competitive factors influence state efforts in financing higher education, especially when their fiscal capacity and efforts are limited. The state fiscal capacity and effort are indicative of state relative wealth and must, therefore, be taken into consideration when evaluating state commitment to higher education.

Capacity and effort

Various measures are used to gauge the wealth of a state. The four most widely utilized measures of state fiscal capacity are: gross state product (GSP), state personal income (SPI), the representative tax system (RTS), and total taxable resources (TTR). While these measures are reviewed in more detail in the methodology section, it can be said at this juncture that states vary significantly in their fiscal capacity to collect taxes as well as in their tax efforts. Tax effort and expenditure priorities both affect higher education funding and differ among states for political as well as socioeconomic reasons. Regardless of political or popular will to support higher education, when a state faces limited tax collection capacity, even if it exerts high effort, the increased level of competition for state resources for various public purposes makes securing sufficient funding for higher education difficult. This is especially true during times of slow economic activity. Even when a state has high revenue capacity and high revenue effort, it still can be in a fiscally weak position if it also has high expenditure need (Hoo et al., 2002).

Although a strong association appears to exist between fiscal capacity and social welfare spending, Mogull (1993) noted that the correlation fails to explain the causal basis for the association. Most researchers however, agreed that the higher the taxpayers' income, the better able the state is to fund additional services. Higher per capita income reduces the financial burden on the state (Compson & Navratil, 1997; Hossler, Lund & Ramin, 1997; The Lewin Group & The Nelson A. Rockefeller Institute of Government, 2004).

Research by Hoo and others (2002) and Rizzo (2006) further illuminated factors that exacerbate competition for limited state resources. States with a higher proportion of residents living in poverty bring in less tax revenue and face a greater need for programs that provide public assistance. In addition, slow economic growth can further deteriorate state budget health (Hoo et al., 2002). Thus, while higher education is rightly called a state's budget "balance wheel," other factors such as the percentage of a state's population living in poverty or demographic changes require redirection of resources and therefore influence budgetary priorities because of their impact on state budgets (Rizzo, 2006).

State Socioeconomic Climate and Higher Education

Several studies have employed state data to examine the impact of socioeconomic variables on public policy (Halstead, 1974; Hofferbert, 1986; Hossler, Lund & Ramin, 1997). In each of these studies the authors used a somewhat different array of independent variables that correlated to varying degrees with dependent variables of particular relevance to the specific piece of research. The choice of variables is usually rationalized through the process of elimination using specific statistical procedures. Hofferbert (1968) has found that while various theories are discussed, the choice of variables is rarely explained on the basis of theory. The apparent difficulty in application of theory lies in the complexity of issues being investigated.

Accordingly, studies tend to be discipline specific—e.g., political science or economics—rather than interdisciplinary. However, socioeconomic variables involved are always interdisciplinary and complex (St. John & Parsons, 2004). Additionally, within these studies, the terms “socioeconomic variables,” “demographic variables,” and “environmental variables” are often used with various factors at play.

Gray (2007) reviewed several socioeconomic factors that impact state policy: population size and composition, migration, state physical characteristics, and natural resources, types of economic activities stemming from a state’s physical endowments, wealth, and regional economic sources. These factors have a tremendous impact on such public policies as taxation, health and welfare, education, corrections, social and economic regulation, economic development and infrastructure. While they are very important for understanding and appreciating state differences, it is not a goal of this work to explore each of them. Instead, it is perceived that state tax effort and expenditures reflect all the above factors and present important tangible evidence of state policy priorities and, over time, the stability of its commitment to various causes, needs and programs. Additionally, this approach together with the consideration of poverty level allows gauging state public service priorities with specific regard to higher education.

Dawson and Robinson (1963), as well as Dye (1966), found socioeconomic factors such as wealth and industrialization influence public expenditures. Peterson (1976) used the following factors: Hofferbert's industrialization and affluence factors, personal income per capita, corporate income per capita, median years of school completed by the population 25 years or older, percent of the population 25 and older who are college educated, and percent of the population of college age (18 to 22 years old). While Peterson (1976) found that the state level of industrialization has

a negative impact on its commitment to higher education, Halstead (1974) found that the state level of professionalization has a positive impact.

Halstead (1974) outlined five socioeconomic characteristics indicative of the strength of state support for higher education, using them to create a composite climate index: educational attainment (median school years completed by persons age 25 and over), elementary-secondary school productivity (high school graduates as a percent of the 17-year-old population), college educated population (percent of persons age 25 and over with four or more years of college), professional occupations (percent of employed persons in professional, technical, and kindred occupations), and personal income (personal per capita). A shortcoming of this approach is that each factor is weighted equally even though Halstead himself acknowledged that personal income is probably the most important.

Conversely, Layzell and Lyddon (1990) suggested that research on the influence of per capita income on appropriations is inconclusive and requires further study. Additionally, one can take issue with the way educational attainment is measured. The large numbers of part-time and working students who take longer to degree completion have not been accounted for, a fact that calls the accuracy of the measurement into question. Educational attainment can be estimated more accurately by determining the state's proportions of citizens with various levels of college education. The rationale for looking at the educational level of constituencies is that researchers stress that higher educational opportunity for young people is strongly associated with parental education levels (Bean, 2005; Titus, 2006). That having been said, the remainder of Halstead's categories are most appealing insofar as first, they are related to education and, second, they remain relevant in today's service-oriented economy. By the end of the 20th Century approximately 80 percent of jobs were in the service sector (Atkinson, Court, & Ward, 1999).

State Political Context

Public postsecondary institutions have few opportunities to save for a rainy day and can face funding difficulties because—with the exception of precedent—there is little that allows them to predict the level of political support for higher education, particularly as the end of an election cycle approaches (Orkodashvili, 2009). Decisions are prone to change with political turnover and are often driven by economic fortunes, the state of the economy, the level of state economic wealth, and the next election cycle (McLendon, Hern, & Mokher, 2009). McLendon and Hearn (2007) stressed that educational policy researchers tend to ignore the fact that the state political environment influences both policy design and its successful implementation. In light of the fact that the research reviewed for this study found no consistent influence to have been demonstrated by state political variables, however, this study did not attempt to incorporate them. Moreover, this is the area that lies outside of the scope of this work. Nevertheless, a review of political variables effecting policy decisions can shed light on the complexity of state higher education funding policy and help establish the need for cooperative, comprehensive policy reviews with all stakeholders.

St. John (2004) asserted that political decisions, not research findings, drive policy decisions: “policy research has been used to rationalize new policies rather than inform the public and policy development” (p. 232). State policy choices are conditioned by the state political context, which includes political institutions, actors, and state political processes, the so-called “rules of the game” (McLendon & Hearn, 2007; Toutkoushian & Hollis, 1998). Gray (2007) also characterized state political context as “longstanding historical and cultural patterns, contemporary public opinion and ideology, and national political trends” (p. 20). He further stressed that policymakers’ position on the liberal-conservative continuum based upon the mean

rank on the liberalism index, partisanship within the state legislature, and the governor's party affiliation also shape higher education policies. Partisanship can influence the higher education policy agenda as can the partisan balance of state government, which can determine adherence to political commitments versus adjusting one's opinions to preserve power (Gray, 2007; Hovey, 1999).

Layzell and Lyddon (1990) stressed that state leadership and partisan political activity, the strength of various interest groups, as well as the existence of other urgent state agenda influence higher education funding policy. However, research on the partisanship and education expenditures is inconclusive. Okunade (2004) pointed out that democratic legislators are more supportive of public higher education, while the findings of Nicholson-Crotty, Theobald and Wood (2006) suggested that an increase in liberalism produced tradeoffs that favor welfare and healthcare expenditures over education.

Policy outcomes can also be influenced by state legislative organization and membership. Legislative organization refers to a state's level of legislative professionalism, whether its legislative assemblies are professionalized, judged by factors such as the length of legislative sessions, members' pay, and availability of staff resources (Hamm & Moncrief, 2007). Ample resources tend to be associated with greater analytical capacity in a decision-making process. Other legislative organizational factors that can influence policy decisions are "the powers accorded leadership, the means of allocation of committee assignments, the terms permitted officeholders, and the prerequisites of incumbency" (McLendon & Hearn, 2007, p. 17).

Legislative membership refers to demographic differences within a legislature such as gender, ethnicity, level of education, and type of previous occupation (McLendon & Hearn, 2007). Extent of gubernatorial influence, or the governor's institutional and personal powers, can

also impact higher education policy. A governor's institutional powers are measured by "tenure potential, appointment power, budget power, veto power, extent to which the governor's party also controls the legislature, and whether the state provides separately elected executive branch officials" (McLendon & Hearn, 2007, p. 19). The personal powers of a governor depend upon electoral mandate, ambition, political future, personal style, and job performance rating (Beyle & Ferguson, 2007).

Other factors to consider are the variety and lobbying power of various interest groups in the state, especially the effectiveness of higher education public agencies advocating for the financing of various programs. Wildavsky (1978), Layzell and Lyddon (1990) as well as Hossler, Lund and Ramin (1997) identified such factors as historical traditions and political culture as affecting policy decisions. Most notably they pointed out that the state's historical relationship with higher education is a strong predictor of the level of higher education appropriations, as budgeting is a "ritual." The discussion of political theories and frameworks that follows in the next section further illuminates the complexity of the political environment and how it influences policy.

Policy Research and Theory

There are multiple rationales for this section of the literature review. It concentrates on various theories that help to explain what influences policy processes in general and higher education funding policy in particular. No less important, it also builds a foundation for drawing informed conclusions regarding the results of research undertaken in preparation for this study. Finally, it makes it possible to validate recommendations to politicians, the public, and institutions of higher education.

Stressing the need for a new rationale for public finance policy, St. John and Parson (2004) stated that the problem with higher education policy research was “under-theorized” analysis (p. 5). The construction and application of theory for policy research purposes is important for three reasons. Solid theory, they said, “offers an opportunity to influence policy proactively” (St. John & Parson, 2004, p. 8). It can also be a healthy substitute for the ideology-driven debate masquerading as policy analysis that erodes the common ground necessary for a healthy discussion of policy. Theory can also “lead to common framework” and the “space” and “distance” needed for critical analysis (St. John & Parson, 2004, p. 8). But theory building is neither a fast process, nor is it consensus building. It is therefore essential to understand the role of advocacy in policy development. Researchers need to explore new rationales for public funding of higher education from multiple theoretical perspectives supported by evidence. Such research can inform policymakers on both sides of the aisle.

St. John and Parson (2004) suggested that if an economic theory has outlived its usefulness in informing policy rationale, when the political nature of the policy process is considered, it is time to use a political theory. McLendon and Hearn (2007) confirmed that political science, as a framework for higher education policy research, is largely overlooked.

Political culture. As educational policies are expressions of underlying cultural values, examination of those values can assist in understanding and, to some degree, predicting policy outcome. Heck describes the political system as “the means of mediating value conflicts” (2004, p. 101).

There is a set of basic national values underlying American democracy—individualism, economic self-interest, liberty and personal freedom, equality, a sense of community, and social order (Fowler, 2008)—that must first be taken into consideration. Next, the differences in state

ideologies and values can be analyzed and thus provide explanation for policy variations. Elazar (1984) identified three distinct political cultures: traditional, moralistic, and individualistic. Traditional culture is characterized by order and stability maintained through personal connections and resistance to change. Moralistic culture is sustained by the government's pursuit of public "good." In individualistic culture the role of government is to satisfy public demand (Elazar, 1984).

The application of Elazar's topology to research proved its usefulness by generating additional hypotheses and propositions. Lee (1997) identified certain characteristics of policy—complexity, high cost, and the disruptive element of innovation—that make it less conducive to enactment. State culture also influences the level and timeframe of policy implementation. Researchers have found that different political cultures pursue different core ideological values: choice, quality of life, efficiency, and equity or equal opportunity (Gray, 2007; Kaufman, 1956; Marshall, Mitchell & Wirt, 1986). Reinforcement of core values, efficiency, and quality can assist in understanding of timely policy implementation, for example. Conflicts between core values, efficiency, and equity within the state can also explain policy dilemmas and standstills in policy processes. Marshall, Mitchell, and Wirt (1986) stated that when the reforms are driven by a national agenda, differences in policy reforms among states are less pronounced, as state policymakers obligated to respond (pp. 88-89).

Gray (2007) and her colleagues constructed a "policy liberalism index" that allowed researchers to rank states according to their standing on five policies: gun control, abortion laws, Temporary Assistance to Needy Families (TANF) welfare eligibility and work requirements, tax progressivity (the extent to which the top five percent of earners are taxed more than the lower

forty percent), and the state level of unionization. The study concluded that states fail to fit neatly into either a liberal or conservative category.

While helpful, a cultural theoretical framework does not specifically consider the role of postsecondary institutions in the state higher education policy process nor is it particularly helpful in establishing the rationale for public funding of higher education. It is, however, useful in examining policy processes and partially explaining differences between the states. But if we want to achieve change, it is more difficult to influence the political process itself than it is to convince politicians of the economic gains derived from higher education (Heller, 2009; Ruppert, 2001).

Economic arguments. Education competes with other social programs for tax dollars. While St. John (2004) insisted that economic rationale no longer plays an important role in the policy arena. He posited, politicians who call for greater financial accountability in higher education continue to utilize economic arguments such as resource allocation and efficiency, as well as, educational outcomes to justify reductions in public funding of higher education. It is therefore important to review existing arguments in order to avoid their repetition and consider new developments such as renewed interest in and application of human capital theory, which is addressed in the next section.

The Obama administration (The White House, 2009) has voiced concerns over postsecondary education's failure to meet demand for a skilled, competitive workforce, an approach that stresses an economic assessment of educational effort by evaluating success in terms of meeting societal demand for an educated workforce. The administration's concerns are not new. More than a decade ago the Boyer Report (Boyer Commission, 1998) and again just a few years ago the Spellings Commission Report (Department of Education, 2006) expressed

similar concerns about the global competitiveness of the US workforce. These concerns go hand-in-hand with the question of return on public investment in higher education, input versus output.

While scholars have identified a broad range of factors to measure effectiveness, linking these inputs to student outcomes appears to have been as difficult as identifying the amount and combination of resources that would lead to improvement in outcomes, as the same inputs lead to different results in different places. Such difficulties opened the findings of existing cost-effectiveness studies to ample criticism (Catterall, 1997; Levin & McEwan 2000). That is not to say that there are no studies that implement cost benefit analysis successfully (Tzang, 1997). These studies are likely to address manageable problems of secondary education systems such as local program feasibility rather than generalized student learning outcomes and civic contributions to society.

Educational outcomes, especially higher education outcomes, however, are not easily quantifiable. Another approach is to look at education from the perspective of individual and societal return on investment and human capital theory. No state contribution to higher education can be discussed without addressing the public/private benefit debate of higher education. An analysis of who pays and/or who receives the benefits of higher education can help to inform policy agendas as well as influence public attitudes regarding the support of higher education.

Human capital theory. The human capital theory is viewed as a combination of economic and social benefits accruing to individuals and to society. Different types of human capital models for education have been developed in recent decades, with some including only economic variables and others taking social variables into consideration as well (Becker, 1994; Harmersh, 2005; McMahan, 2006; McMahan, 2009; Pasque, 2010). There are also a variety of perspectives from which human capital theory is employed: individual (Hamermesh, 2005;

Carneiro & Heckman, 2003; Cunha, Heckman, Lochner & Masterov, 2006) and society (Carneiro & Heckman, 2003; Cunha et al., 2006; McMahon, 2006; McMahon 2009; Pasque, 2010; Sparks, 2011).

Hamermesh (2005) looked at investment in higher education through the human capital theory from the perspective of a student. According to Hamermesh, the average cost to the student includes the opportunity cost of the student's time and tuition, less any direct financial aid and subsidies on student loans. Moreover, he stressed that the opportunity cost to a student—presently forgone wages—accounts for the majority of the true cost of attending college (Hamermesh, 2005). Though parents and students are unhappy about tuition increases, the increases are often offset by a variety of state and federal subsidies. Thus, even when an increase in tuition and fees does not have a negative impact on enrollment, the negative impact of forgone wages is reflected in college enrollment and persistence rates. In other words, wages foregone in the present are more real for students than an opportunity to earn a higher income in the future.

Historically, the share of the population enrolled in colleges and receiving a college degree increases during economic slowdowns (NASBO, 2010). And while those enrolling during such times are also more likely to be concerned with immediate income rather than an increase in earnings several years down the road, offering generous grants to reduce the cost of attending college has a limited impact on college attendance and completion (Hamermesh, 2005). According to Hamermesh, “The best estimate is that a program that reduces the net tuition cost nearly to zero increases the share of the population receiving a college degree by about 3 percent” (2005, p. 6). He went on to conclude that “offering further subsidies to college attendance or cutting back on existing subsidies is unlikely to alter greatly the average number of students attending and completing higher education” (Hamermesh, 2005, p. 6). He also concluded, though,

that the reduction in subsidies disproportionately prevents low-income students from pursuing higher education and contributes to increasing income inequality. State politicians often view support of higher education as being discretionary, partially due to the fact that it does not entirely depend on appropriations, drawing as it does on revenues from tuition and fees, and partially because it reflects their outlook on who receives benefits, who should pay and to what extent they should pay (Hovey, 1999; Rizzo, 2006; Russell, 2008; Zameta, 2004).

While Hamermesh's research can be used to point out the individual economic benefits of college enrollment, it also draws attention to the role of tuition and financial aid in the policy process. Politicians are able to justify tuition increases because they are offset by substantial lifetime returns for an individual—at least ten percent for each additional year of tertiary education (Hamermesh, 2005). However, the size of these returns is disputed, especially when graduates face a sluggish economy. In fact, under such conditions they can actually be used to lobby for increasing the state burden of the costs of higher education.

Hamermesh's research considered the theory of human capital from the perspective of a student as an independent person rather than a member of society. His strict economic or market perspective leaves the question of justification of public subsidies unresolved. Indeed, when the term "human capital" was pioneered in the 1950s and 60s, approaching schooling as an investment rather than cultural experience was deemed sacrificial as it was criticized for treating people like machines (Becker, 1994).

According to Carneiro and Heckman (2003) and Cunha, Heckman, Lochner, and Masterov (2006) human capital formation is a multistage process of life-cycle learning. Skills formed at one stage augment skills attained at later stages. Cunha and others (2006) termed this phenomenon self-productivity and self-reinforcement. They also stressed the complementary

nature of these processes, as early investments have to be followed by later investments in order for the former to be productive, “skills beget skills and abilities beget abilities (p.703).” They further concluded that “complementary, self-productivity of human capital and multiplier effects imply an equity-efficiency trade-off for late child investments but not for early investments” (p. 703). The authors also stress that the economic returns of initial investment at early ages dwindle as age increases. Additionally, early investment lowers the cost of following investments.

Carneiro and Heckman (2003) and Cunha and others (2006) recommended a comprehensive lifetime view of skill formation. Their conclusions have important implications for public policy concerning education at various levels of attainment (e.g., prioritizing K-12 investment over higher education). However, some of their conclusions regarding investment returns at various stages can be easily misused. Their research suggested that family factors throughout a child’s formative years have a major impact on a child’s cognitive abilities, attitudes, and social skills and outweigh the impact of tuition or family credit constraints on college success. Without a comprehensive reform of education at all levels, such conclusions, while they may be correct, can lead to underinvestment in human capital at later ages, thereby resulting in the increased disadvantage of those who need investment the most to compensate for previous underinvestment.

The theory of human capital development can be and is used to justify public funding of higher education, incorporating the idea of positive externalities, benefits to the public from an educated citizenry (McMahon, 2006; McMahon, 2009; Pasque, 2010). However, a more informed approach results when the theory is used in all its comprehensiveness and from multiple perspectives to incorporate public and private as well as market and non-market benefits of higher education.

McMahon (2006) provided such a comprehensive foundation for higher education studies and analysis. His concept of human capital incorporates tangible and non-tangible properties, direct and indirect benefits, public and private benefits, and can serve as a well developed rationale for public and private funding of higher education. "Human capital is the knowledge, skills, and attributes acquired by investment in education and health throughout the lifecycle" (McMahon, 2009, pp. 41-42). It is the social non-market contribution to the operation of civic institutions essential to democracy, human rights, and political stability, as well as contribution to the operation of the criminal justice system, to crime reduction, to poverty reduction, to environmental sustainability, and the creation and dissemination of new knowledge (McMahon, 2006).

Jones and Kelly stressed that "few issues unite policymakers in quite the same way as economic development does" (Jones & Kelly, 2007, p. 1). Policymakers understand that strong economies are characterized by an abundance of well-paying jobs; and overwhelmingly, individuals who hold well-paying jobs have knowledge and skills obtained through education beyond high school (Jones & Kelly, 2007).

There are several factors that contribute to growing the human capital that fuels societal development. Research points to a strong correlation between the proportions of a state's population enrolled in institutions of higher education and the state's rate of economic development and growth (Zumeta, 2004). Politicians need to be sensitive to the fact that human capital, especially the portion that is active in the labor pool, changes over time through retirements, individuals' choices to remove themselves from the labor pool, the level of education of the younger generation entering the workforce, and migration of the workforce due to lack or abundance of economic opportunity (Jones & Kelly, 2007).

Though the benefits of investment in higher education cannot all be directly traced and quantified, it is helpful to keep them in mind. There are broader implications beyond the loss of global competitiveness for the society that under-invests in higher education. Human capital theory helps to determine whether public and private tangible and non-tangible benefits are acquired through optimized use of resources. It may well be the new rationale necessary to convince both politicians and the electorate of the importance of public support for higher education as it incorporates both the private and public benefits of postsecondary education as well as addresses the roles of all the players in human capital development: government, institutions, students, and society at large.

Higher Education Funding: Historical Perspective

The second part of this review investigates various rationales for public funding of higher education from the 20th century to the present. It begins with a period of consensus and wide public support for growth in both opportunities for enrollment and expansion of services offered. Next, demands for accountability increased and public support for higher education became more conditional based on perceptions of how educational institutions responded to the demands. Finally, current accountability trends, informed by reduced state revenue, the belt tightening that follows, and the demands of the competitive crucible of internationalization, are discussed.

Period of Consensus

St. John and Parsons (2004) characterized most of the 20th Century, until the 1980s, as a period of consensus between government and postsecondary institutions about their relationships and the rationales for public funding of higher education. During this period institutions experienced unprecedented growth and enjoyed increasing public and governmental support. Both state and federal support grew, with the federal government becoming the major financial

need-based support provider for students in the 1960s and 1970s. This level of support was made possible by a broad consensus regarding the social and economic value of higher education. Though different constituencies along the political spectrum supported higher education for various reasons, there was little disagreement beyond which funding strategies would better support expansion of higher education opportunity (St. John & Parson, 2004).

New Accountability

Scholars characterize the change in higher education accountability from accounting for expenditures to accounting for results as a “paradigm shift” (Alexander, 2000; Burke et al., 2002). The new “managerial” approach to higher education calls for quality improvement accompanied by cost reduction and increased productivity. Burke laments the academic community’s failure to define “quality” (Alexander, 2000; Burke et al., 2002). While the quality of campus resources according to the “Resource and Reputation Model,” including the level of funding, quality of admitted students, and reputation of faculty research, defined “quality”, the model did not take into consideration the quality or quantity of services provided to students, states, and society by postsecondary institutions (Burke et al., 2002). With no definition of quality and resistance by the academic community to defining clear goals and objectives regarding how to achieve this excellence, a “gap between legislative hope and campus comfort” emerged (Burke et al., 2002, p. 3). Quality is an issue that cannot be ignored. The quality of an education is as important for human capital formation as its attainment. Institutions are being ranked by the returns their graduates harvest in the job market. While institutions vary more in the perceived quality of the provided education than states do, state variations are significant because states are the main providers of funds for public institutions (Zhang, 2009).

The economic crisis of the 1990s led to the launch of an assessment and accountability movement (Alexander, 2000; Burke et al., 2002). As in the 1980s, however, institutions failed to define educational quality despite early calls for assessment. In the 1990s state governments took charge of defining quality and mandating accountability (Alexander, 2000; Burke et al., 2002). Higher education faced criticism regarding quality and quantity of faculty teaching and student learning (Boyer, 1990). The quality of undergraduate education as well as institutional expenditures on administrative and student support services, productivity, and efficiency faced scrutiny (Boyer Commission, 1998; Burke et al., 2002). Politicians' preference for quantitative indicators led to numbers-driven accountability. A few of the most common performance factors identified by State Higher Education Executive Officers (SHEEO) and the Educational Commission of the States were (a) retention, (b) graduation and transfer rates, (c) time-to-degree, (d) faculty workload/ productivity, (e) satisfaction studies, (f) remediation activities and effectiveness, (g) pass rates on licensure exams, (h) degrees awarded, (i) placement data on graduates, (j) total student credit hours, (k) admission standards and measures, and (l) number and percent of accredited programs .

Though in response to criticism, reforms in higher education took root in some places, they varied in degree and comprehensiveness and lost their vigor during the economic boom at the start of the new millennium. The present economic crisis and the attention of the Obama administration have brought higher education under renewed scrutiny (The White House, 2009).

Current Developments: Performance and Financial Resources

Attention to higher education increases when the nation faces financial crisis. Shrinking budgets give politicians additional reason to renew their demand for accountability as proof that

colleges and universities deserve scarce tax dollars. But driving higher education into a defensive position creates an environment adverse to productive dialogue.

Higher education officials and administrators see a shortfall in appropriations as a narrow problem that only higher education faces. But there are numerous other programs and services that rely equally on public funds. Politicians, meanwhile, look for a solution to funding shortfalls in new measures of accountability for higher education. Viewing the problem from a business perspective, they often seek to improve quality while cutting costs and increasing productivity (Schapiro, 1993). There appears to be little attempt to find common ground.

Present accountability calls are as much about performance as they are about costs. Jane Wellman (2006) looked at the costs and prices of higher education and their impact on affordability. The author stressed the importance of policy decisions based on both the quality and financing of higher education. One of the policy issues identified is the need by states to maintain their capacity to invest in research and technology to remain economically competitive. But to ensure public credibility and support for higher education, institutions and states alike must be held accountable for their use of resources to produce a high-quality workforce (Wellman, 2006).

Financial Strategies

This section is devoted to the rationales for various funding strategy policies. It begins with performance-based funding formulas and concludes with a review of comprehensive financial strategies as a sound alternative to the narrower performance-based approach to funding. State higher education strategies begin with the prioritizing of goals that the state deems essential for institutions of higher education to achieve. The explicit goals can be found in state legislative documents while implicit goals are often temporary and are harder to determine. St. John (1991),

while addressing overall resource management, pointed to three major goals that states charge higher education with achieving: equity, quality, and economic development. The states, with varying degrees of success, then typically attempt to measure the outcomes and tie their financing strategies to what they have discovered.

Funding Formulas and Performance-based Funding

Various funding formulas and guidelines for public higher education have been in use in the United States since the 1940s (Ahumada, 1990). Their original purpose was to distribute funds in a rational and equitable manner. Today all states use some form of funding formula or guidelines to help set appropriation levels. While these funding formulas vary greatly by state (Ahumada, 1990; McKeown & Layzell, 1994), they appear to share common strengths and weaknesses. Formula budgeting advocates have identified the advantages as simplification of budgeting procedures; reduced “political warfare” and lobbying efforts; at least partial assurance of incoming appropriations that allow for institutional planning, and compromise between “state control over line-item budgeting and institutional fiscal autonomy (Ahumada, 1990, p. 333).

The most cited formula funding shortcomings include the tendency “to reproduce past costs and behavior—irrespective of changes in needs or priorities” and “fail[ure] to reflect the qualitative dimensions of educational activities” (Ahumada, 1990, p 334). While the former remains a problem, the later has been partially addressed by some states through implementation of performance-based formulas.

Renewed concern about economic development has been brought to the forefront by the Obama administration, though what is expected of institutions beyond educating a higher percentage of the population has yet to be enunciated (The White House, 2009). The theory of human capital development as a means to provide common ground to address issues of economic

development and equity has been discussed earlier. Though the definition of quality remains contentious, there are certain indicators that are accepted by several states and institutions to represent quality. These are discussed later in this review. There is prolific research available dealing with performance quality and funding. Yet, which performance indicators best evaluate quality and what exactly quality is remain at issue. While the aims of the approach are understandable, the goals remain obscure and the difficulty of assessing quality using quantitative to the exclusion of qualitative measures, is unresolved.

The dispute between the proponents and opponents of performance-based funding is ongoing. Opponents, mostly from campuses, stress the unresolved definition of quality and the lack of clarity in how to measure it (Layzell, 1999; Burke et al., 2002) as well as the absence of a theoretical framework to support the existing measures and a tradition of ignoring research findings that dispute the validity of the indicators in use (Layzell, 1999; Titus, 2006). Some opponents of performance-based funding go so far as to state that performance funding is a fad, driven by data availability rather than rationale (Ewell & Jones, 1994).

Meanwhile, proponents, mostly from state capitals and the business community (Burke et al., 2002), stress that performance-based funding conveys to institutions public goals for higher education, provides an appealing notion of academic excellence (Burke et al., 2002), and adds clarity to funding allocation and the resource utilization (Herbst, 2008).

Layzell (1999) pointed out the problems of implementing performance-based funding models due to the difficulties of establishing a direct linkage between performance measures and results in resource allocation. Performance-based funding, while ensuring transparency and clarity, can also result in a significant financial loss to an institution that fails to perform up to a defined standard (Layzell, 1999). Conversely, when, indirect linkage formulas that contain

measures that could reduce the negative impact on appropriations in case of underperformance are employed in addition to performance indicators, objectivity and clarity are reduced (Layzell, 1999). Layzell also pointed out that this trade-off as well as the following three factors are cited most often as difficulties stakeholders encounter when designing a performance-based funding system: (a) selection of performance indicators, (b) selection of benchmarks, and (c) lack of resources for development and implementation of the system.

Additionally, theoretical support and justification of preference for certain indicators is missing. Layzell (1999) stressed the importance of an explicit policy framework to guide the development of performance indicators. He posits two questions for consideration: what does the state view as the most significant goals to be achieved by higher education, and how should they be measured?

But even when researchers provide evidence of the inadequacy of indicators, politicians tend to ignore their findings. For example, several researchers stress that there has been no systematic effort to address the relationship between college completion, or production of postsecondary degrees, and a state's higher education policy context (Astin, 1997; Bean, 2005; Titus, 2006). Astin (1997), Bean (2005), and Titus (2006) also showed that persistence and graduation rates—for which colleges and universities are held responsible—depend upon the availability of financial support through state and federal financial aid programs that the institutions have no influence over. Titus (2006) suggested that

rather than linking federal aid for colleges and universities to institutional graduation rates, federal policymakers should consider how college completion rates are influenced by student characteristics and the financial aspects of a state's higher education policy context which are beyond the control of campus leaders (p. 312).

Additionally, opponents of performance-based funding reject the idea as pointless, asserting that there is no “right amount” that can be arrived at through a perfect formula (Layzell, 1999; Burke et al., 2002). In other research, Robst (2001) determined that institutions in which state funding constitutes a smaller percentage of total revenue are less cost-efficient than institutions in which state funding constitutes a larger percentage of revenue. He defines cost-efficiency as the difference between actual costs and an estimated minimum cost, further determining that small declines in the level of appropriations led to smaller drops in efficiency than did large declines. Lingenfelter (2008) stated that the whole debate is pointless because “financial policy is fundamentally about priorities, investment, management, and politics, not formulas” (2008, p. 3).

Proponents often attempt to address the appeal of the scheme and the fact that performance-based funding can be utilized in a better way (Burke, 2002). They stressed that performance-based funding adds clarity to allocation and the resource utilization process (Herbst, 2008). Herbst listed among well-meaning aims of performance-based funding an increase in productivity, improved competitiveness, and furtherance of accountability. Moreover, it is implied by actors involved that institutions of higher education are expected to be good stewards of public resources. Burke and associates (2002) addressed the appeal of the notion of “academic excellence” to politicians and the public alike and argue that it cannot be ignored by the academic community (2002). Others stated that in order to be of any use, performance indicators should be employed only as part of a comprehensive policy approach (Titus, 2006; Jones et al., 2003), not as “an attempt to micromanage individual units, colleges, or universities” (Ewell & Jones, 1994, p. 13). The Western Interstate Commission for Higher Education (Jones et al., 2003) considers expenditures rather than funding formulas and historical precedents in its

recommendation for a balanced approach to financial strategies, one incorporating institutional subsidies, student charges, and student financial aid availability.

However, the popularity of performance-based funding with politicians guarantees the survival of the trend whether institutions like it or not, and whether it can be linked to measurable positive results or not (Schmidt, 2002, February 22). During economic slowdowns politicians generally favor the argument that more investment is completely unnecessary and institutions need to be held fiscally accountable (Lingenfelter, 2008).

Judging from the effects of previous economic downturns on higher education appropriations, colleges and universities are unlikely to enjoy a significant appropriations increase, if any at all, under present conditions (Hovey, 1999). Better management of institutional resources is no longer negotiable and performance-based funding, with or without theoretical support, is here to stay. Unfortunately, a performance based funding approach-bereft rationale, goals compatibility and a general framework is not likely to bring positive results.

Sound Financial Strategies

Neither states nor institutions appear willing to plan for the cyclical economic downturns that inevitably follow times of prosperity, a reluctance borne out by the patchwork of occasional calls for reform that appear during recession. Hovey (1999) warned against this shortsighted approach to higher education funding, saying that institutions that enjoy increases in appropriations during economic booms find it harder to maintain the same level of essential services during economic downturns. While it is essential for institutions to find better ways to manage their resources, it is no less important for states to have a funding system in place that is less susceptible to the vicissitudes of economic circumstance.

St. John (1991) proposed that state higher education policy reevaluation be undertaken with the role of the state in higher education as well as state economic development in mind. Suggesting that states employ comprehensive resource management strategies rather than simple financing, he proposed an adaptive framework for public policy strategy development based primarily on the decisions that are within the control of the higher education system. He relegated those decisions that are out of the control of higher education officials but can be influenced through the state legislative process to secondary status, noting that additional consideration should be given to intervening factors such as tax shortfalls and external factors including demographic trends and future economic conditions that are beyond the influence of either higher education or governmental officials.

Apart from its fluctuating nature, higher education financing is “potentially the most powerful policy tool states can utilize to influence how institutions, students, and employers behave in ways consistent with broader public purposes” (Jones, 2003, p. 1). However, it is not often that this policy tool is used effectively. Jones concentrates on the four components of higher education policy over which the state has influence or control, drawing attention to federal policies and various types of financial aid in the process. The four components are: (a) appropriations made directly to the institutions; (b) tuition and fee policy; (c) state student financial aid policy; and (d) institutional student financial policy (Jones, 2003). Additionally, federal financial aid policy and other programs must be taken into consideration in the state process of policy planning to ensure that states can take advantage of federal programs and thereby maximize the cost-effectiveness of their own programs.

Both the components of higher education policy that the state exerts some influence or control over as well as federal programs must be considered simultaneously in the process of

state policy planning in order to maximize effectiveness. Unfortunately, states often fail to do so due to divided responsibility among various committees within the state government, the legislature, institutional boards, and institutions themselves for different policy elements (Jones, 2003; Michelau, 2008; St. John, 1991). Decisions made at different times by players with various agendas influence the order in which other decisions are made which in turn ultimately affects policy.

Furthermore, congruency of state and institutional higher education agendas and the availability of resources to implement them are necessary conditions for an effective policy to materialize. As observed regarding the Lumina Foundation's four-year project, *Changing Direction: Integrating Higher Education Financial Aid and Financing Policy*, lessons were learned about the necessity of aligning appropriations, tuition, and financial aid (ATFA), but they were learned by academicians and higher education professionals and "too few of the important messages [were] conveyed to state legislators working and voting on the issue" (Michelau, 2008, p. 1).

An investigation of the historical trends of a state's approach to the tuition/aid relationship can reveal not only state political trends but also state commitment to higher education. During 1990s many states were shifting their funding strategies from high appropriations/low aid to low appropriation/high aid (Okunade, 2004; Rizzo, 2006).

St. John (1993) stressed a trade-off between quality and access when quality improvement initiatives are financed through tuition increases rather than appropriations and not accompanied by a financial aid increase. There are four approaches to linking tuition and student aid: (a) low tuition/low aid, (b) high tuition/high aid, (c) high tuition/low aid, and (d) low tuition/high aid. According to St. John, the low tuition/low aid philosophy assumes that

taxpayers should finance a substantial portion of educational costs due to the benefits they reap from an educated citizenry. The low tuition/high aid approach promotes opportunities and access to higher education. Those postulating that low tuition subsidizes middle- and upper-income students argue for the high tuition/high aid policy approach. The high tuition/low aid approach favors upper and middle-income families at the expense of low-income families in terms of access to higher education.

Resource availability has the greatest impact on the quality of education provided by institutions as well as their adherence to public policies (Robst, 2001; St. John, 1991). In order to ensure adequate resource availability for institutions to fulfill state goals for higher education, Kelly and Jones (2005) suggested a comprehensive approach to state-level resource management in higher education, linking program and facilities planning, cost management, institutional subsidies, student aid, and enrollment management. Program and facilities planning includes mission differentiation and various forms of institutional cooperation including a mutually recognizable system of credit transfers and dual enrollment options.

With regards to cost effectiveness, Kelly and Jones (2005) suggested that the state's ability to define adequacy of resources and to pursue strategies to achieve these levels are important for the long-term academic and financial health of higher education institutions. Unfortunately, few states consider educational costs when setting appropriations levels (SHEEO, 2011). They also fail to consider tuition and financial aid policies at the same time, thereby undermining institutional financial stability as tuition increases often follow appropriations shortfalls (Bell, 2008). Unless the increased cost of tuition is accompanied by access to greater financial aid, low-income students would incur greater financial difficulties in their pursuit of a college education (SHEEO, 2011).

St. John (1993) and Kelly and Jones (2005) approaches to funding policy planning and implementation can be viewed as complementary rather than independently comprehensive, as the former deals mainly with the revenue side of funding and the latter deals with educational costs. There are other issues to be considered as well. Federal government mandates and state policies both impact enrollment management strategy, which encompasses marketing to and recruitment of potential students, pricing and financial aid, academic and career advising, academic assistance, institutional research, orientation, and retention. Institutions of higher education rather than the state address these activities most often (St. John, 1993). Such overlap of state and institutional involvement in the above activities may lead to the duplication of efforts and limited outreach. Furthermore, some of these activities, such as financial aid, fall outside the influence of higher education institutions. States need to consider all of the above, as well as the nuances of the political process and the state economic context in order to create a workable, sustainable system.

Thus, St. John (1991), who warned about the dangers of incremental versus comprehensive strategies, and others (Jones, 2003; Jones et al., 2003; Jones & Kelly, 2007) suggested that at a minimum educational expenditures, federal and state government subsidies, tuition and fees, and state financial aid all need to be considered by states in creating higher education financial strategies that emphasize access. The best approach would involve cooperation between state government and institutions of higher education to develop higher education financial strategies that consider the costs of education. Alexander (2003, 2011) also supported the comprehensive approach idea and warned that federal subsidies failed to recognize and adequately support those states that endeavor to maintain tax effort in funding higher education and containing costs.

The unified framework can help to evaluate present policies as well as develop new strategies. There are no studies available, however, that concentrate on state financial policies as a whole and can demonstrate whether a comprehensive approach leads to superior financial health of the state system of education. With states appearing to prefer the simplicity of patchwork to comprehensive reform, research in higher education funding often reflects that preference. In *From politics to policy: A case study in educational reform* various researchers follow one reform initiative to its successful implementation and evaluate its impact (Matthews, Swanson, & Kerker, ed., 1991). The rich narrative of hurdles and successes, however, lacks suggestions about what can be changed structurally for similar initiatives to be implemented more simply. It is also more common for a success story to find its way into a study than a failure, though the lessons learned and suggestions for further improvement from the latter would prove valuable. Nevertheless, these kinds of narratives are useful for learning how to navigate the political system. It would have proven to be even more useful, however, had a conceptual framework been employed to draw parallels with other state initiatives and policy process in other states.

Framing Research

While there is great variety in higher education funding policy studies as well as the factors they take into consideration when conducting analysis, only rarely is reference made to a specific framework. As a result, it is necessary to review available frameworks to inform our understanding of the rationale for selection of specific factors. Doing so not only makes it possible to trace the origins of the factors that have been considered in the existing body of higher education funding research, it also allows evaluation of the predictive power of each

indicator within the applied model and guides the selection of indicators for the methodology part of this study.

Theoretical Framework

Richardson (2004) designed a framework based on lessons learned from research that points to the difficulty of cross-state comparative analysis. He describes a conceptual framework developed after a series of Alliance for International Higher Education Policy Studies (AIHEPS) projects, compares it with the institutional analysis and development (IAD) framework developed by Ostrom, Gardner, and Walker (Ostrom, 2007), and proposed a new version of the AIHEPS framework that incorporated IAD. According to Richardson, a unified framework such as IAD acknowledges multiple levels of policy decision-making at the federal, state, and institutional levels. The improved framework provides a comprehensive guide to the players, rules, issues, situations, and actions at each level in addition to considering the system's adaptive capacity to define priorities, achieve accountability, enhance collaboration, and manage conflict.

McLendon and Hearn's (2007) framework included indicators such as (a) higher education organization patterns, (b) variety of state postsecondary institutions, (c) enrollment demographics, (d) state economic conditions, (e) political culture and ideology, (f) legislative design, (g) partisanship, (h) gubernatorial influence, (i) interest group climates, and (j) diffusion of ideas that need to be considered to determine if they directly or indirectly influence state higher education policy. The authors also stressed the difficulty of incorporating political indicators into research, citing specific problems such as establishing theoretical relevance, defining and operationalizing the dependent variable (e.g., policy), selecting and delimiting samples, and choosing a method to interpret, collect, and measure data. While the first model provides a broader, more general outlook on the policy environment, the second allows

populating the framework with indicators, making the framework more complex, but allowing more flexibility in the selection of variables, retaining only those that withstand the theoretical relevance test.

McLendon and Hearn (2007), and Richardson (2004) did not consider K-12 and tertiary education together, nor did they consider other budgetary obligations that states incur.

Discussion of higher education funding policies is not complete without considering state obligations at all levels of educational achievement. With primary, secondary, and postsecondary education systems as well as healthcare and prison systems competing for the same state dollars, policy deliberations must consider these systems together in terms of economic and social costs and returns in order for decisions regarding funding to be sound. Certain returns from education, while less significant in terms of achievement, can have a significant impact on economic and social well-being in areas such as involvement in the country's political process through voting, human rights support, and heightened awareness of public welfare, health, and environmental issues.

McMahon (2002) proposed *The Framework for Endogenous Development*, an apparent straightforward approach to gauging the value added to society through education. It comprises eight sectors: economic growth, population and health, democratization and human rights, reduction of poverty and inequality, the environment, crime and drug use, labor force participation, and education enrollment rates. However, this model is more suitable for designing new policies oriented toward human development than explaining existing ones. Additionally, due to limited state data availability for the eight sectors, this model is presently more suitable for international than interstate comparisons.

Interstate Comparison: Insuring Comparability

McLendon and Hearn (2007) pointed out that the policies that states adopt reflect not only demographic, socioeconomic, and political factors, but also the degree of influence one factor can exert upon another. Halstead (1974, 1996) also asserted that any serious planning for statewide higher education should begin with an assessment of socioeconomic conditions and that the investigation should be supplemented through interstate comparisons. He further proposed analyzing and comparing state financing of public education by studying five factors: student burden (enrollment), fiscal tax capacity, fiscal tax effort (ratio of actual state tax revenue to tax capacity), allocation to higher education (appropriations as percent of tax revenue), and financial support achievement (appropriations for higher education operating expenses per FTE student).

While state fiscal capacity, effort, and their significance in capturing interstate disparities have been discussed earlier, some methodological issues need to be addressed further. The four widely adopted ways to measure fiscal capacity, or a state's potential to raise revenue are gross state product (GSP), state personal income (SPI), representative tax system (RTS), and total taxable resources (TTR).

Gross State Product (GSP) is criticized for its lack of comprehensiveness, as "by definition [it] does not include income earned by residents from out-of-state sources" (U.S. Department of the Treasury, 2002). Specifically, resident earnings (wages, salaries, proprietor's income, etc.) from out-of-state, and resident dividend and interest income earned from out-of-state sources are not included in Gross State Product (GSP).

State Personal Income (SPI) represents the collective wealth of state residents. In comparison, the Per Capita Personal Income (PCPI) measure represents the total personal

income of the state's residents divided by its total population. PCPI data is readily available and is a good indicator of residents' relative wealth and ability to pay taxes that are, in their turn, used to finance public services. There are, however, inherent problems with it (Hoo et al., 2002; Kincaid, 1989; Mikesell, 2007). Controversy exists over this measure's validity as an indicator of revenue-raising ability. Like Gross State Product (GSP), it is not sufficiently comprehensive, failing to reflect the diversity of existing state tax and revenue sources and take into account the ability of states to "export" taxes. Unfortunately, the federal government uses Per Capita Personal Income (PCPI) (Kincaid, p. 9).

Representative Taxable System (RTS) applies the average tax rate on income, consumption, and real property over all states to each state's tax bases (Halstead, 1974; Kincaid, 1989). The Representative Tax System (RTS) methodology, while exhaustive, is a data-intensive approach to understanding the fiscal capacity of a state and its local governments. "[U]sing disaggregated data and representative rates, policymakers are able to not only ascertain a state's relative level of fiscal capacity, but also draw out underlying levels of revenue and expenditure effort amidst various tax bases and spending categories" (Hoo et al., 2002). Unfortunately, Representative Tax System (RTS) is not regularly reported. The data are both hard to come by and lack consistency as well.

Total Taxable Resources (TTR), which has been calculated by the U.S. Department of the Treasury since 1992, captures a state's ability to raise revenues. Total Taxable Resources (TTR) is defined as the unduplicated sum of the income flows produced within a state, otherwise known as Gross State Product or GSP, and the income flows received by its residents (SPI) that a state can potentially tax. While, the measure is criticized for the lack of comprehensiveness for which Representative Tax System (RTS) is praised (Mikesell, 2007), it is widely adopted

(Grapevine, NASBO) due to the data being readily available from the U.S. Department of the Treasury.

While all three measures have their advantages and disadvantages, each yields different results when the fiscal capacity of states is evaluated. Total Taxable Resources (TTR) is utilized in this study. It is more comprehensive than either SPI or GSP. According to the U.S. Department of the Treasury (2002), TTR was designed to overcome the lack of completeness associated with SPI and Gross State Product (GSP) by accounting for the cross-border income flows that are not accounted for in Gross State Product (GSP). Its main advantage over Representative Tax System (RTS) is that the measure is regularly published by the U.S. Department of the Treasury under Public Law 102-321.

However, comparing the achievement levels of states without accounting for differences in their need for various public services in general and higher education in particular accomplishes just part of the task of evaluating state effort in funding higher education. Halstead (1974) approaches need for higher education funding in terms of "burden," the number of students that state has to serve. While supporting the idea of enrollment effect on appropriations in general, Leslie and Ramey (1986) stress that over the years there was an observable decrease in additional funding per each additional FTE student. Thus, "adding enrollments is usually bad institutional policy" as "the marginal cost of educating additional students will be greater than the marginal revenue" (p. 17). They go on to note that the decline in the appropriation-enrollment ratio is greater in states running a budget deficit, but their research does not fully account for interstate differences in enrollments by educational levels, nor does it attempt to account for other states needs and obligations.

Measuring fiscal disparities requires a state-by-state construction of estimated revenues and expenditures based on typical tax and expenditure policies across the nation (Hoo et al., 2002). This is accomplished by *Measuring Fiscal Disparities across the U.S. States: A Representative Revenue System/Representative Expenditure System Approach* (further Report), a study commissioned by the Tax Policy Center in collaboration with the New England Public Policy Center at the Federal Reserve Bank of Boston. The report measures the fiscal disparities across the 50 states looking at each state's revenue capacity, expenditure need, and level of fiscal capacity. It uses a methodology based on "the underlying economic and demographic conditions found in the states rather than actual revenue and expenditure levels" (Hoo et al., 2002).

While Report's use of a representative revenue system serves best to equalize states for the purposes of this research, there are difficulties in obtaining pertinent data, difficulties that have already been discussed earlier in the literature review. However, Report's utilization of Representative Expense System (RES) is a different matter. A state's expenditure need estimates the extent to which the state faces conditions that require it to raise or to lower its support for public services. Representative Expense System (RES) takes into account a state's underlying demographic, socioeconomic, and geographical characteristics to calculate its expenditure need. These expenditure estimates are independent of states' actual tax and expenditure policies. While Report is unfortunately limited to one fiscal year, 2002, it nevertheless provides compelling rationale for its methodology. Report's RES approach is adopted in this study for the purposes of calculating state needs for funding of higher education to further compare it with actual state achievement. An additional appeal of the measure is its policy-neutral approach. Higher education expenditure need measures how much a state must spend per capita on its residents to

provide the basic higher education services typically offered by states across the country. The process of calculating this measure is explained in detail in the next chapter.

The disparity that exists in fiscal capacity levels among states reveals the difficulties some face funding higher education. While fiscal capacity is independent of state policies, state tax effort is based on state policy decisions and financial priorities. The size of a state's fiscal gap between its fiscal effort and expenditure needs indicates how much greater the revenue effort needs to be in order to meet the expenditure needs of the state without relying on federal grants or cutting program expenses.

Unfortunately, there are no national studies that evaluate the impact of state fiscal capacity and effort on the levels of support for higher education. Some national studies have utilized these variables, but they did not go beyond ranking and not attempted to explain how these differences affect higher education funding. Additional problems with national studies are the topic of the next section.

Methodological Research Issues

Educational research is frequently criticized for an absence of scientific rigor (Lagemann, 1999). Lamentably, it also seldom heads or influences policy changes (Orland, 2009). The latter can be explained by a variety of existing policy networks that do not always coordinate with one another. The complexity of the policy environment was discussed earlier in this review when various policy frameworks and the polarization of the policy process were considered. The very nature of higher education funding research is complex because the higher education funding decision-making process is value-laden, politically exploited, and at the mercy of economic cycles. The scientific rigor of educational research in general and research in higher education funding specifically is further addressed here.

Scientific Rigor

Lagemann (1999) pointed out that one of the problems with educational research is that “more often than not studies of the same problem reach fundamentally different conclusions” (p. 8). The reviewed research indicated that in addition to differences in importance of each factor in higher education funding, there are differences in factor selection as well. There are as many combinations of variables considered in higher education funding research as there are research publications on this topic (Cheslock & Hughes, 2011; Rizzo, 2006; Weerts & Ronca, 2008; McLendon & Hearn, 2007; Toutkoushian & Hollis, 1998). In addition to the wide range of variables considered by scholars are the variety of frameworks and theories encountered in their research. Hofferbert (1968) pointed out that in the absence of unified theoretical support there is a substantial amount of variance left unexplained. He also stressed that theory would be likely to point the direction for future research to “chip away at the unexplained variance” (p. 402).

Methods. Orland (2009) observed that the emphasis in academic research on making original contributions to the field as opposed to replicating or refining the work of others makes attaining scientific rigor challenging. Nevertheless, it is worth pointing out that educational scholars readily employ advanced statistical procedures in the attempt to ensure scientific rigor in their research. In the higher education funding research surveyed for this study that examined multilevel data, two broad methods were typically employed: hierarchical linear regression (HLR) methods (Hossler et al., 1997) and econometric panel methods (Cheslock & Hughes, 2011; Rizzo, 2006; Toutkoushian & Hollis, 1998; Weerts & Ronca, 2008). Cheslock and Hughes (2011), however, pointed out that there are more similarities between the two approaches than differences, that econometric panel models are essentially more advanced regression models. While they asserted that the choice of methodological tradition within which to work often

depends on practical considerations—e.g., methodological limitations, accessible computing options, etc.—they also stressed the benefits of using more advanced models. The two main advantages of using panel data analysis are an increased number of observations and the ability to compare observations across space and over time (Podestà, 2000). Among the main disadvantages are cross-case autocorrelation—e.g., a sluggish economy effects all states, a tuition increase in one state impacts enrollments in other states, etc.—and increased chance of heteroscedasticity due to multiple observations (Podestà, 2000).

In addition to methodological differences that impact research findings (Toutkoushian & Hollis, 1998) and differences in the frameworks utilized to select variables, some variation in findings can be attributed to the use of data from different sources, as various organizations might have slightly different ways of reporting data. “Understanding state support for higher education is complicated by the various perspectives of organizations that measure monetary support” (SHEEO, 2010, p. 57). The National Center for Educational Statistics, the Bureau of Economic Analysis, the U.S. Census Bureau, the U.S. Treasury, the Bureau of Labor Statistics, the State Higher Education Finance (SHEF) study, National Association of State Budget Officers (NASBO) reports, and Illinois State University's Grapevine surveys all have their own methods of data identification, collection, compilation, and reporting. Following are some of the differences relevant to this study are examined.

Data. Three national annual SHEF studies, the *Grapevine* survey, and NASBO all report different numbers based on “unique definitions and data elements” (SHEEO, 2010). Further, states differ in their practices of collecting and reporting data (SHEEO, 2010). To avoid some of the pitfalls in data collection, data such as TTR, state tax collections, poverty levels, etc. were taken from the agencies whose responsibility it is to collect that data— e.g., the Bureau of

Economic Analysis, the U.S. Census Bureau, the U.S. Treasury, and the Bureau of Labor Statistics—rather than from national studies of higher education finance. “Reconciling these differences (both at the data collection and state levels) may be impossible; understanding them, however, is essential to getting a clear picture of state trends in financing higher education” (SHEEO, 2010, p. 57).

Conclusion

Education is the primary means to resolve some of societal problems. Throughout history, various rationales have been used to secure public support for higher education. The U.S. now lags behind other developed countries in its production of educated citizenry (The White House, 2009). As doubts about the nation’s future global competitiveness grow, calls for reform mount. But instead of constructive criticism to bring positive change, the rationale that drives policymakers becomes this: “higher education has another source of revenue—tuition” (AASCU, 2011). This rationale does not help promote access to, improve the quality of, or accomplish the goals of education.

Scholars stressed that present research extends existing arguments but falls short of proposing a new rationale for public financing of higher education (St. John & Parson, 2004). The absence of a new rationale limits the impact that policy research has on improving policy, as the public and politicians alike need to be convinced once again that education is a necessity and not a luxury. While it appears that politicians would rather equivocate than solicit input from researchers to inform policy decisions, policy implementation now draws the attention of researchers who are concerned with under-investment in higher education and eager to create a new rationale to gain public support. The human capital and human development theories can provide the much needed rationale for public support of higher education. A comprehensive

approach, built on a framework that incorporates national, state, and institutional priorities in all the complexity of their political, socioeconomic, demographic, and fiscal environments, can better inform higher education funding policy decisions. Human capital theory as a rationale for expanding investment in higher education allows us to step beyond the immediate fiscal circumstances that face the state and glimpse a more rational world in which higher education appropriations are directed where the need is greatest and informed decisions are made based on the best evidence available to all the stakeholders.

Conceptual frameworks, theories, and models are important to structure the research process and inform policy decisions. Review of previous research leads to several important methodological conclusions. First, there are multiple dimensions to be found in the types of so-called “social”, “economic”, and “political” characteristics that have been used most frequently in comparative state studies. The composition of these dimensions, while sufficiently consistent over time for some variables (e.g., political variables), can be less so for others (e.g., socioeconomic variables) that are more multidimensional. Research utilizing socioeconomic variables does not contain a readily apparent theoretical rationale for the utilization of any particular factor. Rather, such research explores whether those factors have any influence over specific phenomena such as higher education funding. The impact of state fiscal conditions—tax effort and tax capacity—though, is not studied in terms of its relevance to higher education funding decisions. This gap is addressed in this work. Thus, in the absence of strong theoretical support for selecting particular variables, by selecting a unique set of variables and studying their impact on state support of higher education, researchers attempt to move toward the formation of a theory (Hofferbert, 1968). This research contributes to that effort.

It is essential, however, to use methods of scientific inquiry to test these variables to determine how much promise they “hold for relating in a theoretically interesting manner” (Hofferbert, 1968, p. 407) to the dependent variable (state support for higher education). This is the subject of the next chapter, which is devoted to the methodology of this study.

Chapter Three

Methodology

Underinvestment in higher education is underinvestment in the human capital of a state and the country as whole. It not only undermines the nation's competitiveness in the global marketplace, but also limits the utilization of human potential and curbs social development (Heckman & Krueger, 2004). Investment in human capital is threatened during economic downturns as states facing budgetary constraints cut appropriations, largely at the expense of higher education (Orkodashvili, 2008). However, states vary in the extent of those cuts. As the literature review has demonstrated, there are socioeconomic, political, demographic, and fiscal reasons for this variation. This chapter presents the research methodology to account for factors associated with state higher education funding. It makes use of state demographic, socioeconomic, and budgetary characteristics as they relate to the strength of state support for higher education and as rationale for funding and investment in higher education.

Research Design

In order to adequately analyze states' commitment to support of higher education, two methods were used. The methods were chosen as a result of the literature review in the context of the goals of the study as most capable of revealing higher education funding trends: panel data analysis (also known as longitudinal or cross-sectional time-series, or pooled time series) and descriptive statistical analysis.

In the review of higher education funding research that examines multilevel data, it was found that two broad methods are typically employed: hierarchical linear regression methods and econometric panel methods. In order to analyze the impact of various factors on the level of state appropriations for WICHE states both across the states and over several years panel data analysis

procedures were employed. Panel data analysis acknowledges states' heterogeneity and controls for it (Baltagi, 2008). "Panel data give more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency" (Baltagi, 2008, p. 7). A variety of terms are used under the umbrella of cross-section time series research: pooled time series, panel data, and longitudinal data. Additionally, several different models are employed to estimate linear panel regression: pooled estimators, fixed effects (FE) estimators, and random effects (RE) estimators.

As the panel data involves a large number of observations, the issue of consistency of the findings was the decisive factor in the choice of the appropriate model. The pooled estimators model assumes that the coefficients remain constant across time and space, thus limiting the interpretive power of the panel, "camouflag[ing] the heterogeneity (individuality or uniqueness) that may exist" among 15 states (Gujarati, 2011, p. 282).

The term "fixed effects" is due to the fact that each state intercept, although different from the intercepts of other states, does not vary over time, that is, it is time-invariant (β_0_i). The RE model (REM) intercept is random not only across states but also across time for individual states ($\beta_{0_{it}}$). REM is more appropriate when the data included in the panel is a sample rather than a population, which is not the case in this study. As the 15 WICHE states were treated as a population and inference was restricted to the analysis of these fifteen states, the fixed effects model (FEM) is an appropriate "specification" (Baltagi, 2008). An additional decisive factor was that all variables included were time-variant variables; control over omitted time-invariant variables made the FEM a preferred method as it produces unbiased and consistent estimates (Zhang, 2010). Thus, FEM was determined to be the most appropriate model for this research.

Descriptive statistics was used to compare the higher education expenditure need and actual expenditures for higher education for all 50 states, further concentrating on WICHE states in general, and Montana in particular.

Research Questions

Several research questions were focus of this work:

1. What is the relationship of a state's socioeconomic climate and its competing priorities on higher education support?
2. What is the relationship between state's higher education characteristic and state's contributions to higher education?
3. What is the relationship between state's fiscal capacity and effort and state's contributions to higher education?
4. What is the relationship between state higher education expenditure need and state higher education appropriations?
5. Where is Montana relative to other WICHE states in terms of higher education support?

Variables and level of data

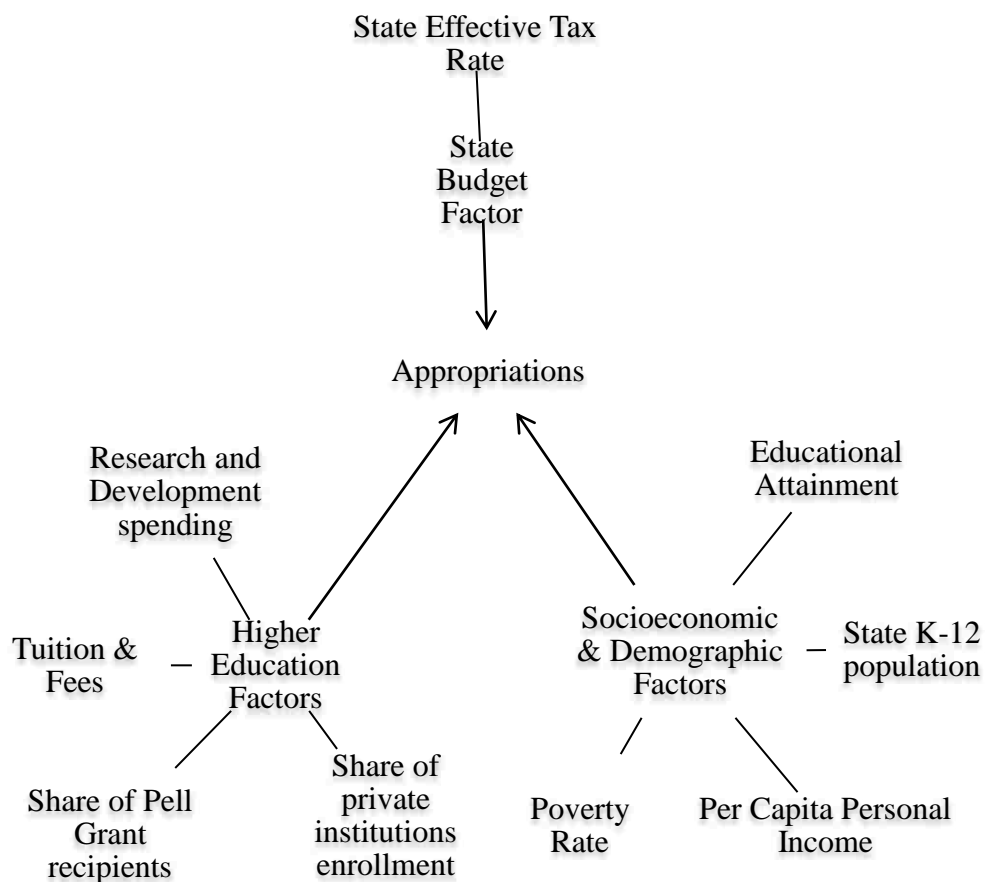
“A responsible procedure for making interstate comparisons must necessarily begin with a thorough and accurate understanding of every estimate involved” (Halstead, 1974, p. 54). Most of the variables utilized in this research are composite variables, or variables expressed in the form of indexes. While some were drawn directly from various sources, others required calculation. Both, however, call for the detailed description presented here and supplemented with more information in Appendix A.

Although financial support of higher education is a complicated issue, one influenced by intangible as well as tangible factors, only quantifiable variables were used in this study (See

Figure 1). All collected data was ratio level data. The comprehensive literature review identified the following variables as potential if not actual factors associated with the predictive validity of financial support for higher education.

Independent variables. Nine independent variables were utilized in this study. These variables were taken from the Review of the Literature based upon their appropriateness for determining predictive validity. Figure 1 outlines the underlined relationship between variables described below.

Figure 1. Relationship between independent and dependent variables



Socioeconomic and demographic factors (SED).

1. *State educational attainment (Ed Attainment)*: The percentage of the population 25 and older with a bachelor's degree or higher. Multiple studies demonstrated that one factor in student success in college is encouragement and support of parents who themselves have some level of higher education (Bean, 2005; Titus, 2006). Another factor is income level, also addressed here when measuring PCPI. Overall, the estimate of a state population's education is perceived to be indicative of the extent to which that population, by reason of obtaining formal educational experience, is likely to appreciate higher education and encourage and support its development (Halstead, 1974).
2. *K-12*: The proportion of a state's K-12 population as the percentage of total state population. This variable was included because the literature review indicated that K-12 education appropriations compete with higher education appropriations (Hossler, Lund & Ramin, 1997; Tandberg, 2010; Weerts, & Ronca, 2008).
3. *Per Capita Personal Income (PCPI)*: An estimate of the total personal income of a state's residents divided by the state's total population. It is one estimate of a state's relative wealth and the estimate used in such federal grant programs to the states as Medicaid (Compson & Navratil, 1997; The Lewin Group & The Nelson A. Rockefeller Institute of Government, 2004). Low PCPI is cited by politicians as a reason for low appropriations due to the state's inability to raise taxes (Hossler, Lund, & Ramin, 1997). The estimate can also be viewed as a representative estimate of educational impact on earnings in the state. Research indicates that people with higher education earn more over their lifetimes than those without it (Baum, Ma &

Payea, 2010; U. S. Department of Labor: Bureau of Labor Statistics, 2011). Low PCPI can be a motivating factor in encouraging higher education support.

4. *Poverty Rate (Poverty)*: The proportion of the state population living in poverty (U.S. Census Bureau, 2010b; The Lewin Group & The Nelson A. Rockefeller Institute of Government, 2004). The U.S. government estimates poverty by income standard. This estimate is chosen over the unemployment rate for two reasons: first, the unemployment rate is subject to greater fluctuations, and second, the unemployment rate is not really an unemployment rate. It is the number of people who looked for work during a certain fiscal period. Those people who draw unemployment benefits may not look for work until their benefits run out but are not counted as unemployed during the months in-between. Thus, poverty can be a more accurate indicator, as the poverty guidelines are used to determine eligibility for public programs such as Medicaid and other welfare services that compete with higher education for state funding.

Higher education factors.

1. *State higher education enrollment in private institutions (Private)*: The actual share of the estimated full-time-equivalent (FTE) enrollment in private institutions. This estimate is perceived to be important in determining whether there is a difference in higher education allocations with states that have a large share of their population attending private institutions as some research has indicated there is (Rizzo, 2006).
2. *Pell Grant Student (Pell Grant)*: Percentage of the student body that are Pell grant recipients. The federal Pell Grant is a guaranteed federal financial assistance program

to all students meeting government-established eligibility criteria, with the amount of aid determined by financial need, enrollment level, and educational cost. Because the program is sponsored by the federal government, there is a possibility that it negatively impacts higher education appropriations as poor students are partially supported by federal dollars (Rizzo, 2006; Tanberg, 2010).

3. *Tuition and Fees (Tuition)*: Average tuition and fees in public institutions of higher education per FTE student. Tuition and fees are sources of revenue for colleges and universities. Politicians often consider them in the process of making decisions about appropriations because these institutions can generate their own revenue by charging their students for the services they provide.

When appropriations are cut institutions often have to raise tuition and fees to maintain the same level of services (Koshal & Koshal, 2000). Robst (2001) stated that reductions in state appropriations combined with increases in tuition revenue resulted in universities receiving a reduced proportion of revenues from the state and an increased proportion from students.

The tuition and fees charged by states at their public higher education institutions, and consequently, the costs of education students face will depend greatly upon the state in which they reside. The tuition and fees factor is widely used in higher education funding research (Cheslock & Hughes, 2011; Hamermesh, 2005; Hovey, 1999; Rizzo, 2006; Russell, 2008; Zameta, 2004). It is also one of the factors influencing the decisions students make regarding enrollment and persistence in higher education. Such decisions affect state higher education participation and graduation rates as well as overall state human capital development (Astin, 1997;

Bean, 2005; Titus, 2006).

4. *Research and Development investment per capita (R&D)*: Total (federal, state, and local) R&D expenditures for postsecondary institutions / Total population. The R&D expenditures estimate is one of the ways to assess state competitiveness in generating research in the areas of medicine, science, and engineering. It includes only the R&D expenditures generated by postsecondary institutions and it does not include federal labs. R&D investments boost discoveries that enhance productivity and expand economic capacity.

State budget factors.

State Effective Tax Rate (ETR): Actual Tax Revenue per capita divided by Total Taxable Resources per capita, expressed as a percentage, ETR can be expressed in the formula: $ETR = \text{Tax Revenue} / \text{Tax Capacity}$. Effective tax rates are indexed to the national average in order to indicate the variation across states relative to the national average. Estimating fiscal disparities requires the utilization of a typical tax and expenditures policy that is independent of state policies. As indicated in the literature review, there are several estimates that to some degree satisfy this requirement. The full description of each and the rationale for the choice of total taxable resources (TTR) is also provided in literature review. An estimate of state fiscal capacity, the TTR is independent of a state's actual tax policies. Produced annually by the U.S. Department of the Treasury, it is readily available. The U.S. Census Bureau provides the data regarding resources collected through taxes (tax revenue) that are available for public spending. While SHEEO SHEF reports utilize this data, the original data sources are used to acquire the tax revenue and TTR information. Both estimates—tax capacity and tax revenue—are reported on per capita basis, simplifying the calculations. State tax effort represents the extent to which a

government uses its tax capacity to support public services, including providing for higher education (Alexander, 2003; Halstead, 1974, 1996). Alexander pointed out that when the fiscal capacity and effort of a state to support higher education and other public services is not taken into account, state higher education expenditures may present a distorted picture. Poor states, for example, may appear to spend less on higher education and welfare programs and wealthier states more (The Lewin Group & The Nelson A. Rockefeller Institute of Government, 2004). As stated in the literature review, wealthy states with above average fiscal capacity and poor states with below average fiscal capacity differ in their ability to raise additional tax revenue. States also differ in their tax effort for various political and economic reasons. Utilization of ETR in this research allows for unified outlook on state tax effort for the purposes of comparison.

Dependent variables. There was one dependent variable in this study—state appropriations per FTE student. Appropriations provide a monetary measure of state commitment to higher education support (Bell, 2008).

State Appropriations per FTE student (Appropriations): State appropriations statistics utilized were state and local appropriations for general operating expenses of public postsecondary education and include state-funded financial aid to students attending in-state public institutions. Sums for research, agricultural extension, and teaching hospitals and medical schools were excluded (SHEEO, 2010; U. S. Census Bureau, 2010a). This estimate was the amount that the state allocated to support the operation of its institutions of higher education divided by the total number of FTE students in the state. Calculation was unnecessary as the data were reported by SHEEO and WICHE on a per FTE student basis.

There are two methods commonly used to estimate state appropriations to higher education (SHEEO, 2010). One estimates appropriations per \$1,000 of personal income

(Richardson & Martinez, 2009, Grapevine System, 2012), the other estimates appropriations on a per FTE student basis. Both State Higher Education Executive Officers (SHEEO) SHEF and WICHE report appropriations using both methods, and some researchers use both methods without explaining why they have done so (Toutkoushian & Hollis, 1998). The second method was chosen for this research. The main consideration for use of the per-FTE-student appropriations estimate was to allow for equitable comparison among states. Another consideration is that the *Tuition & Fees* variable was also estimated on a per-FTE-student basis. Thus, comparison on a per-FTE-student basis appeared to be a better estimate of a state's achievement in supporting its higher education services. Appropriations were adjusted for inflation, interstate differences in the cost of living, and in the enrollment mix among different types of state institutions.

Descriptive statistics variables. A state's expenditure need for higher education (*S_HEDNeed*) is the amount that a state would have to have spent per FTE student to provide higher education services on par with the national average. It included expenditures associated with operational expenses of higher education institutions. Expenditure need estimates were independent of the actual expenditure policies of states (Hoo et al., 2002). The *need* estimate was determined on a per-FTE-student basis for the same reason that the estimate of state appropriations was determined on per-FTE-student basis. An additional consideration was to preserve consistency between the two estimates. There were four factors and two adjustment indexes that were necessary for the estimate of higher education expenditure need. They were:

1. *United States higher education population (USHEDP)*: Entire United States population, 2010 estimates.

2. *State higher education population (S_HEDP)*: Higher education population of each of the 50 states.
3. *State higher education expenditure (S_HEDE)*: State and local dollars appropriated to higher education operating expenses. It excluded appropriations for independent institutions, financial aid for students attending independent institutions, research, hospitals, and medical education (SHEEO, 2010).
4. *United States total direct general expenditure (USTDGE)*: Included state and local government expenditures for education services, social services and income maintenance, transportation, public safety, environment and housing, governmental administration, interest on general debt, and other general expenditures (NCES, 2008).

Adjustments

Failure to make inflation adjustments may result in misinterpretation of the simultaneous growth of two variables as a strong correlative relationship, while it may simply be due to inflation that impacts both variables simultaneously. Accordingly, time-series variables that were measured in dollars such as state higher education appropriations, net tuition and fees, per capita personal income, and R&D investments were all adjusted for inflation. Thus, to eliminate the effect of inflation all dollar variables were presented in 2010 dollars. Additionally, states have different costs of living—e.g. Hawaii and Alaska represent two of the extreme examples of a significantly higher-than-average cost of living (SHEEO, 2010). There are three adjustments that SHEEO (2010) recommends applying to all variables estimated in dollars for the purposes of interstate comparison of higher education expenditures:

1. *Cost of Living Adjustment (S_COLA)*: Adjusts for cost of living differences among the states. It was utilized in both pooled time-series analysis and descriptive statistics analysis.
2. *Enrollment Mix Index (S_EMI)*: Adjusts for differences in the mix of enrollment and costs among types of institutions with different costs across the states. It was utilized in both pooled time-series analysis and descriptive statistics analysis.
3. *Higher Education Cost Adjustment (HECA)*: Adjusts for inflation over time. It was only utilized in pooled time-series. Descriptive statistics analysis results were indexed and thereby there was no need to adjust for inflation.

COLA and inflation coefficients are applied to PCPI estimates. Inflation coefficients are also applied to Research and Development investment. The SHEEO data had already all three recommended coefficients applied to appropriations and HECA to net tuition estimates. A complete description of the data source for every variable and adjustment index utilized can be found in Appendix B.

Population

Two different populations were used for panel and descriptive parts of this research. For the panel or pooled cross-section time series analysis, the population was 15 WICHE states: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, North Dakota, Utah, Washington and Wyoming.

There was no sampling error specified because both panel and descriptive analysis included the entire population and were censuses. In the panel part of the research dealing with the 15 WICHE states, these states were the entire population and a census. For the descriptive

statistical analysis of differences between actual higher education appropriations and estimated need, the population was all 50 states.

External validity

Many of the variables included in this study estimate complex constructs. As it was difficult to determine how well these variables actually represent the targeted phenomenon, studies utilizing similar constructs were investigated to determine construct validity. The estimates utilized have been demonstrated to have varying degrees of impact on state higher education support.

While variables' validity is assured by the organizations collecting data. However, some, poverty rate, for example, have been reported with a degree of error. This is viewed as unavoidable when a population survey is involved or simple human error may have occurred in data collection. As some of reported errors are insignificant, their impact on data accuracy is negligible (United States Census Bureau, 2012). The degree of uncertainty for an estimate is represented through the use of a confidence interval. United States Census Bureau reports 90 percent confidence interval, thus it provides 90 percent certainty that the true number falls between the lower and upper bounds.

Another challenge was presented by the diverse practices in data collection and reporting among the 50 states, and the timing of these processes, which makes it impossible to eliminate all inconsistencies and accomplish absolute comparability among states and institutions (Grapevine System, 2012).

Each state differs in its cost of living. The State Higher Education Finance (SHEEO,

2010) report recommends adjustments of the “raw” state data to account for interstate differences. Each state’s actual expenditures per FTE student were adjusted to account for differences in cost of living among states (S_COLA), enrollment mix (S_EMI), and higher education cost adjustment (HECA) (see Tables E1 and E2).

To convert per FTE student appropriations to 2010 constant dollars, the nominal dollar amount was divided by each of the adjustments. For example:

$\text{Appropriations (any year) / S_EMI / S_COLA / HECA}$ provided a constant 2010 dollar net tuition figure appropriate for interstate comparison (SHEEO, 2010). To convert T&F to 2010 constant dollars, the nominal amount was divided by each of the adjustments. For example:

$\text{Tuition/S_EMI/S_COLA/HECA}$ provided a constant 2010 dollars net tuition figure appropriate for interstate comparison.

Data Collection Procedures

Secondary data sources were utilized in this work. The data was acquired from and cross-referenced with the National Center for Education Statistics (NCES), the National Center for Health Statistics, the State Higher Education Executive Officers (SHEEO), Illinois State University's Center for the Study of Education Policy (Grapevine), the Western Interstate Commission for Higher Education (WICHE), the United States Department of the Treasury, and the United States Census Bureau. The data were carefully reviewed and compared in an attempt to verify that the same methodology was used for the same variables during the same years in various sources.

For the panel analysis, the data years were 2001-2009. Gathering data over time and from multiple sources where possible allowed comparing variables for consistency and helped reduce validity threats to the results of the analysis. Data availability and the methodological

consistency of data collection were the major considerations in limiting the data to the years 2001-2009. For example, 2009 was the last year of data used because there was no data available to calculate ETR beyond that. While this study was thus limited longitudinally, it nevertheless covered periods of economic prosperity as well as hardship (National Bureau of Economic Research, 2010).

For the descriptive statistical analysis the 2001, 2005, and 2010 data were used. The consistency of the methodology of data collection and data availability were the major considerations in limiting the data to these three years. A complete description of the data source for every variable utilized and the time period in which the data was collected and pooled, can be found in Appendix A.

Measurements and instruments

Panel analysis. First, panel (Gujarati, 2011; Halcoussis, 2005) or longitudinal data analysis, also referred to as regression time series analysis, pooled time series cross-section analysis (Halcoussis, 2005; Podestà, 2000) (further panel) was employed to examine what kind of influence states' socioeconomic, demographic, higher education, and financial factors play in their level of support for higher education. Podestà (2000) identified several advantages of using panel data. The main goal of time series analysis is to identify the nature of the phenomenon represented by the sequence of observations. Panel analysis allows observations among states and economic variables by comparing observations across space and over time. It combines time series for several cross-sections. Panel data are characterized by having repeated observations over several years on fixed units (states). This means that pooled arrays of data are those that combine cross-sectional data on N spatial units and T time periods to produce a data set of $N \times T$

observations. Here, the range of units analyzed was the 15 WICHE states, with each unit observed over nine consecutive years:

15 states \times 9 years = 135 observations for each variable. There are total 10 variables (9 independent + 1 dependent).

As the cross-section units were more numerous than temporal units ($N > T$; $15 > 9$), the pool was conceptualized as “cross-sectional dominant” (Podestà, 2000). Also, Sayrs (1989) pointed out that pooling is particularly useful in applied research when the data are limited.

The generic pooled linear regression model is estimable by the Ordinary Least Squares (OLS) procedure:

$$y_{it} = \beta_{0i} + \sum_{k=2}^k \beta_k x_{kit} + e_{it}$$

Here, i = state 1, state 2, ...; t = year 1, year 2, ...; k = explanatory variable 1, variable 2, ... Thus, y_{it} and x_{it} refer respectively to dependent and independent variables for unit i and time t ; and e_{it} is random error and β_0 and β_k refer, respectively, to the intercept and the slope parameters.

Within the panel research, the cases are “state-year” (NT observations) starting from the state i ($i = 1, 2, \dots, 15$ states) in year t ($t = 1, 2, \dots, 9$ fiscal years), then state i in year $t + 1$ through state z in the last year of the period under investigation. The interval between observations is constant and fixed as the observations are taken in consecutive years. In this research data is called a balanced panel because the number of time observations, nine, is the same for each state (Gujarati, 2011). The error term, e_{it} , has two dimensions, one for the state and one for the time period. When using the fixed effects model, one assumes that the state error

component is constant across time for individual states (it becomes part of the constant term) and varies with each state. Thus, all states have constant slopes, but varying intercepts. It leaves the model with only one error component, the time error component. STATA 12 was used to conduct panel (cross-section time-series, or longitudinal) data analysis.

Descriptive analysis. Additionally, descriptive statistics was used to evaluate how well all 50 states meet their need for public support of higher education. Higher education support need—spending that was approximately the same as the national average—and actual expenditure were compared to evaluate whether each state spent enough to provide its residents with higher education services that were equivalent to the national average. Expenditure need calculations took into account the underlying demographic and socioeconomic structure of each state by adjusting the expenditure need monetary value to account for interstate cost of living and enrollment differences. A state's expenditure need for higher education was the amount that a state would had to have spent on its residents to provide higher education services on an equal level with the national average.

In order to estimate higher education need, several calculation steps were performed. The calculation steps were based on the procedure outlined in *Measuring Fiscal Disparities across the U.S. States: A Representative Revenue System/Representative Expenditure System Approach*, a study commissioned by the Tax Policy Center in collaboration with the New England Public Policy Center at the Federal Reserve Bank of Boston, previously discussed in the literature review section.

Step 1. For higher education expenditure, the *workload* that determined the relative need across states was identified. For higher education, the workload factor was the number of students enrolled in higher education in a specified year.

- Step 2.* Because the focus was on relative need, each state's workload factor was presented as a percentage of the national workload factor.
- Step 3.* For higher education expenditure function, the national total direct general expenditure was multiplied by each state's higher education workload factor to estimate expenditure need.
- Step 4.* In order to account for interstate higher education cost differences, the expenditure need in each state was adjusted by COLA and EMI factors.
- Step 5.* Adjusted expenditure need was normalized so that the total national expenditure need for higher education equaled the actual national need for higher education.
- Step 6.* To calculate the per FTE student expenditure need, normalized and adjusted expenditure need was divided by the state's FTE student population.
- Step 7.* Each state's expenditure need was indexed to the national average to calculate the *index of expenditure need*.
- Step 8.* States' expenditure needs and actual higher education spending was compared to estimate how well states met their higher education needs.
- Step 9.* For easier interstate comparison, states were ordered from high to low higher education expenditure gap.

Data Analysis

Type of analysis

Panel data analysis, also called pooled cross-section time series analyses was used to examine the level of correlation between each independent variable and the level of state support for higher education. This line of inquiry focused on the relationship between appropriations for higher education and several state variables: socioeconomic and demographic variables, state

budget, and higher education factors. According to Cozby (2007), the internal validity of an experiment is the extent to which the researcher has controlled extraneous variables so that any observed effect can be attributed solely to the variables utilized in the research. The Fixed Effects Model (FEM) controls for extraneous variables.

It was not the purpose of this study to validate the predictive strength of the independent variables used; this research assumed that the chosen independent variables influence the funding of higher education. "The measurements are clearly interrelated, yet each is sufficiently distinctive and important to contribute independently to the total impression" (Halstead, 1974, p. 55). This research investigates the degree of this influence. Utilization of STATA statistical procedures insures the accuracy of the estimates of that influence.

Also the differences among WICHE states with regards to factors associated with state support for higher education as well as the level of support itself were examined. Descriptive statistical methods were used to analyze states' achievement in funding higher education based on their needs and actual support and states were ranked by the level of achievement in funding higher education.

A priori assumptions. Based on the research discussed in the literature review section of this study, it was first assumed that all the independent variables have an impact on state appropriations for higher education. There was an assumption that some unobserved state characteristics might impact or bias the appropriations variable, but FEM controlled for them. Another assumption was that these unobserved time-invariant characteristics were unique to individual states and were not correlated with independent variables. Finally, two assumptions regarding the regression error term were made: first, individual errors were not correlated with each other; and second, individual errors and the constant term were not correlated.

Summary

This chapter provided a comprehensive explanation of the quantitative methodology utilized in this research. Cross-section time-series analysis and descriptive statistical analysis were employed to answer research questions about how different socioeconomic, demographic, higher education and budget factors are associated with state support for higher education. The choice of independent variables—state population level of education, elementary-secondary school productivity, portion of state K-12 population, percent of state population employed in professional and service industries, per capita personal income, poverty rate, share of student population in public colleges, universities, and the private higher education sector, percentage of student population receiving Pell grant support, average tuition and fees, as well as state ETR—was explained. Explanation was given for each composite variable to show how it was estimated. The data collection procedures and databases used were stated and the evidence of data quality was presented. The two populations—all 50 U.S. states and 15 WICHE states—under study were described. Research steps and procedures were outlined. The next chapter reports the results of research procedures.

Chapter Four

Results

The purpose of this quantitative study was twofold: first, to examine the level of influence on state appropriations to higher education exerted by a state's socioeconomic, demographic, and higher education factors, and, second, to evaluate states' higher education support and compare that support with each state's need. The following research questions were selected to meet the above-stated purpose:

1. What is the influence of a state's socioeconomic climate and competing priorities within the state on its support for higher education?
2. What is the relationship between a state's higher education characteristics and its contributions to higher education?
3. What is the relationship between a state's fiscal capacity and effort and its contributions to higher education?
4. What is the relationship between state higher education expenditure need and state higher education appropriations?
5. Where is Montana relative to other WICHE states in terms of higher education support?

The above questions are the core of this chapter, the first part of which presents the results of the panel data analysis in addressing the first three research questions: the influence of state socioeconomic climate and competing budget priorities, state higher education characteristics, and state fiscal capacity and effort on state support of higher education. The second part of this chapter is devoted to descriptive research dealing with the fourth research

question, the relationship between state higher education expenditure need and state higher education appropriations for all 50 states. It also further concentrates on WICHE states and Montana and thus covers the fifth research question. The follow-up discussion of the findings will be addressed in the last chapter of this research.

Panel Data Analysis

This section reports the results of statistical analysis examining the first three research questions. Overall panel and descriptive data analysis results are presented, followed by results related to the influence of state socioeconomic factors on higher education appropriations, the influence of higher education factors on state higher education, and, finally, state budget factors are presented to demonstrate their level of influence on state support of higher education.

Panel analysis results

The first three research questions dealt with three categories of state factors— socioeconomic and demographic characteristics, higher education characteristics, and budget characteristics — and the extent of their influence over state support for higher education as measured by state appropriations to higher education. State socioeconomic and demographic characteristics were represented by such factors as per capita personal income, poverty rate, educational attainment, and state K-12 population. State research and development spending, tuition and fees, share of Pell grant recipients, share of private institution enrollment were higher education factors considered in evaluating their influence over the level of state appropriations. The relationship between a state's fiscal capacity and effort (actual collected tax revenue) is represented by state effective tax rate (ETR). ETR was the single state budgetary factor used to determine its influence on state contributions to higher education. The panel regression fixed effects model was used to analyze the influence of all nine independent variables— educational

attainment, state K-12 population, per capita personal income, poverty rate, research and development spending, tuition and fees, share of Pell grant recipients, share of private institutions enrollment, and tax effort— on state support for higher education, aka state appropriations. The single dependent variable in the model was the level of state appropriations expressed in state dollar spending per FTE student (see Table C12). The independent and dependent variables were gathered for 15 WICHE states (n = 15) over 9 consecutive years (T = 9). Overall, there were 135 observations (N = 135) with no missing data values. A descriptive summary of the panel data is presented in Table C1 and descriptive summary for Montana is presented in Table 1.

Table 1

Descriptive Statistics Summary for Montana, 2001-2009

Variable	Mean	SD	Min	Max
Appropriations	4158.02	270.84	3803.24	4523.82
Tuition & Fees	4016.87	453.22	3269.04	4479.97
Private	10.23	.97	8.94	12.00
Pell Grant	42.95	3.10	38.39	47.24
PCPI	35135.46	1873.70	32511.10	37535.35
K-12	15.74	.88	14.55	17.10
Poverty	13.64	.67	12.90	15.10
R & D	151.64	33.05	96.31	190.01
Ed Attainment	25.64	1.51	24.37	27.40
ETR	8.03	0.42	7.60	8.80

The results of panel data analysis are presented in Table 2 and in Table C2. Coefficients for each of the regressors (β_k) or independent variables, indicate how much appropriations change over time on average per state when an independent variable increases by one unit of measurement. The intercept is \$27,018.41, or $\beta_0 = 27,018.41$. Both the t -statistics and the two-tail p -values indicate whether independent variables have a statistically significant impact on the dependent variable. A t -statistic higher than 1.96 (for a 95% confidence level) indicate a statistically significant influence of an independent variable on the level of appropriations. A p -value is the probability of observing a t -statistic that is large enough to indicate that the coefficient of independent variable is not zero. All reported significant relationships have a p -value of less than 0.05. While p -values are essential when the purpose of research is to predict future changes in levels of appropriation based on the current impact of each independent variable or to extend the findings to a population when only a sample is used, these are not issues in this study as the fifteen states in the research represent the WICHE population. Instead, the impact of each variable is at issue and p -values were reported to adhere to principles of generalization. The coefficients and their corresponding p -values can be of use for generalization regarding the behavior of the same variables among WICHE states in the future or to compare the findings when the same population data within a different time frame is analyzed in future research. Therefore, coefficients for all independent variables were of interest, not only those that appeared to be significant, and were reported according to existing reporting standards (American Psychological Association, 2009) (see Table 2 and Table C2).

While t -tests examine the individual coefficients, R^2 is the most common measure of goodness of fit or how well the regression works in explaining the changes in the dependent variable (Halcoussis, 2005). R-squared ($R^2 = 0.96$, $R^2_{\text{adj}} = 0.96$) indicates that 96.45% of variance

in state appropriations may be explained by the utilized independent variables. The model's $p = 0.0000$. The fifteen states over nine years resulted in 135 observations overall; $F_{crit}(10, 110) = 11.16$ and $F_{statistic}(14, 110) = 67.30$.

Table 2

Fixed Effects Cross-Section Time Series Data Analysis

Variable	Appropriations per FTE student
Constant	27018.41
Tuition & Fees	- 0.81***
Private	4.15
Pell Grant	-45.41
PCPI	.15**
K-12	-112.12
Poverty	80.82
R & D	.08
Ed Attainment	78.69
ETR	213.38***
R2	.96448926
R2_adjusted	.95674146

Legend: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

States' socioeconomic climate and support for higher education

Socioeconomic and demographic factors. Among socioeconomic and demographic factors, per capita personal income showed a significant ($p = .001$) positive impact on state level

of appropriations. Although the poverty rate, educational attainment, and K-12 variables also demonstrated an influence on the level of appropriations, the confidence interval for these estimates is below the generally accepted range of statistical significance (See table C2).

While individual state indicators change over the years, the change is not as dramatic as the variations that occur among WICHE states on the same indicators. The extreme cases of these variations for each indicator are noted below alongside panel results and Montana data.

Poverty. The coefficient for poverty rate $\beta_k = 80.82$, while was not statistically significant at the 5% error level, does approach significance ($p=.056$) and thus calls for explanation. An increase of a one-percentage point in the poverty rate resulted in an increase in the level of appropriations over time, on average per state, all else constant, by \$80.82. States vary tremendously in their poverty levels, from the overall lowest rate among WICHE states of 7.10% to the overall highest rate of 21.20%. The average WICHE poverty rate was 11.66% ($M = 11.67$) while Montana's mean is 13.64% ($M = 13.64$) and ($SD = .67$). Considering that the standard deviation for the poverty share in Montana is approximately .67, it is reasonable to assume that if the share of poverty in the state population increases by one standard deviation, the level of appropriations per FTE student in Montana will increase by approximately \$54, all else constant. That represents almost one-fifth standard deviation change in appropriations per student. Conversely, if the share of poverty in the state population decreases by one standard deviation, the level of appropriations per FTE student in Montana will decrease by approximately \$54. All the relevant data can be found in tables 1, C1, and C3.

Per capita personal income. The coefficient for per capita personal income $\beta_k = 0.15$ was statistically significant at $p=.001$. An increase in per capita personal income by \$1 resulted in an increase in the level of appropriations by \$0.15, a fifteen-cent increase for each additional

dollar of income. WICHE average per capita personal income was \$36,584 ($M = 36583.93$); for Montana it was \$35,135. Overall, the lowest level of personal income was \$26,807 (Hawaii, 2001) and the highest was \$51,257 (Wyoming, 2008), nearly twice as high (See Table C4).

Educational attainment. The educational attainment coefficient $\beta_k = 78.69$ indicated that a one percentage point increase of college educated people in state population leads to an appropriation increase of \$78.69. For the nine years of the study, 2001-09, the WICHE state average and the Montana share of population with a bachelor's degree and above are $M=25.58$ and $M=25.64$ respectively. Overall, the minimum rate for state educational attainment from 2001 to 2009 was 18.16% (Nevada, 2001-05) and the maximum was 35.90% (Colorado, 2009). While Colorado is a consistent leader in educational attainment, Nevada consistently lags behind. The remaining WICHE states fall somewhere in between, while Montana is close to 2001-09 WICHE average (See Table C5).

K-12. The state K-12 population coefficient ($\beta_k = -112.11$) indicates that a one percentage point increase in share of a state's K-12 population leads to an average \$112 decrease in the level of appropriations per FTE student. In other words, the higher the percentage of a state's population that is enrolled in K-12, the lower that state's appropriations are for higher education on an FTE basis. Averages for WICHE and Montana levels of the K-12 population share of state population are $M=16.90$ and $M=15.74$ respectively. Overall, the minimum share of K-12 population over 2001-2009 was 13.86% and the maximum was 21.13%. Utah consistently recorded higher percentage levels of K-12 population while Montana's share of K-12 population is consistently dwindling (Table C6).

States' higher education characteristics and contributions to higher education

Higher education factors. Among higher education factors, all other factors being equal, only Net Tuition had a consistently significant negative monetary impact on the level of state appropriations. Research and development funding had statistically insignificant positive influence over the level of appropriations as did share of private institutions enrollment. Share of Pell Grant recipients among state student population had statistically insignificant negative influence over the level of state appropriations.

Research and development (R&D). The coefficient for research and development spending per capita $\beta_{\#} = 0.08$ indicates that a \$1 increase in per capita R&D spending increases appropriations by \$0.08 per FTE student. Averages for WICHE and Montana levels of R&D funding are $M = \$134.88$ and $M = \$151.64$ respectively. Overall, the lowest level of R&D funding was \$34.43 in South Dakota in 2001 and the highest was \$281.36 in North Dakota in 2009 (See Table C7).

Net Tuition. The tuition and fees variable coefficient ($\beta_{\#} = -0.81, p = .000$) indicates that a \$1 increase in net tuition per FTE student spending reduces appropriations by \$0.81 per FTE student. The more tuition a student pays, the less, per FTE a state appropriates. Averages for WICHE and Montana tuition levels are $M = 3190.22$ and $M = 4016.87$ respectively. Overall, the lowest level of net tuition was \$859.63 in California in 2002 and the highest was \$6,421 in North Dakota in 2009 (See Table C8).

Pell Grant. A one percentage point increase in the share of Pell Grant recipients among the student body reduces the level of state higher education appropriations by \$45.41 per FTE ($\beta_{\#} = -45.41, p = .082$). Average percentages of the student body that are Pell Grant recipients for the WICHE region and the state of Montana are $M = 32.58\%$ and $M = 42.95\%$ respectively (See Table 1 and 2). While this indicator is not statistically significant at the 5% error level, it is

relatively close to it and is thus of interest. For example, in 2009 in Montana the total FTE student population was 36,388 (See Table C9). 13,968 of these were Pell Grant recipients, or 38.39%. A one percentage point increase in the share of the student population receiving Pell Grants represents 365 students. Considering that standard deviation for the Pell Grant share indicator is approximately 3.1, it is reasonable to assume that from year to year the share of Pell Grant recipients can increase by one percentage point, thus reducing the appropriations level on average by \$45.41 per FTE using the point estimate. Whether in practical or monetary terms this is a significant amount or not is a matter of judgment. To put it into perspective if the share of Pell Grants in Montana fell by one standard deviation, this would lead to a 3 percentage point fall, yielding a \$135 per FTE change in appropriations, approximately equal to a one-half standard deviation change in appropriates per students in Montana. Of course, this number will vary from state to state, being smaller in states with a large FTE student population and higher in states with a smaller student population.

Private sector. A one percentage point increase in the share of student population enrolled in private institutions of higher education increases the level of appropriations per FTE student on average by \$4.15 ($\beta_k = 4.15, p = .822$). Averages for the WICHE and Montana private sector share in state student populations are $M=16.26\%$ and $M=10.23\%$ respectively. Overall, the minimum share of student population enrolled in private institutions of higher education over 2001-2009 was 3.91% and the maximum was 52.96%. While Arizona has the highest share of private enrollment, Alaska and Wyoming have the lowest (See Table C10).

States' fiscal capacity and effort and states' contributions to higher education

Budget factors. State effective tax rate (ETR) was the measure of state effort to secure revenue to fund its various public programs including higher education. ETR was calculated

using two measures: fiscal capacity or total taxable resources (TTR) and actual revenue collected (ATR) by a state in a year of interest. While this study utilized ETR data that was calculated and reported by SHEEO, both the TTR and ATR data in tables F2 and F3 are essential for the analysis in the following chapter of the results reported.

Effective Tax Rate (ETR). State effective tax rate is the significant ($p = .000$) factor in state higher education appropriations across the WICHE region. The lowest effective tax rate among all the states during the nine years surveyed was 5.7% in South Dakota in 2007-2008, while the highest was 19.2% in Alaska in 2008 (See Table C11). Montana's effective tax rate fluctuated between 7.6% and 8.8%, with $M=8.03\%$, which is above the WICHE average ($M=7.84\%$). The effective tax rate coefficient $\beta_k = 213.38$ indicates that a one percentage point increase in the effective tax rate leads to an average \$213.38 increase in per FTE student appropriations.

Descriptive Data Analysis

Measuring higher education funding fiscal disparities across 50 states requires collection of actual higher education expenditures data (further *expenditure*) as well as state-by-state calculations of estimated expenditure needs (further *need(s)*). Further analysis of state expenditure effort (further *effort*) for each state must be estimated. Doing so allows ranking of states according to their effort in funding state systems of higher education. This section describes the results of the analysis mentioned above that helped answer the fourth and the fifth research questions.

The relationship between states' higher education expenditure need and states' higher education appropriations

Higher education expenditure need in all fifty states. The difference between revenue capacity and expenditure need measures how much greater revenue effort would need to be in order to meet the expenditure needs of a state. In 2010 dollars, the U.S. average higher education expenditure need per FTE student in 2002 was \$7,376. In 2006, it was \$8,633, and in 2010, it was \$6,261. Overall, the 50 states were most generous toward higher education in 2006. In 2002, thirty-three states satisfied the relative expenditure need in their states, meaning that their actual spending on higher education was equal or exceeded their expenditure need. In 2006 thirty-nine states satisfied that need. But only twenty-two states had appropriations that met normalized expenditure need requirements in 2010, the rest fell short in their effort. Table D2 displays the complete data results on state expenditure effort, calculated as ratios of actual expenditures to the representative estimates of expenditure need for higher education for all 50 states. U.S. effort represents the point of reference. Table D3 displays the results of ranking 50 states according to their higher education funding effort.

Montana and other WICHE states and higher education support

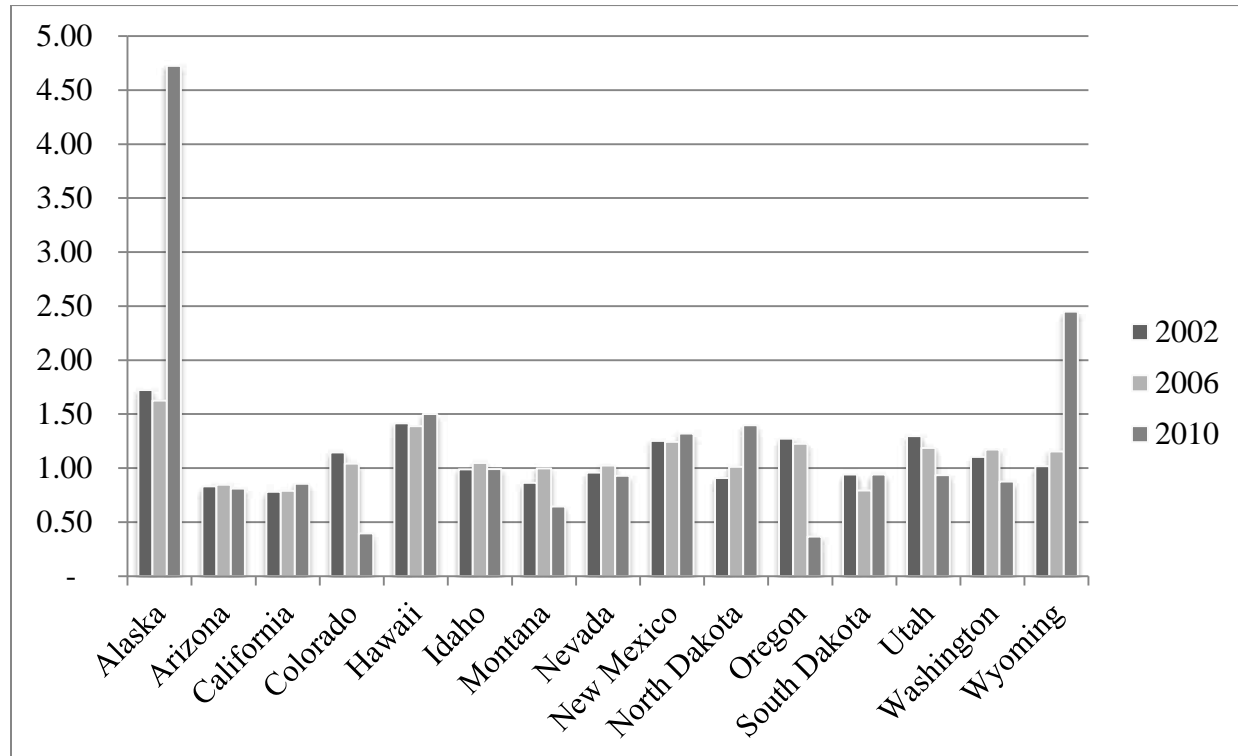
Montana and WICHE states' higher education expenditure need. Table D1 presents the results of WICHE higher education expenditure effort analysis and Figure 2 presents a graphic presentation of that effort. Table 3 presents the higher education expenditure effort ranking of WICHE states and Table D3 presents the higher education expenditure effort ranking of all 50 states.

Montana's higher education expenditure effort for 2002 per FTE student was 0.86; actual expenditures in 2010 dollars (\$8,149) covered only 86% of its expenditure need of \$9,441. In 2002 Montana ranked 13th among WICHE states, slightly above Arizona and California, and 46th of the 50 states. In 2006, Montana placed 12th among WICHE states and 39th among all 50

states. Its expenditure effort on average was close to 1.00, with actual expenditure \$9,339 close to its expenditure need of \$9,359 (all in 2010 dollars). In 2006 twelve WICHE states and 39 states nationwide either met their need or their actual expenditures exceeded their expenditure

Figure 2

Expenditure Effort WICHE states.



needs. By 2010, however, the higher education expenditure effort in Montana fell below its 2002 effort and Montana once again ranked 13th among WICHE states and 46th nationwide. The 2010 actual expenditure per FTE student adjusted by enrollment mix and cost of living (EMI & COLA) was \$6,680, which covered only 64% of the state's expenditure need. In 2010 only Oregon, with the indexed effort of 0.37, and Colorado, with the indexed effort of 0.40, had higher education expenditure effort ratios that were worse than Montana (See Table 3).

Further interpretation of the results of panel and descriptive data analysis presented here together with their implications for available options for future state funding of higher education are presented in the next chapter.

Table 3

WICHE States Higher Education Expenditure Effort Rank (Actual Expenditure/Expenditure Need) per FTE, indexed

2002			2006			2010		
Rank	State	Effort	Rank	State	Effort	Rank	State	Effort
1	AK	1.72	1	AK	1.63	1	AK	4.72
2	HI	1.42	2	HI	1.39	2	WY	2.45
3	UT	1.30	3	NM	1.24	3	HI	1.50
4	OR	1.27	4	OR	1.23	4	ND	1.40
5	NM	1.25	5	UT	1.19	5	NM	1.32
6	CO	1.14	6	WA	1.17	6	ID	0.99
7	WA	1.10	7	WY	1.16	7	SD	0.94
8	WY	1.02	8	ID	1.05	8	UT	0.94
9	ID	0.99	9	CO	1.04	9	NV	0.93
10	NV	0.96	10	NV	1.02	10	WA	0.87
11	SD	0.94	11	ND	1.01	11	CA	0.86
12	ND	0.91	12	MT	1.00	12	AZ	0.81
13	MT	0.86	13	AZ	0.85	13	MT	0.64
14	AZ	0.83	14	SD	0.79	14	CO	0.40
15	CA	0.78	15	CA	0.79	15	OR	0.37

Chapter Five

Discussion

“Human development is the expansion of people’s freedoms and capabilities to lead lives that they value and have reason to value. It is about expanding choices. Freedoms and capabilities are a more expansive notion than basic needs” (United Nations Human Development Programme, 2011, p. 1).

This research undertook to examine the various factors affecting higher education funding, evaluate the fiscal capacity of states to support higher education, the need for this support, and the states’ actual effort to provide it. The human capital theoretical lens is utilized in the analysis and recommendations that constitute this chapter in order to focus the attention of policymakers on their states’ effort to invest in human capital development via public higher education. The findings of this research are presented in six parts.

The first part is devoted to the conclusions drawn from the panel data analysis and descriptive data analysis of various factors affecting higher education funding and with state need, capacity, and effort to support public higher education services. State effective tax rate, tuition, and income are the three factors that were discovered to have statistically consistent influence over the level of higher education appropriations. These factors are discussed first, followed by a brief review of other socioeconomic and higher education factors that did not demonstrate a significant level of statistical consistency. A discussion of the need for higher

education funding and its satisfaction concludes the first part. The second part is devoted to human capital theory as a means of reaching consensus between politicians and educators for justifying sustained public support for higher education. Next, the perceived contributions of this research to the field of higher education research are discussed. The fourth part addresses the recommendations to policymakers and other stakeholders and was guided by human capital theory, under which higher education is treated as an investment in human capital. The penultimate part of this chapter is devoted to the need for future research. Some final thoughts on the future of higher education funding conclude this chapter.

Conclusions from the analysis of the data

Understanding the state factors affecting state appropriations makes it possible to determine the areas that can be influenced through policy procedures to improve state funding of higher education. This part draws upon the conclusions based on the results of panel data analysis and descriptive data analysis presented in the previous chapter and that answer the first five research questions.

Panel data analysis

As a result of panel data analysis it has been determined that among the socioeconomic, budgetary, and higher education factors considered, only a state's effective tax rate and per capita personal income have a statistically important positive impact on its level of appropriations, while tuition has a statistically significant negative influence. These three factors are examined in detail followed by a discussion of the factors found to be less influential.

Tax effort and higher education funding effort. As higher education appropriations come from state budgets, it is not surprising that a state's effective tax rate has significant influence on its level of higher education appropriations. The influence that state tax effort, measured by

effective tax rate, has on the level of higher education appropriations dictates that close attention be paid to tax disparities among the states as well as to their higher education spending practices.

State tax effort is the ratio of its actual tax revenue (ATR) to its total taxable resources (TTR). A state experiences an increase in tax effort either when its ATR increases while its TTR remains the same or increases at a lower rate than its ATR, or when its TTR decreases while its ATR remains the same or decreases at a lower rate than its TTR.

While the trend in tax capacity among WICHE states was generally upward during the period 2001-2009, only two states, South Dakota and North Dakota, moved from having a below average level of total taxable resources in 2001 to having an above average one in 2009 (see Table F2). Montana, Idaho, New Mexico, Utah, Arizona, and Oregon, states with low level of total taxable resources (TTR), remained in that category though they improved slightly. With the exception of Montana, these states also experienced tax revenue declines in 2009 as well as a decline in their effective tax rate. Thanks to increases in oil and gas production, only Alaska and Wyoming, two states that rely heavily on natural resources for tax revenue, recorded a substantial increase in total taxable resources (TTR), an actual tax revenue (ATR) increase, and an effective tax rate (ETR) increase.

Oregon, California, Colorado, Idaho, Montana, Utah, and Hawaii, states that rely on income taxes for more than 20% of their revenue, experienced slight fluctuations in their effective tax rates, recording no significant increase in their levels of total taxable resources (TTR). A state's TTR is influenced by both its gross state product (GSP) and the personal income of its residents, but both GSP and personal income grew only slightly in these states (see Tables B4 and F1). An increase in GSP usually leads to increased productivity and an increase in the level of personal income, thus increasing a state's actual tax revenues (ATR). However, as

there were recessions in both 2001 and 2007 followed by short periods of recovery, these states suffered most due to depressed ATR resulting from increased unemployment.

States that rely heavily on natural resource extraction taxes, however, saw their wealth expand as GSP increased, with those taxes as well as licensure and other fees helping boost their actual tax revenues. TTR and ATR per capita increased dramatically only in Alaska, Wyoming and North Dakota. As a result, all three had the highest tax effort among WICHE states. In 2008, with the help of the oil industry, Alaska experienced an extraordinary increase in its tax revenue (Alaska State Department of Revenue, 2012). Alaska's effective tax rate (ETR) increased from 8.8% in 2001 to 13.5% in 2009, peaking at 19.2% in 2008. Both Wyoming and North Dakota enjoyed an increased ETR during the same period, rising from 8.2% to 10.1% and 8.3% to 9.7% respectively. Both also had a more gradual TTR growth pattern than did Alaska due in large part to an increase in oil and gas production that had a positive fiscal impact on their tax revenue.

States that rely on taxes deriving from natural resource extraction, however, are not without problems. They too are prone to changes in the economy, demand, for example, and price fluctuations, to say nothing of the negative environmental impact that results from mining and drilling (The Economist, 2012, July 14th-20th). Only in Alaska and Wyoming did increases in ETR translate into higher education appropriation growth; North Dakota remained among the five WICHE states with the lowest higher education appropriations and joined Montana as the two states with high tax effort whose priorities do not lie with higher education.

Montana's per capita tax capacity, also boosted somewhat by revenues from the energy sector, increased slightly from 0.74 in 2001 to 0.82 in 2009. Its ATR increased from 0.78 in 2001 to 0.87 in 2009 and its effective tax rate, while falling from 2002-04 to as low as 7.6%, grew from 8.6% in 2001 to 8.8% in 2009, the highest tax effort in nine years. A state is said to have a

high revenue (tax) effort if its actual revenues (tax collections) exceed its revenue capacity (total taxable resources). As Montana's tax effort, 1.06 in 2009, is high already (see Table F4), the issue for Montana is how it can increase its tax capacity assuming that it utilizes its resources in the most efficient manner. Montana's clear failure to satisfy the need for higher education expenditure (see Table D1) is evidence of this necessity. However, as other budget spending areas lie outside of the scope of this research, the conclusions drawn here are based on the data at hand. Montana can increase its tax effort without expanding its tax capacity and increasing taxes only during periods of economic growth when unemployment is low and incomes are on the upturn. Increasing a state's tax revenue by increasing state taxes without expanding state's stock of total taxable resources is no solution, as it merely increases the burden on state taxpayers and does nothing to increase state tax capacity.

Overall, WICHE state allocations of available revenue to higher education fluctuated between 2001 and 2009. Allocations to higher education decreased, on average, from a high of \$7,343 in 2001 to a low of \$ 6,130 in 2005 before increasing slightly to reach \$6,936 in 2008 and starting another downward trend in 2009, when the average was \$6, 560. Not all states shared the same pattern, though Montana did up to 2009, when it was still experiencing a slight growth in appropriations. Montana's appropriations per FTE student, however, are much lower than the WICHE average; indeed, they are the second lowest, after Colorado (see Table C12).

In general, states were observed to adhere to their historical pattern of higher education funding: those whose funding was higher than the WICHE average in 2001—Alaska, California, Idaho, Nevada, New Mexico, and Wyoming—remained in this category through 2009. Only three states—Hawaii, Arizona, and Washington—changed their pattern, joining the states budgeting higher-than-average appropriations for higher education. But it is important to note

that the WICHE average for 2001 in 2009 dollars was \$7,343, well above the 2009 average of \$6,560. Hawaii alone improved the lot of its students by increasing state appropriations to higher education. The rest of the states—Colorado, Montana, North Dakota, Oregon, South Dakota, and Utah—continued to be the lowest contributors to higher education. These findings support the theories of Hossler, Lund, and Ramin (1997), Layzell and Lyddon (1990), and Wildavsky (1978), all of which were reviewed in the literature review section of this dissertation regarding the incremental, backward looking nature of the budgetary process. It also appears that pleas by researchers and both official and unofficial higher education lobbyists to improve funding failed to result in significant change in how higher education is treated in state budgets.

At the same time Montana increased its tax effort to an indexed tax rate of 1.059, the cost of higher education at public institutions in the state continued to increase, resulting in higher tuition costs to students and their parents and indicating that although the state fully utilizes its tax capacity, much like other states in the high effort category (see Table C11 and F4) it had spending priorities that clearly lie in areas other than higher education. The same conclusion can be drawn from a calculation of state higher education needs and how well states meet those needs, which is discussed at the end of this section.

Tuition and higher education funding effort. It is necessary to address the results of the negative impact that tuition increases have on appropriations separately for the following reasons: First, the influence of state tuition levels and state higher education appropriations is mutual (Bell, 2008; Koshal & Koshal, 2000; SHEEO, 2011; & Tanberg, 2010). Second, tuition increases usually surpass the reductions in higher education appropriations that they are said to offset. Finally, the appropriations-tuition composite of higher education revenue can be

indicative of how state governments view the public good versus private good debate with regards to higher education.

While there is mutual influence between higher education appropriations and tuition, based on the balance wheel theory (Hovey, 1999; Delaney & Doyle, 2007; Orkodashvili, 2008) it is assumed that legislators set appropriations with an eye on tuition. Legislators are aware that institutions can raise tuition if necessary to meet appropriation shortfalls. It is also important to note that all other things being equal, appropriation reductions are on average disproportionately lower than tuition increases. That is, for every dollar increase in tuition appropriations only decrease \$.80. One possible explanation for the difference is that institutions compensate for earlier appropriations reductions by cutting back on expenses. Thus, the year following an appropriations reduction, institutions raise tuition to both recoup the previous year's shortage and prepare for the likelihood of further shortages to come.

Additionally, if we are to presume that the ratio of state appropriations to tuition funding of higher education is indicative of the state outlook on higher education as a predominantly public rather than private good, it can be concluded that those states that devote a higher share of resources to fund higher education place a higher value the public benefits of higher education than do those states whose funding for higher education is derived primarily from tuition and fees charged students by universities and colleges. Montana ranked 13th among WICHE states, with an average of 50% of higher education funding covered by the state over the years 2001 to 2009, making it one of the states that puts very nearly equal emphasis on public and private funding of higher education.

Overall, between 2001 and 2009, the share contributed by WICHE states—with the exception of Wyoming—to higher education funding declined, shifting the burden from the state

to individuals. According to a report published by State Higher Education Executive Officers (2011), Montana state fiscal officers indicated that state per capita personal income is among the most important considerations in the tuition setting process (SHEEO, 2011). The fact, however, is that Montana's in-state tuition is well above the WICHE average while its per capita personal income is well below it.

There is a lack of agreement among policymakers in different states (Bell, Carnahan & L'Orange, 2011) for what is considered "high," "moderate," and "low" tuition. Two striking examples are Montana and California. Although California's policy is that tuition should be "moderate" and Montana policymakers state that tuition should be "as low as possible" (Bell, Carnahan & L'Orange, 2011), California's tuition is actually much lower than Montana's. Additionally, in 2009 Montana contributed only 50% of the cost of higher education in the state, while California's contribution was 81%. With Montana's per capita income level below California residents of the state do not have the financial capacity that California's do to finance their children's education or their own (See Table C4).

Income level and higher education funding effort. While state level of per capita personal income does not itself guarantee generous higher education appropriations, it is indicative of higher state economic productivity and to some extent the competitiveness of a state's workforce as productivity drives income levels. Job creation and improvements in productivity are themselves driven by the sectors of the economy that require a skilled, educated workforce and these sectors pull the income level up for the rest of the workforce in the so-called spillover effect. It is also known that higher education engenders higher income levels, so it not surprising that an increase in a state's per capita income has a positive impact on higher education appropriations.

Looking at the 2001-2009 trend in Montana's income, though the state experienced above average income growth among WICHE members, it remained one of the lowest average income states in the U.S. and was unable to lower its poverty rate. A long-term solution is needed that includes increased appropriations to higher education as an investment in the development of the human resources that will make Montana's workforce more productive, competitive and thus will expand Montana's tax capacity.

Other factors. Such variables as K-12 population, level of educational attainment in a state, poverty, share of Pell Grant recipients, investment in research and development, and share of private institutions of higher education did not show a statistically consistent influence on appropriations. Their practical import, however, is indisputable. All contribute to state human capital and, depending on the level of appropriations directed thereto or, in the case of share of private institutions of higher education, the absence of need for appropriations, they all affect the level of appropriations available to be shared by the demand they place on state funds.

While panel data analysis showed that appropriations to the K-12 sector have a negative impact on higher education appropriations, unlike other research (Toutkoushian & Hollis, 1998) the result was not statistically significant. Such an inconclusive result may be attributed to the great variations among states in the share of local government support of the K-12 sector. The larger the share of local support, the lesser the burden on state resources and the lower the interference with funding for higher education. However, even if K-12 funding had a significant impact on higher education funding, in the long-run it would be advantageous for the society as a whole because returns are high from investment in K-12, particularly for higher education, presuming that more generous funding of K-12 leads to higher quality graduates and less

remediation expenditures required of colleges and universities upon matriculation of graduates of programs that have benefitted from appropriation largess.

Educational attainment within a state was another factor that, while exhibiting a positive influence on the level of appropriations allocated to higher education, did not demonstrate a statistically significant level of influence. Montana was among the states that underappreciate higher education degrees as the income disparity for populations with various levels of education was less pronounced in Montana than it was in other states. In some states even when the source of economic growth was highly educated workforce, the spillover affected all levels of the workforce, thus masking the initial cause of growth. A higher per capita income level for workers without higher education may have reduced the impetus to get a college degree.

While it was surprising to find that an increase in the level of poverty positively influenced higher education appropriations, analysis indicated that this influence was not statistically significant. It is possible that the positive impact observed resulted from a long-term commitment to alleviating poverty rather than one driven by the election cycle to which politicians are enthralled. While some states redirect resources to address the effects of poverty, others invest in education to lift state residents out of poverty. A reduction in poverty, however, should not be considered evidence that investment in higher education is less warranted; alleviation of poverty is only one of the many goals of higher education in the process of human capital development. Poverty also increases demand on various public assistance programs including Medicaid, the growth of which is predicted to result from the Affordable Care Act. Future research is therefore required to deliver a definitive understanding of the influence of poverty on the distribution of state fiscal resources to various programs including higher education.

As with previous research, an increase in the share of Pell Grant recipients among a state's student population was found to have a statistically insignificant negative influence on state appropriations, an influence that could, perhaps, be explained by states accounting for or anticipating partial federal support of the neediest students when they make appropriations decisions. There is little indication, however, that any such policy coordination between state and federal governments takes place in the realm of higher education appropriations.

Statistically insignificant positive effect on the level of appropriations was observed in both investment in research and development and share of students enrolled in private institutions of higher education. The positive influence of research and development investment on the level of appropriations can be explained by states' shared philosophy in acknowledging its positive influence on the creation of human capital. The positive influence of private sector institutions of higher education, meanwhile, can be explained by the decreased demand on state funds they create as alternative venues of higher education for students, especially those relying, in part, on federal support. The more of a state's students that are enrolled in private colleges and universities, the lower the demand on state support for public institutions. Like other variables that did not show statistically significant influence on the level of state appropriations, the share of enrollment in private institutions of higher education has a practically important impact that may be attributed to the welter of competing influences and priorities that drive the budgetary process.

Descriptive data analysis

Higher education expenditure need. All other things being equal, a state with a high percentage of its residents attending state institutions of higher education has a higher need for spending on higher education than one with a lower percentage. A state with a high expenditure

effort spends more than its expenditure need. Montana, where state appropriations covered only 64% of higher education expenditure needs in 2010, does not qualify as one of these states. It did in 2005-06, however, when it was on par with the national average (see Table D1).

Montana's higher tax effort did not translate into higher satisfaction of higher education expenditure need in the state. With a healthier state budget than most WICHE states, Montana's higher education is grossly underfinanced by national standards—the national average—of higher education funding expenditure need when compared to actual expenditure level. That having been said, estimated expenditure need is not a need in an absolute sense. Instead, it reflects how much it would cost a state to finance the higher education of its residents at the national-average level of higher education funding. Thus, funding at the national average does not necessarily indicate that the state contributes sufficiently to its human capital development to gain a competitive advantage.

Thus, both the panel and descriptive parts of the research support the conclusion that an increase in state tax revenue will not necessary bring relief to higher education as state budgetary priorities may lie elsewhere. The issue of state wealth is further addressed through the lens of human capital theory in the following part, which revisits human capital theory in an attempt to determine what it can contribute to policy decisions regarding higher education funding.

Human capital and higher education funding

As Becker (1962) rightly noted, the willingness to invest in human capital depends upon the extent of the perceived connection between such investment and the return it is expected to produce. Becker was addressing monetary income return in his early work, an area well covered in the literature. "The typical investor in human capital is more impetuous and thus more likely to err than is the typical investor in tangible capital" (Becker, 1962, p. 10). According to this

view it is reasonable for politicians to elect not to make additional investments in higher education during economic downturns as there are more pressing issues to address such as unemployment and poverty. But this represents a short-term solution to pressing fiscal problems rather than a long-term plan to reinvest in human capital for future prosperity. It overlooks the important fact that the higher education sector absorbs the unemployed, educates and arms them with skills that are marketable in an evolving economy (Fry et al., 2010). Although it offers less neatly quantifiable returns such as reeducation and retraining, investment in human capital by means of higher education is an investment in future labor-market flexibility at the very least. Unlike any other budgetary item, higher education continues producing both tangible and intangible returns even in the direst economic times. Becker (2009, August 14) argued in his most recent interview that a liberal arts education allows for labor market flexibility and is thus particularly important during difficult economic times. Higher education is also best positioned to provide the public with knowledge that leads to the generation of new ideas as “good jobs and salaries increasingly come from the production of new ideas, new knowledge, and new technologies” (Moretti, 2012, p. 215).

As much as we may desire evidence that we are making the right investment choices, some formula that will justify investment in higher education, such decisions are ultimately based on how each individual views higher education, reflecting whether higher education is viewed as freedom to explore and learn, to nurture interests and develop skills, or as a path towards better paying job. Investment decisions at the state level reflect how the state views such social returns from higher education, so-called “externalities,” the collective impact of which can greatly outweigh the direct benefits of investment. The very same externalities that are controlled

for in statistical research in order to compare states make each state a unique environment for development.

In 2011, the International Human Dimensions Programme on Global Environmental Change (IHDP) teamed up with United Nations Environment Programme (UNEP) to create an Inclusive Wealth Report (IWR) (UNI-IHDP & UNEP, 2012) that measures the overall “well-being” of societies. The cooperation sprang out of long brewing dissatisfaction with measuring wealth using such production indicators as gross domestic product (GDP), a measure that ignores the impact of GDP on the environment, for example. An increase in GDP may result in an increase in pollution or stress and associated health problems, thus adversely impacting overall societal well-being. The IWR tried to account for these shortcomings by creating a “basket of stock” of various countries’ assets, including natural capital (natural resources, ecosystems, etc.), produced capital (buildings, equipment, etc.), human capital (education, health, skills, etc.), and social capital (intuitions, social networks, etc.). One significant aspect of the new way to measure “well-being” is the inclusion of present and future generations. This inclusion is based on the belief that the ability to pass the accumulated resource stock to a future generation has an impact on present well-being.

Another United Nations report (UNDP, 2011) measuring human development using the Human Development Index (HDI) emphasizes “empowerment, equity, and sustainability in expanding people’s choices” (p. 13). It pointed out that an approach that maximizes economic growth and tends to ignore environmental impact is both unsustainable and irresponsible. The report also states that across the United States greater inequality in power, as measured by voter participation, educational attainment and weaker fiscal policies, leads to weaker environmental protection policies and thus to higher environmental degradation.

Adopting of a broader view of state wealth and the role education plays in it allows us to look at state capacity through not only the prism of total tax resources (TTR) or representative tax system (RTS) resources calculation, but to take into consideration state human capital development and potential as well. Investment in human capital is an investment in the expansion of state wealth and its fiscal capacity. It is not limited to the creation of the additional tax revenue that an educated workforce brings to state coffers, but views that educated workforce as a hub of creation where new ideas and knowledge are spawned. Until policymakers move beyond short-term solutions to budgetary problems and are willing to consider evidence and arguments that emphasize non-numeric proofs of value, state higher education funding policies will continue to ignore the true value of investment in higher education, which will remain underappreciated and underfinanced, and the community's economic and social decline as well as the persistence—nay, growth—of inequality will continue.

Study contribution

While at the outset it was not the goal of this research to compare two different methodologies for evaluating the level of support of higher education among states, ultimately, the main finding of the research may lie in the discovery that advanced econometric procedures, while they are gaining ground in educational research, do not appear to improve our understanding of the funding woes faced by institutions of higher education. Utilization of panel data in higher education funding studies across the states allows for control of unobserved variables that are capable of distorting research findings, thus allowing discovery of similarities in higher education funding influences among states that have different tax systems, demographic characteristics, and higher education characteristics. Manzi (2012) argues that all regression models are subject to omitted variable bias, interaction effects, and intercorrelation.

Claiming that the “complexity of the real world overwhelms the tool of regression analysis” (p.110), he stresses that these shortcomings are not a result of the regression method itself, but inherent in the phenomenon under study, the complexity of which outstrips our ability to build all possible interaction terms and results in the problem of omitted variable bias, which renders the results unreliable. These arguments are supported by the fact that no two research papers reviewed for this dissertation arrive at the same results when studying the same phenomenon. As indicated by the data analysis above, this research is no exception.

There are, however, lessons to be learned from regression analysis. The cross section time series data analysis indicated that states are unique and in addition to the significant impact of state tax effort, tuition, and personal income on the level of appropriations across all WICHE states, there are additional factors, including those studied here—share of K-12 population, level of educational attainment in a state, poverty, share of Pell Grant recipients, investment in research and development, and share of private institutions of higher education—that determine appropriations in a unique way for individual states though not across all WICHE states. Thus, policy solutions that work for one state will not bring the same results in another, nor is a purely empirical approach to studying the problems of dwindling higher education finance sufficient to propose ready, state-specific solutions due to the complexity of each state’s socio-political environment. Additionally, looking at the above variables in terms of their impact on higher education obfuscates the impact each has on human capital creation.

While the panel method was a useful tool to consider WICHE states as a unit, the Representative Expenditure System (RES) estimates for higher education funding need that were used in descriptive analysis proved more useful to understand the disparities among individual states in their higher education funding effort. Unfortunately, RES methodology has not been

previously applied in higher education research, nor has the Representative Revenue System (RRS), a methodology that allows policymakers to ascertain a state's relative level of fiscal capacity when states with different fiscal policies are compared. While SHEF SHEEO reports incorporate the variation of representative system—capacity (TTR) and effective tax rate estimation ETR—in their reports, RES is a more comprehensive approach. But more importantly, the methodology developed by the Advisory Commission on Intergovernmental Relations that is utilized by Hoo et al. (2002) and adopted herein with some minor changes allows comparison of a state's higher education expenditure levels with its expenditure needs as well as comparison of various states in their effort to fund higher education.

A further contribution of this research is the way in which the RTS methodology was adapted by incorporation of both EMI and COLA adjustments to make it consistent with current standards within the higher education community. Specifically, the data was scaled to account for variations among states in their cost of living and enrollment mix. EMI adjustment allows a more accurate estimate of need as it takes into consideration the variations in quantity of service demanded by both 2-year and 4-year public institutions. COLA also increases the accuracy of the estimates by accounting for differences in cost of living among the states. While SHEEO has been utilizing these adjustments for years, they have not been previously applied to the RTS approach to estimate higher education expenditure need.

Performing data analysis on the data assembled utilizing both RTS and representative expenditure system (RES) frameworks can provide state higher education leaders with comprehensive quantitative comparative data to base policy initiatives on. Data analysis, within the representative system framework (both RTS and RES), can reveal patterns of change in the underlying state tax structures and interrelationships among various state expenditures. Together

with the expansion of definition of state wealth to incorporate state human capital development and potential, the comprehensive RTS approach can provide sufficient data for dialogue with constituencies that represent different state interests.

Recommendations

The persistently sluggish U.S. economy, exacerbated by the legislative gridlock that often precedes presidential elections, together with the European fiscal crisis has intensified debate among economists about how to boost the economy. Paul Krugman (2012) and Joseph Stiglitz (2010) argue that we should continue to spend on economy-boosting projects, among which is education. They argue that any increase in spending can be financed by debt as interest rates are at or near historic lows and returns even in the 5% range on such debt-dependent investment will lead to growth. It is well documented that the return on investment from educating the population is higher yet.

Pursuing such an investment strategy is possible at the Federal level; balanced budget provisions at the state level, however, prevent them from such debt obligations. States can raise taxes to expand revenue or change the way taxes are levied or implement both of these measures to increase tax revenue. But a tax revenue increase in itself will not guarantee an increase in higher education spending unless state governments realize that education is an investment in state wealth rather than a mere expenditure.

So, should Montana increase its tax base or change how tax revenue is distributed in order to invest more in higher education? Based upon the descriptive research findings herein that estimated that as of 2010 Montana had failed to fully fund its higher education needs and invest in its future, the short answer is “yes.” The long answer is it depends on whether there is

an opportunity to shift resources to higher education without endangering other areas of public service. Montana's Progressive Think Tank has proposed changes to Montana's tax system to make it more progressive (The Policy Institute, 2012). As recommending specific changes to the tax code is outside the scope of this research, no such recommendations will be made here. It is necessary, however, to point out that no evidence was found that tax policy in one state has been more advantageous to higher education than in another as no two states have the same resources for gathering revenue or the same demands for expenditure. All tax systems have advantages and disadvantages. There is no one-size-fits-all system, as in addition to state resource capacity, the stability of the national and state economies also influence budgetary policy. The findings of the research do, however, support the view that a tax increase is less detrimental to state economies than budget cuts, especially when the cuts occur in investment in human capital such as higher education.

State budgets are constrained to varying degrees by inherent revenue capacity. But a state can choose to expand capacity and thus expand its tax revenue base. Variations across states in tax systems as well as quality and availability of public services in general and higher education support in particular influence interstate migration, which can be seen in the migration patterns of students in the WICHE system. But is it beneficial to the state of Montana if its residents seek higher education elsewhere? Demand for higher education will remain whether or not a particular state is capable of supplying the service at an affordable price. Should residents determine that the service—higher education—that they seek is beyond their financial reach in state, they may vote with their feet if it is more affordable elsewhere, a migration that will cost the state not only in terms of current college population, but also that population's future social and financial contribution to the state.

Pursuit of economic opportunity contributes to interstate migration. While Montana still enjoys a positive in-migration of educated people, such a situation should not be taken for granted. The state's standing on the new economy index (NEI) is low. Its college-age population is decreasing and comparatively high tuition and fees may cause more students to seek education elsewhere. Participation in WICHE allows residents of one state to pursue college degrees in another member state at reduced rates of tuition. But of the Montana students participating in WICHE's Professional Student Exchange Program over the five years from 2001 to 2005 only 48% returned to the state, the third lowest rate for reporting states, prompting the organization to single out Montana along with Wyoming in its Student Exchange Program Statistical Report for having low return rates and encouraging them to adopt policies to encourage professionals to return to their home state upon completion of their professional program and/or allow states to recuperate the expenses incurred (WICHE, 2011).

For its part, Montana has been projected (WICHE, 2008) to begin experiencing a reduction in enrollments while such WICHE states as Alaska, Arizona, California, Colorado, Idaho, Nevada, Oregon, Washington, and Utah are expected to see an increase as they face continuing financial challenges. With established exchange programs such as WICHE's serving as a catalyst for student migration (Morphew, 2005), it is reasonable to assume that if Montana's intent is to encourage bright students to migrate to the state, it may be well positioned by virtue of its own falling enrollment to absorb them from those WICHE states that face enrollment pressures.

Technological advances beget changes in the economy. In order to keep up, communities must reinvent themselves and for this they need an educated workforce. Underinvesting in education—and by extension in state human capital—is a wealth-depressing

action. Conversely, choosing to view higher education as an essential investment in human capital allows a state to expand its fiscal capacity by attracting both resident and non-resident students and retaining them in state upon graduation, thus growing the tax base as the state reapportions tax revenue to be distributed among public services in a way that enhances human capital and thus state socioeconomic development.

Policymakers must look at state sources of revenue both in terms of their ability to fund essential public services as well as enable residents to increase their potential and thereby increase the state's human capital. In order to do this, higher education must be considered as a public service from which the state accrues benefits surpassing its investments. A state invests money, but what it gets in return is more than money can buy. Additionally, state governments need to ensure that the higher education budgeting process is sustainable and less dependent on fluctuations in the economy.

As previous fruitless calls for support indicate, little will change without strong political will and popular support to increase investment in higher education. States allowed the federal government to provide assistance through funds released by the American Recovery and Reinvestment Act of 2009, but did little to substantially increase investment themselves as evidenced by dwindling public support for higher education. The public needs to be aware of the possibility that jobs lost in recession may never return. As the American manufacturing sector becomes increasingly productive, it does so with increasingly fewer workers. The economy is in need of a different kind of workforce, one that is highly intelligent, versatile, and adaptive, a notion that is fully supported by the most recent study released by the Georgetown University Center on Education and the Workforce (Carnevale, Jayasundera & Cheah, 2012), which indicated that virtually all jobs lost in the 2007 recession that were recovered required some form

of postsecondary education. While the call by both national and state politicians for improved educational quality is often depicted as an adversarial confrontation between the providers of higher education and elected officials, both parties really have the same goal: they want to increase the intellectual capacity of the country through education. Far from being just another budgetary expenditure, investment in higher education is an investment in human capital and enhanced human capital is the engine that drives economic and social development.

Recommendations for future research

The representative taxable system (RTS) methodology that includes estimation of states' representative revenues and expenditures (RRS and RES) has been shown to be the most comprehensive data-driven approach to understanding the fiscal capacity, expenditure need, and actual expenditure of various states and local governments. Research analyzing several years of data on the representative tax capacity and expenditures covering all spending categories, not just education, of different states should generate more data-driven research into the rationale for variations among states in their budgetary priorities and the place occupied therein by higher education. As the RES methodology allows calculation of expenditure needs independent of state political and historical priorities, additional data analysis of individual state tax systems and expenditure patterns will produce a clearer understanding of state-specific priorities by comparing the representative expenditure patterns and needs as well as actual state resource allocations. While the present research dealt only with higher education expenditure and expenditure need, a more comprehensive approach can facilitate avoiding selective interpretation of indicators to promote a particular agenda.

However, even the most comprehensive methodology can be limiting without the broader theoretical outlook on the country's overall socioeconomic development that Human

Capital theory is capable of providing when, in addition to higher education, other components such as healthy, productive living and environment are included. Future research that attempts to create such a model can bring unity to all decision-makers involved in policies that affect sustainable development of the nation.

At the state level, qualitative study of the higher education environment can both enrich quantitative research and provide the state with ideas about what can be capitalized on and what requires improvement. Utilizing a mixed research methodology, future analysis of state fiscal capacity, expenditure need, and effort will provide state governments with useful information about their ability to obtain resources for public services and the choices they make in their allocation and disbursement. When this information is combined with the findings on the benefits of investment in higher education it can inform decisions by state policymakers regarding how to best achieve a balance between investment in human capital, and thereby desirable social and economic development, and other state expenses, particularly in times of financial austerity.

Final thoughts: Future state of higher education

Fiscal constraints

No tax system in use today is sufficiently flexible to allow states to react seamlessly to the impact on their budgets of recession followed by prolonged anemic growth. Whether because of limited state taxable resources, unwillingness to impose higher taxes, or economic downturn all states experience budgetary constraints at one time or another, constraints that have a negative impact on resource allocation to various areas of public service, including but not limited to state institutions of higher education. Which state programs receive funding and how much each receives are determined by the state legislative decisions and traditions of resource allocation.

Funds the legislature can allocate to its spending priorities are subject to budgetary limits imposed by state effort. State effort, in turn, is the result of state taxation schemes.

Under balanced budget provisions states have three choices when the economy is bad and there is less revenue coming into state coffers: increase taxes, cut spending, or a combination of both. Unfortunately, the majority of states cut higher education spending. Convincing the public and politicians to raise taxes to support higher education is extremely difficult when higher education is not a priority. And while some states have increased taxes to reduce cuts, higher education still suffered reductions.

Higher education will face growing competition for state allocations for several reasons. First, although U.S. Department of Education, National Center for Education Statistics (2011) projections indicate that college enrollment nationally will continue to grow over the next 8 years and such growth will increase demand for higher education funding just to maintain current levels, Montana's under-44 population, meanwhile, is projected to decline while significant growth in the 65 and older population is expected (U. S. Census Bureau, 2011). Such demographic trends bode ill for funding policy changes favoring higher education in Montana as the concerns of an increasingly larger proportion of the population, one whose turnout at the polls is high, turns from developing human capital through education to support of social programs for health and financial security in old age.

Second, changes in entitlement programs will affect both individuals and states. Threats to social security will strain family budgets by forcing families to set aside more for retirement during their productive years in the labor force, which in turn will make it more difficult for many to pay out-of-pocket for college, either for their children or themselves should they be required to reeducate or retrain to keep abreast of an evolving economy.

Third, implementation of the Affordable Care Act (ACA) also promises to make further demands on state general fund allocations by virtue of provisions that call for an expansion of the Medicaid program and implementation of various accompanying regulatory and auxiliary programs (Blavin, Buettgens, & Roth, 2012). For Montana, this could mean as much as a 75.96% increase in Medicaid enrollment, highest among WICHE states. And while the federal government will shoulder more than 90% of the costs of expansion, the remaining costs will be paid out of state funds, thus increasing competition for limited state resources despite Montana being among the states forecasted to benefit most from being late starters on health care reform implementation (Blavin, Buettgens, & Roth, 2012). While health care reform appears beneficial over the long run by creating savings from a healthier society, improved well-being and reduced stress (Baicker & Finkelstein, 2011), the short-run costs of expansion are likely to further stress state budgets and encourage lobbying at the expense of cooperation. This likelihood is one higher education leaders must plan for.

Fourth, research indicates that higher education never completely returns to funding levels enjoyed prior to an economic slump. If higher education is not among the highest budgetary priorities of a state before an economic downturn it will not enjoy prioritization with recovery without a major policy change, which is unlikely as historical precedent and incrementalism are driving budgetary forces.

Thus, if higher education is not already among a state's highest priorities, little change beyond the small increases and decreases in funding that occur as the economic cycle progresses unless there is a concerted effort to draw policymakers' attention to their state's fiscal capacity to support higher education, the need for this support, and the state's actual effort. Arguing from the perspective of developing human capital must be the lynchpin of this effort.

Human capital

It appears unlikely that the U.S. will achieve the President's goal of having the highest proportion of students graduating from college in the world by 2020. Similar goals were set but unachieved by President Clinton (Fuhrman, 1994). The United States must reconfirm its belief in the virtue of education and its influence on the development of civic society if such goals are ever to be reached. Financial resources are secondary. To consider higher education simply as a stepping-stone to higher income is to ignore both the private and social non-market benefits it offers society by developing human capital. Assuming that the sole legitimate measure of human capital is quantitative inhibits this development. Deciding that only degrees that bring high financial returns are worth pursuing will reduce the educational process to a just-in-time manufacturing process free of creativity, motivation, and intellectual development while failing to recognize that human capital is multifaceted and includes both financial and non-financial elements.

While there is general agreement among academicians on the role of externalities at the primary and secondary education level, some argue for the diminishing value of externalities with additional years of education (and thus for reduced need for financial public support of education) and others go so far as to argue that there are no externalities created at the tertiary level at all. But although a degree in the humanities, for example, may not translate directly into substantial private financial return, it will result in significant private and social non-commercial benefits. Jackson (2009) rightfully noted that "prosperity is not synonymous with material wealth" (p. 143), it depends on a combination of physical, psychological and social wellbeing,

“prosperity hangs crucially on our ability to participate meaningfully in the life of society” (p. 143). We may never be able to avoid economic recession, but by fully funding state post-secondary educational institutions we have an opportunity to avoid social and intellectual recession.

We may never have the highest percentage of college graduates in our population, but we may well already have the highest number of students testing their strengths in various online venues freely provided by underfinanced public and private colleges and universities as well as by independent educational enthusiasts who believe that knowledge should be widely—and freely—accessible. Indeed, enabled by digital technology, the university of the future will be accessible to everyone, both in the state and out, who strives to improve by capitalizing on the development of open courseware and thus gives the lie to claims that there are no externalities created at the tertiary level.

References

- Ackoff, R. L. (1994). Higher Education and Social Stratification. *Interfaces*, 24(4), 73-82.
Retrieved: January 30, 2011, from <http://www.jstor.org/stable/25061909>
- Ahumada, M. M. (1990). An analysis of state formula budgeting in higher education. In D. W. Breneman, L. L. Leslie & R. E. Anderson (Eds.), *ASHE Reader on Finance in Higher Education* (pp. 331-354). Needham Heights, Massachusetts: Ginn Press.
- Alexander, F. K. (2000). The Changing Face of Accountability: Monitoring and Assessing Institutional Performance in Higher Education. *The Journal of Higher Education*, 71(4), 411-431.
- Alexander, F. K. (2003). Comparative study of state tax effort and the role of Federal government policy in shaping revenue reliance patterns. *New directions for institutional research*. Wiley Periodicals, Inc. no. 19, Fall 2003, p. 13-25.
- Alexander, F. K. (2011). Maintenance of State Effort for Higher Education: "Barriers to Equal Educational Opportunity in Addressing the Rising Costs of a College Education." *Journal Of Education Finance*, 36(4), 442-450.
- American Association of State Colleges and Universities (AASCU). (2011). *State outlook: Fiscal and state policy issues affecting postsecondary education*. (A Higher Education Policy Brief). Retrieved from AASCU
<http://www.aascu.org/uploadedFiles/AASCU/Content/WhatsNew/stateoutlookjuly2011.pdf>
- American Association of State Colleges and Universities (AASCU) & Policy Analysis Team.

- (2012). *Top 10 higher education state policy issues for 2012*. (A Higher Education Policy Brief). Retrieved from AASCU website:
http://www.aascu.org/uploadedFiles/AASCU/Content/Root/PolicyAndAdvocacy/PolicyPublications/Policy_Matters/Top_Ten_State_Policy_Issues_2012.pdf
- American Psychological Association (APA). (2009). *Publication manual of the American Psychological Association* (6th ed.). Washington, D. C.
- Archibald, R. B. & Feldman, D. H. (2006). State Higher Education Spending and the Tax Revolt. *The Journal of Higher Education*, 77(4), 618-644
- Astin, A. W. (1997). How "good" is your institution's retention rate? *Research in Higher Education*, 38(6), 647-658.
- Atkinson, R. D. & Andes, S. (2010). *The 2010 state new economy index: Benchmarking economic transformation in the states*. The Information Technology and Innovation Foundation. Retrieved from <http://www.itif.org/files/2010-state-new-economy-index.pdf>
- Atkinson, R. D., Court, R. H., & Ward, J. M. (1999). *The state new economy index: Benchmarking economic transformation in the states*. Progressive Policy Institute Technology & New Economy Project.
<http://www.research.fsu.edu/techtransfer/documents/snei.pdf>
- Baicker, C. & Finkelstein, A. (2011). The effects of medicaid coverage — learning from the Oregon Experiment. *The New England Journal of Medicine*, 365, 683-685.
- Baltagi, B. H. 2008. *Econometric analysis of panel data*. Chichester, UK: John Wiley & Sons Ltd
- Baum, S., Ma, J., Payea, K. (2010). *Education Pays 2010: The Benefits of Higher Education for Individuals and Society*. College Board: Advocacy & Policy Center. Retrieved from http://trends.collegeboard.org/downloads/Education_Pays_2010.pdf

- Bean, J. P. (2005). Nine themes of college retention. In A. Seidman (Ed.), *College student retention. Formula for student success* (pp. 215-245). Westport, CT: American Council on Higher Education & Praeger Publishers.
- Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *The Journal of Political Economy*, 70(5), 9-49.
- Becker, G. S. (1994). Human capital: A theoretical and empirical analysis, with special reference to education. Chicago, IL: University Of Chicago Press.
- Becker, G. S. (2009, August 14). Re: How to survive in an uncertain economy [CBS news interview with Edmund Lee]. Retrieved from http://www.cbsnews.com/8301-505125_162-51331638/gary-becker-how-to-survive-in-an-uncertain-economy/
- Bell, J. D. (2008). *The nuts and bolts of the higher education legislative appropriations process* (Policy Briefs: Getting what you pay for). Retrieved from WICHE website: http://www.wiche.edu/info/gwypf/bell_appropriations.pdf
- Bell, A. C., Carnahan, J., & L'Orange, H. P. (2011). *State tuition, fees, and financial assistance policies for public colleges and Universities 2010-11*. Retrieved from State Higher Education Executive Officers (SHEEO) website: http://www.sheeo.org/finance/tuit/2010-2011Tuition_and_fees.pdf
- Beyle, T. & Ferguson, M. (2007). Governors and the executive branch. In V. Gray & R. L. Hanson (Eds.), *Politics in the American states: A comparative analysis* (pp.192-228). Washington D.C.: CQ Press.
- Blavin, F., Buettgens, M., & Roth, J. (2012). *State progress toward health reform implementation: Slower moving states have much to gain* (Urban Institute Publications). Retrieved from Urban Institute website: <http://www.urban.org/UploadedPDF/412485->

state-progress-report.pdf

Boatman, A. & L'Orange, H. (2006). *State tuition, fees, and financial assistance policies for public colleges and Universities 2005-06*. Retrieved from State Higher Education

Executive Officers (SHEEO) website: <http://www.sheeo.org/finance/tuitionfee06.pdf>

Bowen, H. R. (1997). *Investment in learning*. Baltimore, MD: The Johns Hopkins University Press.

Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professorate*. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching

The Boyer Commission on Educating Undergraduates in the Research University. (1989).

Retrieved from <http://naples.cc.sunysb.edu/Pres/boyer.nsf/>

Burke & Associates. (2002). *Funding public colleges and universities for performance*. Albany, New York: The Rockefeller Institute Press.

Callan, P. M. (2002). *Coping with recession: Public policy, economic downturns and higher education*. Retrieved from the National Center for Public Policy and Higher Education

website: <http://www.highereducation.org/reports/cwrecession/MIS11738.pdf>

Catterall, J. S. (1997). Reflections on Economic Analysis and Education Policy: Introduction. *Educational Evaluation and Policy Analysis*, 19(4), 297-299.

Carneiro & Heckman. (2003). *Human capital policy* (National Bureau of Economic Research Working Paper No. 9495). Retrieved from

http://www.ecdgroup.com/pdfs/heckman_article-20_05_2003-17_59_04.pdf

Carnevale, A. P., Smith, N. & Strohl, J. (2010). *Help wanted: Projections of jobs and education requirements through 2018*. Retrieved from Georgetown University Center on Education

and the Workforce website: <http://cew.georgetown.edu/jobs2018/>

- Carnevale, A. P., Jayasundera, T & Cheah, B. (2012). *The college advantage: Weathering the economic storm*. Retrieved from Georgetown University Center on Education and the Workforce website:
<http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/CollegeAdvantage.FullReport.081512.pdf>
- Center on Budget and Policy Priorities. (2010). *Policy Basics: The ABCs of State Budgets*. Retrieved from <http://www.cbpp.org/cms/index.cfm?fa=view&id=3067>
- Cheslock, J. J., & Hughes, R. P. (2011). Differences Across States in Higher Education Finance Policy. *Journal Of Education Finance*, 36(4), 369-393.
- Compson, M & Navratil, J. (1997). *An Improved Method for Estimating The Total Taxable Resources of the States*, Treasury Research Paper No. 9702, Office of the Assistant Secretary for Economic Policy, Department of Treasury.
- Cozby, P. C. (2007). *Methods in behavioral research* (9th ed.). New York, NY: McGraw Hill.
- Cunha, F., Heckman, J. J., Lochner, L. & Masterov, D. V. (2006) Interpreting the evidence on the life cycle skill formation. In E. A. Hanushek & F. Welch (Eds.), *Handbook of the economics of education*. V.1, Ch 12, pp. 697-812. Handbooks in Economics, 26. Oxford, U. K.
- Delaney, J. A. (2011). Introduction to the Special Issue on Higher Education. *Journal Of Education Finance*, 36(4), 339-341.
- Delaney, J. A., & Doyle, W. R. (2007). The role of higher education in state budgets. In K. M. Shaw, & D. E. Heller (Eds.), *State postsecondary education research*. Sterling, Virginia: Stylus.

- Doyle, W. R. (2007). Challenges to designing cross-state measures of state resources for higher education. In K. M. Shaw, & D. E. Heller (Eds.), *State postsecondary education research*. Sterling, Virginia: Stylus.
- The Economist. (2012, July 14th-20th). Wyoming: Poor rich kid. One downside of cheap energy. *The Economist*, July 14th-20th, 31.
- Elazar, D. J. (1984). *American federalism: A view from the states*. New York, New York: Harpercollins College Div.
- Ewell, P. T. & Jones, D. P. (1994). Pointing the way: Indicators as policy tools in higher education. In S. Ruppert (Ed.), *Charting higher education accountability: A sourcebook on state-level performance indicators*. Education Commission of the States. Denver: Colorado
- Ewell, P. T., Jones, D. P. & Kelly, P. (2002). Conceptualizing and Researching the Educational Pipeline. Retrieved from <http://www.higheredinfo.org/analyses/Pipeline%20Article.pdf>
- Fowler, F. C. (2008) *Policy studies for educational leaders*. NJ: Prentice Hall; 3 edition
- Fry, R., Taylor, P., Velasco, G., & Dockterman, D. (2010). Minorities and the recession-era college enrollment boom. Demographic trends report. Pew Research Center's Social & Demographic Trends Project. Retrieved from <http://www.pewsocialtrends.org/files/2010/11/757-college-enrollment.pdf>
- Fuhrman, S. H. (1994). Clinton's Education Policy and Intergovernmental Relations in the 1990s. *Publius* 24(3), 83-97.
- Grapevine System. (2012). *An annual compilation of data on state tax appropriations for the general operation of higher education*. Normal, IL: Center for the Study of

- Education Policy: Illinois State University. Retrieved from
<http://www.coe.ilstu.edu/grapevine/>.
- Gray V. (2007). The socioeconomic and political context of states. In V. Gray & R. L. Hanson (Eds.) *Politics in the American states: A comparative analysis*. (pp.1-30). Washington D.C.: CQ Press.
- Gross, N. (2012). The indoctrination myth. *New York Times*. March 3, 2012.
- Gujarati, D. (2011). *Econometrics by example*. New York, NY: Palgrave Macmillan.
- Halstead, D.K. (1974). *Statewide planning in higher education*. Washington D.C.: U.S. Government Printing Office.
- Halstead, K. (1996). *State Profiles: Financing Public Higher Education 1978 to 1996:Trend Data*, 19th Edn Washington, DC: Research Associates of Washington.
- Hamermesh, D. S. (2005). *Four questions on the labor economics of higher education*. Retrieved from
<http://www2.ed.gov/about/bdscomm/list/hiedfuture/2nd-meeting/daniel-hamermesh.pdf>
- Hamm, K. E. & Moncrief, G. F. (2007). Legislative politics in the states. In V. Gray & R. L. Hanson (Eds.) *Politics in the American states: A comparative analysis*. (pp.154-191). Washington D.C.: CQ Press.
- Hauptman, A. M. (2001). Reforming the ways in which states finance higher education. In D. E. (Ed.), *The states and public higher education policy: affordability, access, and accountability*, p. 64-81. Baltimore, MD: The Johns Hopkins University Press.
- Heck, R. H. (2004). *Studying Educational and Social Policy: Theoretical Concepts and Research Methods*. Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.

- Heckman, J. & Krueger, A. B. (2004). *Inequality in America: What role for human capital policies?* Cambridge, MA: MIT Press.
- Heller, D. E. (2009). The context of higher education reform in the United States. *Higher Education Management and Policy*, 21(2), 71-88.
- Herbst, M. (2008). *Financing public universities: The case of performance funding*. Dordrecht, The Netherlands: Springer
- Hofferbert, R. I. (1968). Socioeconomic dimensions of the American states: 1890-1960. *Midwest Journal of Political Science*, 12(3), 401-418
- Hoo, S., Nagowski M., Rueben, K., Tannenwald R. & Yilmaz, Y. (2002). Measuring Fiscal Disparities across the U.S. States: A Representative Revenue System / Representative Expenditure System Approach. Occasional paper Number 74. Assessing the New Federalism An Urban Institute Program to Assess Changing Social Policies.
- Hovey, H. A. (1999). *State spending for higher education in the next decade: The battle to sustain current support*. National Center for Public Policy and Higher Education. Retrieved from <http://www.highereducation.org>
- Hossler, D., Lund, J. P., Ramin, J., Westfall, S., & Irish, S. (1997). State funding for higher education: The Sisyphean task. *Journal of Higher Education*, 68(2), 160-190.
- Jackson, T. (2009). *Prosperity without growth: Economics for a finite planet*. Sterling, VA: Earthscan publishing.
- Jones, D. (2003). *Financing in Sync--Policy Brief. Policy Insights*. Western Interstate Commission for Higher Education. Retrieved from <http://www.wiche.edu/Policy/PolicyInsights/PoliciesInSync/JonesInsight.pdf>

- Jones, D., Mortimer, K. P., Brinkman, P. T., Lingenfelter, P. E., L'Orange, H. P., Rasmussen, C, Voorhees, R. A. (2003). *Policies in Sync: Appropriations, tuition and financial aid for higher education*. A Compilation of Commissioned Papers. Western Interstate Commission for Higher Education. Retrieved from <http://www.wiche.edu/info/publications/PoliciesInSync.pdf>
- Jones, D. & Kelly, P. (2007). *Emerging Policy Triangle*. National Center for Higher Education Management Systems. Retrieved from <http://www.wiche.edu/info/publications/EmergingPolicyTriangle.pdf>
- Kane, T. J., Orszag, P., & Gunter, D. L. (2003). *State fiscal constraints and higher education spending: The role of Medicaid and the business cycle* (The Urban-Brookings Tax Policy Center Publications Discussion Paper No. 11). Retrieved from Tax Policy Center website: http://www.taxpolicycenter.org/UploadedPDF/310787_TPC_DP11.pdf
- Kaufman, H. (1956). Emerging Conflicts in the Doctrines of Public Administration. *The American Political Science Review*, 50(4), 1057-1073.
- Kelly, P. J. & Jones, D. P. (2005). *A new look at the institutional component of higher education finance: A guide for evaluating performance relative to financial resources*. National Center for Higher Education Management System. Retrieved from <http://www.higheredinfo.org/analyses/Policy%20Guide%20Jan2007.pdf>
- Kincaid, J. (1989). Fiscal capacity and tax effort of the American states: Trends and issues. *Public budgeting and finance*. Autumn, 1989.
- Koshal, R. K. & Koshal, M. (2000). State appropriation and higher education tuition: What is the relationship? *Education Economic*, 8(1), 81-89.
- Krugman, P. (2012). *End This Depression Now!* New York, NY: W. W. Norton & Company

Lagemann, E. C. (1999). An Auspicious moment for education research? In Lagemann, E. C. &

Shulman, L. S. (Eds.), *Issues in Education Research: Problems and Possibilities*. San Francisco, CA: Jossey-Bass.

Layzell, D. T. (1999). Linking performance to funding outcomes at the state level for public institutions of higher education. *Research in Higher Education*, 40(2), 233-246.

Layzell, D. T. & Lyddon, J. W. (1990). *Budgeting for higher education for higher education at the state level: Enigma, paradox, and ritual*. ASHE-ERIC Higher Education Report No. 4. Washington, D.C.: The George Washington University, School of Education and Human Development.

Lee, J. (1997). State Activism in education reform: Applying the Rasch model to measure trends and examine policy coherence. *Educational Evaluation and Policy Analysis*, 19(1), 29-43.

Leef, G. (2008). Are Government "Investments" in Higher Education Worthwhile? Library of Economics and Liberty. Retrieved June 16, 2012 from <http://www.econlib.org/library/Columns/y2008/Leefeducation.html>

Leslie L. L. & Ramey, G., (1986). State appropriations and enrollments: Does enrollment growth still pay? *Journal of Higher Education*, 57(1), 1-19.

Levin, H. M. & McEwan (2000). *Cost-effectiveness analysis: Methods and applications*. Thousand Oaks, CA: Sage Publications, Inc

The Lewin Group & The Nelson A. Rockefeller Institute of Government (2004). Spending on social welfare programs in rich and poor states. *Contract # 282-98-0016 Task Order #34*. Retrieved from <http://aspe.hhs.gov/hsp/social-welfare-spending04/report.pdf>

Lingenfelter, P. E. (2008). *State support for higher education*. Association of Governing Boards.

Retrieved from <http://www.sheeo.org/about/paulpres/AGB%20-2008%20%20State%20support%20for%20higher%20education.pdf>

Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22, 3-42.

Schapiro, M. O. (1993). The concept of productivity as applied to U. S. higher education. In McPherson, M. S., Schapiro, M. O. and Winston, G. C. (Eds.), *Paying the piper. Productivity, incentives, and financing in U.S. higher education*. Ann Arbor, MI: The University of Michigan Press.

Manzi, J. (2012). *Uncontrolled: The surprising payoff of trial-and-error for business, politics, and Society*. New York, NY: Basic Books.

Marshall, C., Mitchell, D. & Wirt, F. (1986). The Context of State-Level Policy Formation. *Educational Evaluation and Policy Analysis*, 8(4), 347-378.

Martinez, M. M. (2004). *Postsecondary participation and state policy: Meeting the future demand*. Stylus Higher Education Policy Series. Sterling, VA: Stylus

Matthews, J., Swanson, R., & Kerker, R. (Ed.). (1991). *From politics to policy: A case study in educational reform*. New York, NY: Praeger Publishers.

McKeown, M. P. & Layzell, D. T. (1994). State funding formulas for higher education: Trends and issues, *Journal of Education Finance*, 19(3), 319-346.

McLendon, M. K., & Hearn, J. C. (2007). Incorporating political indicators into comparative state study of higher education policy. In K. M. Shaw, & D. E. Heller (Eds.), *State postsecondary education research: New methods to inform policy and practice* (pp. 11-36). Sterling, VA: Stylus.

McMahon, W. W. (2002). *Education and development: Measuring the social benefits*. New York, NY: Oxford University Press.

McMahon, W. W. (2006). Education finance policy: Financing the nonmarket and social benefits. *Journal of Education Finance*, 32(2), 264-284.

McMahon, W. W. (2009). *Higher learning, greater good*. Baltimore, Maryland: The John Hopkins University Press.

Mikesell, J. (2007). Changing State Fiscal Capacity and tax effort in an era of devolving government, 1981-2003. *The Journal of Federalism*, 37(4), 532-550.

Michelau, D. K. (2008). *Are you getting what you pay for? Understanding higher education: Appropriations, tuition, and financial aid*. Western Interstate Commission for Higher Education. Retrieved from <http://www.wiche.edu/files/gwypf/michelau.pdf>

Moretti, E. (2012). *New Geography of Jobs*. New York, NY: Houghton Mafflin Harcourt Publishing Company.

The National Association of State Budget Officers. (2010). State expenditure report: Examining fiscal 2009-2011 state spending. <http://www.nasbo.org/publications-data/state-expenditure-report/state-expenditure-report-2010-fiscal-2009-2011-data>

The National Bureau of Economic Research (2010). US Business Cycle Expansions and Contractions. Retrieved from <http://www.nber.org/cycles.html>

The National Center for Education Statistics (various years). *Digest of education statistics*. Washington, DC: Author. <http://nces.ed.gov/pubs/esn/n99u.asp>

The National Center for Education Statistics (2002). *Losing ground: A national status report on the affordability of American higher education*. Retrieved from http://www.highereducation.org/reports/losing_ground/affordability_report_final.pdf

- The National Center for Public Policy and Higher Education. (2008). *Measuring Up. The National Report Card on Higher Education*. Retrieved from <http://measuringup2008.highereducation.org/>
- Nicholson-Crotty, S., Theobald, N. A., Wood, B. D. (2006). Fiscal Federalism and Budgetary Tradeoffs in the American States. *Political Research Quarterly*, 59(2), 313-321.
- Okunade, A. A. (2004). What factors influence state appropriations for public higher education in the United States? *Journal of Educational Finance*, 30(2), 123-138.
- Orland, M. (2009). Separate orbits: The distinctive worlds of educational research and Policymaking. In Sykes, G., Schneider, B., & Plank, D. (Eds.), *Handbook of education Policy Research*. New York, New York: Routledge.
- Orkodashvili, M. (2008). *Reversing the Balance Wheel Principle* (MPRA Paper No. 16418). Retrieved from Munich Personal RePEc Archive website: <http://mpra.ub.uni-muenchen.de/16418/>
- Ostrom, E. (2007). Institutional Rational Choice: An Assessment of the Institutional Analysis and Development Framework. In P. Sabatier (Ed.), *Theories of the Policy Process*. Boulder, Colorado: Westview Press.
- Pasque, P. A. (2010). *American higher education, leadership, and policy: Critical issues and the public good*. New York, NY: Palgrave Macmillan.
- Paulsen M. B. & St. John, E. P. (2002). Social class and college costs: Examining the financial nexus between college choice and persistence. *The Journal of Higher Education*. 73(2), 189-236.
- Perna, L. W. & Li, C. (2006). College affordability: Implications for college opportunity. *Journal of Student Financial Aid*. 36(1), 7-24.

- Peterson, R. G. (1976). Environmental and Political Determinants of State Higher Education Appropriations Policies. *The Journal of Higher Education*. 47(5), 523-542.
- Podestà, F. (2000). *Recent developments in quantitative comparative methodology: The case of pooled time series cross-section analysis* (Data Distribution Service (DSS) papers SOC 3-02). Retrieved from http://localgov.fsu.edu/readings_papers/Research%20Methods/Podesta_Pooled_Time_Series_Cross_Section.pdf
- The Policy Institute. (2012). "*Tax*" is not a four-letter word: *Ideas for a more progressive taxation system in Montana* (A Report of the Policy Institute, Montana's progressive think tank). Retrieved from http://www.thepolicyinstitute.org/prog_tax.pdf
- Rasmussen, C. J. (2003). *State tuition, fees, and financial assistance policies, 2002-03*. Retrieved from State Higher Education Executive Officers website: <http://www.sheeo.org/finance/tuitionfee.pdf>
- Richardson, R., & Martinez, M. (2009). Strengthening the policy-performance connection. In Richardson, R. & Martinez, M., *Policy and performance in American higher education*. Baltimore, Maryland: The John Hopkins University Press.
- Richardson, R.C., Jr. (2004). *A conceptual framework for comparative studies of higher education policy*. An AIHEPS working paper. Retrieved from <http://www.nyu.edu/steinhardt/iesp/aiheps/downloads/finalreports/092004Draft.pdf>
- Rizzo, M. J. (2006). State preferences for higher education spending: A panel data analysis, 1977-2001. In R. G. Ehrenverg (Ed.). *What's happening to public higher education? The shifting financial burden* (pp. 3-36). Baltimore, Maryland: The John Hopkins University Press.

- Robst, J. (2001). Cost Efficiency in Public Higher Education Institutions. *The Journal of Higher Education*, 72(6), 730-750.
- Robyn, M. & Prante, G. (2011). *State and local tax burdens: All states, one year, 1977 – 2009* (Tax Foundation Reports). Retrieved from Tax Foundation website:
<http://www.taxfoundation.org/publications/>
- Rogge, B. A. (1979). *Can Capitalism Survive?* Indianapolis, IN: Liberty Fund, Inc.
- Ruppert, S.S. (2001). *Where we go from here: State legislative views on higher education in the new millennium. Results of the 2001 Higher Education Issues Survey*. Retrieved from
http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_ERICExtSearch_SearchValue_0=ED455740&ERICExtSearch_SearchType_0=no&accno=ED455740
- Ruppert, S.S. (2003). *Closing the college participation gap: A national summary*. Retrieved from
<http://eric.ed.gov/PDFS/ED480470.pdf>
- Rusk, J., Leslie, L. & P. Brinkman, P. (1982). The Increasing impact of economic conditions upon higher education enrollments. *Economics of Education Review*, 2(1), 25-48.
- Russell, A. 2008. *Dedicated Funding for Higher Education: Alternatives for Tough Economic Times*. American Association of State Colleges and Universities. Retrieved from
http://www.aascu.org/media/pm/pdf/pmdec08_2.pdf
- Schmidt, P. (2002, February 22). Most states tie aid to performance, despite little proof that it works. *The Chronicle of Higher Education*, February 22. Retrieved from
<http://chronicle.com/article/Most-States-Tie-Aid-to/16169>

- Smith, D.B. (2011, May 1). The University Has No Clothes. *New York Magazine*. Retrieved from <http://nymag.com/news/features/college-education-2011-5/>
- Sparks, R. D. (2011). A value-added model to measure higher education returns on government investment. *Contemporary issues in education research*, 4(2), 15-21.
- State Higher Education Executive Officers (2007). *State higher education finance*. Retrieved from SHEEO website: http://www.sheeo.org/pubs/pubs_results.asp?issueID=12
- State Higher Education Executive Officers (2010). *State higher education finance*. Retrieved from SHEEO website: http://www.sheeo.org/pubs/pubs_results.asp?issueID=12
- St. John, E. P. (1991). A framework for reexamining state resource-management strategies in higher education. *Journal of Higher Education*, 62(3), 263-288.
- St. John, E. P. (1993). Untangling the web: Using price-response measures in enrollment projections. *Journal of Higher Education*, 31(4), 387-403.
- St. John, E. P. (2004). Policy research and political decisions. In E. P. St. John, & M. D. Parsons (Eds.), *Public funding of higher education: Changing Contexts and new rationales* (pp. 231-252). Baltimore, Maryland: The John Hopkins University Press.
- St. John, E. P., & Parson, M. D. (2004). Introduction. In E. P. St. John, & M. D. Parsons (Eds.), *Public funding of higher education: Changing Contexts and new rationales* (pp. 1-16). Baltimore, Maryland: The John Hopkins University Press.
- Stiglitz, J. E. (2010). *Freefall*. New York, NY: W.W. Norton & Company, Inc.
- Tandberg, D. A. (2010). Politics, interest groups and state funding of public higher education. *Research in Higher Education*, 51(5), 416-450.
- Taylor, P., Parker, K., Fry, R., Cohn, D., Wang, W., Velasco, G., Dockterman, D. (2011) Is college worth it? College presidents, public assess value, quality, and mission of higher

education. Pew Research Center: Social and Demographic trends.

<http://www.pewsocialtrends.org/files/2011/05/higher-ed-report.pdf>

Titus, M. A. (2006). No college student left behind: the influence of financial aspects of a state's higher education policy on college completion. *The Review of Higher Education*, 29(3), 293-317.

Toutkoushian, R. K., & Hollis, P. (1998). Using Panel Data to Examine Legislative Demand for Higher Education. *Education Economics*, 6(2), 141.

UNI-IHDP and UNEP. (2012). *Inclusive wealth report 2012. Measuring progress toward sustainability*. Retrieved from UNEP website: http://www.unep.org/pdf/IWR_2012.pdf

United Nations Development Programme. (2011). *Human development reports. HDI trends 1980-2010*. Retrieved from UNDP website:

http://hdr.undp.org/en/media/HDR_2011_EN_Complete.pdf

The U. S. Census Bureau. (2010a). *State and Metropolitan Area Data Book: 2010*. Retrieved from the U. S. Census Bureau website:

<http://www.census.gov/prod/2010pubs/10smadb/2010smadb.pdf>

The U. S. Census Bureau. (2010b). *Social, Economic, and Housing Statistics Division: Poverty*.

Retrieved from the U. S. Census Bureau website:

<http://www.census.gov/hhes/www/poverty/>

The U. S. Census Bureau. (2010c). *State Government Tax Collections Summary Report: 2010*.

Retrieved from the U. S. Census Bureau website:

<http://www.census.gov/prod/2011pubs/g10-stc.pdf>

The U. S. Census Bureau (2012). *Federal, State, and Local Governments* (Definitions).

Retrieved from the U. S. Census Bureau website:

<http://www.census.gov/govs/definitions/index.html#s>

The U. S. Department of Education. (2006). *A test of leadership: Charting the future of U.S. higher education*. A Report of the Commission Appointed by Secretary of Education

Margaret Spellings. Retrieved from the U. S. Department of Education website:

<http://www2.ed.gov/about/bdscomm/list/hiedfuture/reports/final-report.pdf>

The U. S. Department of Labor: Bureau of Labor Statistics. (2012). *Consumer price Index*

(Frequently asked questions). Retrieved from the U. S. Department of Labor website:

http://www.bls.gov/cpi/cpifaq.htm#Question_1

The U. S. Department of Labor: Bureau of Labor Statistics. (2011). *Education pays*. Retrieved

from the U. S. Department of Labor website: http://www.bls.gov/emp/ep_chart_001.htm

The U. S. Department of Treasury. Office of Economic Policy. (1998, 2002) Treasury

methodology for estimating total taxable resources (TTR). Retrieved from the U. S.

Department of Treasury website: www.treas.gov/offices/economic-policy/index.html

Volkwein, J. F. & Szelest, B. P. (1995). Individual and Campus Characteristics Associated with Student Loan Default. *Research in Higher Education*. 36(1), 41-72.

Wellman, J. (2006). *Costs, prices, and affordability* (A Background Paper for the Secretary's Commission on the Future of Higher Education). Retrieved from the Department of

Education website:

<http://www2.ed.gov/about/bdscomm/list/hiedfuture/reports/wellman.pdf>

Weerts, D. J., & Ronca, J. M. (2008). *Determinants of state appropriations for higher education from 1985-2005: An organizational theory analysis*. Madison, WI: Wisconsin Center for

- the Advancement of Postsecondary Education. Retrieved from
<http://wiscap.wisc.edu/uploads/media/2458aa20-970c-4e8d-b75d-d530bf87f65a.pdf>
- Western Interstate Commission for Higher Education. (2008). Knocking at the college door:
Projections of High School Graduates by State and Race/Ethnicity 1992-2022.
Retrieved from: <http://www.wiche.edu/knocking>
- The Whitehouse. (2009). Retrieved from: <http://www.whitehouse.gov/issues/education>
- The Whitehouse. (2012). *President Obama Challenges Governors to Invest in Education*. Home.
The White House blog. Retrieved from:
<http://www.whitehouse.gov/blog/2012/02/27/president-obama-challenges-governors-invest-education>
- Tzang, M. C. (1997). Cost analysis for improved educational policymaking and evaluation.
Educational Evaluation and Policy Analysis, 19(4), 318-324.
- Wildavsky, A. (1978). A budget for all seasons? Why the traditional budget lasts.
Public Administration Review, 38(6), 501-509
- Zhang, L. 2009. A value-added estimate of higher education quality of US states. *Education Economics*. 17(4), 469-489
- Zhang, L. 2010. The use of panel data models in higher education policy studies. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research*, XXV. Dordrecht, The Netherlands: Springer.
- Zumeta, W. 2004. State higher education financing: Demand imperatives meet structural, cyclical, and political constraints. In E. P. St. John, & M. D. Parsons (Eds.), *Public funding of higher education: Changing Contexts and new rationales* (pp. 79-107). Baltimore, Maryland: The John Hopkins University Press.

Appendix A: Panel Variables and Data Sources

Table A1
State Socioeconomic Factors

Variables	Description	Sources
State socioeconomic and demographic factors		
State per capita personal income (PCPI)	A measure of the total personal income of the states residents divided by the states total population	The Bureau of Economic Analysis and Bureau of the Census Per capita personal income (PCPI) estimates for 2010 were calculated using the April 1, 2010 Table 681. Personal Income Per Capita in Current and Constant (2005) Dollars by State http://www.census.gov/compendia/statab/cats/income_expenditures_poverty_wealth.html
State K-12 (K-12)	The proportion of a state's K-12 enrollment in the state population	Total population by state 2001-2009 Source: U.S. Census Bureau, Table 1. Annual Estimates of the Population for the United States, Regions, States, and Puerto Rico: April 1, 2000 to July 1, 2009 & http://www.census.gov/popest/data/state/totals/2009/index.html Total population by state 2010 Source: U.S. Census Bureau, Table 1. Annual Estimates of the Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2011 http://www.census.gov/popest/data/state/totals/2011/index.html K-12 population data is generated through ELSi table generator. http://nces.ed.gov/ccd/elsi/
State poverty rate (Poverty)	Percent of state population living in poverty	U.S. Census Bureau Social, Economic, and Housing Statistics Division: Poverty Table 21. Number of Poor and Poverty Rate, by State: 1980-2010 http://www.census.gov/hhes/www/poverty/data/historical/people.html
State educational attainment (Ed Attainment)	For persons 25 and over State percent of population with B Bachelor degree and more	U.S. Census Bureau, Statistical Abstract of the United States: 2011 http://www.census.gov/compendia/statab/ Table 233: Educational Attainment by State: 1990, 2000, 2006-2009 http://www.census.gov/compendia/statab/cats/education/educational_attainment.html American Community Survey 2000 data is used for years 2001-2005 2009 data is used for year 2010

Appendix A: Panel Variables and Data Sources (continued)

Table A2
Higher Education Factors

Variables	Description	Sources
Higher education factors		
Higher education enrollment in private institutions (Private)	The actual share of the estimated full-time-equivalent (FTE) enrollment in private institutions	The National Center for Education Statistics (NCES) (Table 2) IPEDS Enrollment File 2007-2008 Table 215, 217. Total fall enrollment in degree-granting institutions, by control and type of institution and state or jurisdiction: 2007 and 2008 http://nces.ed.gov/programs/digest/2010/menu_tables.asp Table 194. Total fall enrollment in private degree-granting institutions, by attendance status, sex, and state or jurisdiction: Selected years, 1970 to 2002 (used for 2002-2003)
Pell Grant Student (Pell Grant)	Percent of student body in public institutions Pell grant recipients	Table 21: Distribution of Federal Pell Grant Recipients by State and Control of Institution. The state is based on the location of the institution. http://www2.ed.gov/finaid/prof/resources/data/pell-data.html
State research and development expenditures per capita (R&D)	Total (federal, state, local) R&D expenditures for postsecondary institutions/Total population	NCHEMS Information Center for Higher Education Policymaking and Analysis. http://www.higheredinfo.org/dbrowser/index.php?submeasure=115&year=2001&level=nation&mode=data&state=0 http://www.ssti.org/Digest/Tables/072011t.htm For population estimates: http://www.census.gov/popest/data/historical/2000s/vintage_2009/index.html

Appendix A: Panel Variables and Data Sources (Continued)

Table A2 (continued)

Higher Education Factors

Variables	Description	Sources
Higher education factors		
State Tuition and Fees (Tuition)	Net Tuition Revenue is calculated by taking the gross amount of tuition and fees, less state and institutional financial aid, tuition waivers or discounts, and medical student tuition and fees. Net tuition revenue used for capital debt service is included in the net tuition revenue figures above. (p. 31 SHEF FY10)	WICHE Benchmarks 2011 Fig 14: Background Table Revenues from State and Local Appropriations and Tuition and Fees per FTE, Public Institutions, FY 2001 to FY 2010 (Adjusted EMI, COLA, inflation, HECA 2010) dollars http://www.wiche.edu/factbook

Appendix A: Panel Variables and Data Sources (continued)

Table A3
State Budget Factors

Variables	Description	Sources
State budget factors		
ETR	Actual Tax Revenue per capita divided by Total Taxable Resources per capita, expressed as a percentage.	U.S. Census Bureau http://www.census.gov/govs/www/estimate.html and http://www.census.gov/govs/statetax/historical_data_2008.html
Tax Capacity (Capacity)	Total Taxable Resources per capita (TTR)	http://www.treasury.gov/resource-center/economic-policy/taxable-resources/Pages/Total-Taxable-Resources.aspx

Table A4
Dependent Variable: State Support for Higher Education

Dependent Variable	Description	Sources
State Appropriations per FTE (Appropriations)	State Appropriations per FTE for 2000-2007 in 2007 dollars	WICHE Benchmarks 2011 Fig 13: Background Table Total State and Local Appropriations to Higher Education per FTE, FY 2001 to FY 2010 (Adjusted EMI, COLA, inflation, HECA 2010) dollars

Appendix B: Descriptive Statistics Variables and Data Sources

Table B1
Expenditure Need Factors & Adjustment Indexes

Variables	Description	Sources
US Population (USP)	Actually collected state tax revenue per capita	U.S. Census Bureau Table 1. Annual Estimates of the Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2011 http://www.census.gov/popest/data/national/totals/2011/index.html
State Higher Education Population (S_HEDP)	FTE student population by state	SHEEO State Higher Education Finance (SHEF) 2010 report http://www.sheeo.org/finance/shef_fy10.pdf Excel files 1986-2011 All States and National (XLS) http://www.sheeo.org/finance/shef/shef_data11.htm
US General Total Direct General Expenditures (USTDGE)	USTDGE includes all state and local government expenditures.	http://www.usgovernmentspending.com/compare_state_spending_2010pF0a 2010 data http://nces.ed.gov/programs/digest/d10/tables/dt10_032.asp 2006-2007 data http://nces.ed.gov/search/?output=xml_no_dtd&client=nces&site=nces&q=Direct+general+expenditures Tables 28 & 29 Direct general expenditures of state and local governments for all functions and for education, by level of education and state: for 2001-02 & 2005-06 data http://nces.ed.gov/programs/digest/d08/tables/dt08_028.asp http://nces.ed.gov/programs/digest/d07/tables/dt07_029.asp

U.S. Higher Education Expenditures	Expenditure for higher education operating expenses	<p>http://www.usgovernmentspending.com/year_spending_2010USbn_13bs1n_2024#usgs302</p> <p>http://www.usgovernmentspending.com/compare_state_spending_2010pF0a 2010 data</p> <p>http://nces.ed.gov/programs/digest/d10/tables/dt10_032.asp 2 006-2007 data</p> <p>http://nces.ed.gov/search/?output=xml_no_dtd&client=nces&site=nces&q=Direct+general+expenditures Tables 28 & 29 Direct general expenditures of state and local governments for all functions and for education, by level of education and state: for 2001-02 & 2005-06 data</p> <p>http://nces.ed.gov/programs/digest/d08/tables/dt08_028.asp</p> <p>http://nces.ed.gov/programs/digest/d07/tables/dt07_029.asp</p>
State Higher Education Expenditure (S_HEDE)	State Appropriations for higher education operational expenses	<p>SHEEO State Higher Education Finance (SHEF) 2010 report</p> <p>http://www.sheeo.org/finance/shef_fy10.pdf</p> <p>http://www.usgovernmentspending.com/compare_state_spending_2010pF0a 2010 data</p> <p>http://nces.ed.gov/programs/digest/d10/tables/dt10_032.asp 2 006-2007 data</p> <p>http://nces.ed.gov/search/?output=xml_no_dtd&client=nces&site=nces&q=Direct+general+expenditures Tables 28 & 29 Direct general expenditures of state and local governments for all functions and for education, by level of education and state: for 2001-02 & 2005-06 data</p> <p>http://nces.ed.gov/programs/digest/d08/tables/dt08_028.asp</p> <p>http://nces.ed.gov/programs/digest/d07/tables/dt07_029.asp</p>

S_COLA	Index used to account for cost of living differences among the states	SHEEO State Higher Education Finance (SHEF) 2010 report, p. 55 http://www.sheeo.org/finance/shef_fy10.pdf
HECA	Adjusts for inflation over time	SHEEO State Higher Education Finance (SHEF) 2010 report, p. 51 http://www.sheeo.org/finance/shef_fy10.pdf
S_EMI	Adjust for differences in the mix of enrollment and costs among types of institutions with different costs across the states	SHEEO State Higher Education Finance (SHEF) 2010 report, p. 55 http://www.sheeo.org/finance/shef_fy10.pdf

Appendix C: Panel Data Tables

Table C1
WICHE panel data descriptive summary

Variable		Mean	Std. Dev.	Min	Max
Appropriations	overall	7370.71	2620.79	3127.93	15571.66
	between		2604.22	3742.77	12999.07
	within		701.05	5053.71	9943.31
Tuition	overall	3190.22	1363.97	859.63	6421.08
	between		1321.91	1238.44	5211.53
	within		466.16	1390.74	4445.56
Private	overall	16.26	9.02	3.91	52.96
	between		8.55	4.34	34.04
	within		3.55	-0.85	35.18
Pell Grant	overall	32.58	8.41	20.12	49.70
	between		8.28	21.40	46.95
	within		2.49	26.11	40.58
PCPI	overall	36583.93	4267.43	26806.58	51256.90
	between		3931.46	29064.46	44758.40
	within		1917.64	31435.52	43082.43
K-12	overall	16.90	1.64	13.86	21.13
	between		1.60	14.49	20.38
	within		0.53	15.66	18.26
Poverty	overall	11.66	2.67	7.10	21.20
	between		2.39	9.16	17.54
	within		1.33	8.12	17.40
R & D	overall	134.88	51.36	34.43	281.36
	between		42.96	62.27	209.67
	within		30.03	32.86	206.57
Ed Attainment	overall	25.576	3.55	18.16	35.90
	between		3.36	19.68	33.81
	within		1.41	23.79	28.70
ETR	overall	7.84	1.43	5.7	19.12
	between		0.94	6.04	9.66
	within		1.10	4.58	17.38

Observations 135=15 states*9 years

Appendix C: Panel Data Tables (continued)

Table C2

Panel analysis results

Appropriations	Coefficient	Std. Err.	t	P> t
Year	-13.01	56.64	-0.23	0.819
Tuition	-.81	.16	-5.02	0.000
Private	4.15	18.39	0.23	0.822
Pell Grant	-45.41	25.89	-1.75	0.082
PCPI	.15	.05	3.36	0.001
K-12	-112.12	180.45	-0.62	0.536
Poverty	80.82	41.81	1.93	0.056
R & D	.08	4.16	0.02	0.984
Ed Attainment	78.69	76.42	1.03	0.305
ETR	213.38	55.45	3.85	0.000
Constant	27018.41	112483.7	0.26	0.796

F(14, 110) = 67.30 Prob > F = 0.0000

Appendix C: Panel Data Tables (continued)

Table C3

Poverty Rate, WICHE States: 2000 to 2010, percent

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Alaska	7.6	8.5	8.8	9.6	9.1	10.0	8.9	7.6	8.2	11.7
Arizona	11.7	14.6	13.5	13.5	14.4	15.2	14.4	14.3	18.0	21.2
California	12.7	12.6	13.1	13.1	13.2	13.2	12.2	12.7	14.6	15.3
Colorado	9.8	8.7	9.8	9.7	10.0	11.4	9.7	9.8	11.0	12.3
Hawaii	8.9	11.4	11.3	9.3	8.6	8.6	9.2	7.5	9.9	12.5
Idaho	12.5	11.5	11.3	10.2	9.9	9.9	9.5	9.9	12.2	13.7
Montana	14.1	13.3	13.5	15.1	14.2	13.8	13.5	13.0	12.9	13.5
Nevada	8.8	7.1	8.9	10.9	10.9	10.6	9.5	9.7	10.8	13.0
New Mexico	17.5	18.0	17.9	18.1	16.5	17.9	16.9	14.0	19.3	19.3
North Dakota	10.4	13.8	11.6	9.7	9.7	11.2	11.4	9.3	11.8	10.9
Oregon	10.9	11.8	10.9	12.5	11.8	12.0	11.8	12.8	10.6	13.4
South Dakota	10.7	8.4	11.5	12.7	13.5	11.8	10.7	9.4	13.1	14.1
Utah	7.6	10.5	9.9	9.1	10.1	9.2	9.3	9.6	7.6	9.7
Washington	10.8	10.7	11.0	12.6	11.4	10.2	8.0	10.2	10.4	11.7
Wyoming	10.8	8.7	9.0	9.8	10.0	10.6	10.0	10.9	10.1	9.2

Source: U.S. Bureau of the Census

Appendix C: Panel Data Tables (continued)

Table C4

Per Capita Personal Income, in 2010 constant dollars

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AK	31654	32636	32761	32843	32969	33617	34703	35648	37093	36160
AZ	34669	34839	34462	35019	36015	37295	38865	38861	37936	36094
CA	38792	38392	37636	38199	38898	39481	41402	41730	40768	38713
CO	40972	41570	40311	40036	40338	41053	42630	42831	42486	40153
HI	27214	26807	26981	27511	28269	28862	30199	31147	31056	30749
ID	32549	33005	32683	32803	34018	34194	35658	35753	34836	32984
MT	31255	32858	32511	33728	34469	35058	36566	37286	37535	36206
NV	38823	38045	37224	38303	39853	41540	41741	41555	39828	36895
NM	30308	32165	31677	32129	32779	33498	34564	35097	35625	34795
ND	32395	32807	32724	35081	34397	35328	35776	38114	41316	40453
OR	35652	35403	35196	35693	35666	35465	36984	37100	37036	35585
SD	33113	34061	33524	35981	36752	36640	36535	38554	40310	38634
UT	30724	31314	30722	30706	31016	32018	33400	34144	34037	32215
WA	39072	38761	38010	38446	39407	38906	40963	42298	42422	40617
WY	38185	39730	39610	41279	42452	44489	49121	49138	51257	45749

Source: U. S. Census Bureau.

Appendix C: Panel Data Tables (continued)

Table C5

Educational Attainment. Percent of state population 25 years and over with Bachelor's degree or more.

	2001	2002	2004	2003	2005	2006	2007	2008	2009
AK	24.7	24.7	24.7	24.7	24.7	26.9	26.0	27.3	26.6
AZ	23.5	23.5	23.5	23.5	23.5	25.5	25.3	25.1	25.6
CA	26.6	26.6	26.6	26.6	26.6	29.0	29.5	29.6	29.9
CO	32.7	32.7	32.7	32.7	32.7	34.3	35.0	35.6	35.9
HI	26.2	26.2	26.2	26.2	26.2	29.7	29.2	29.1	29.6
ID	21.7	21.7	21.7	21.7	21.7	23.3	24.5	24.0	23.9
MT	24.4	24.4	24.4	24.4	24.4	27.4	27.0	27.1	27.4
NV	18.2	18.2	18.2	18.2	18.2	20.8	21.8	21.9	21.8
NM	23.5	23.5	23.5	23.5	23.5	25.3	24.8	24.7	25.3
ND	22.0	22.0	22.0	22.0	22.0	25.6	25.7	26.9	25.8
OR	25.1	25.1	25.1	25.1	25.1	27.5	28.3	28.1	29.2
SD	21.5	21.5	21.5	21.5	21.5	24.8	25.0	25.1	25.1
UT	26.1	26.1	26.1	26.1	26.1	28.6	28.7	29.1	28.5
WA	27.7	27.7	27.7	27.7	27.7	30.5	30.3	30.7	31.0
WY	21.9	21.9	21.9	21.9	21.9	22.7	23.4	23.6	23.8

Sources: The 2001-2005 Data is based on the 2000 Census data; 2006-2009 data is based on the annual American Community Survey.

Appendix C: Panel Data Tables (continued)

Table C6

Share of K-12 population in total state population (percent)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
AK	21.1	20.9	20.6	20.2	19.9	19.7	19.4	19.0	18.7
AZ	16.5	16.9	16.8	17.6	17.5	17.7	16.8	16.7	16.5
CA	17.8	17.9	18.0	18.0	18.0	17.9	17.7	17.3	17.1
CO	16.3	16.5	16.5	16.5	16.4	16.4	16.4	16.2	16.3
HI	15.1	15.0	14.8	14.7	14.5	14.3	14.2	14.0	13.9
ID	18.6	18.4	18.2	18.1	18.0	17.9	17.8	17.8	17.8
MT	17.1	16.7	16.4	16.0	15.7	15.4	15.1	14.8	14.6
NV	16.3	16.5	16.5	16.6	16.6	16.5	16.5	16.4	16.4
NM	17.5	17.3	17.1	17.1	17.0	16.8	16.7	16.6	16.4
ND	17.2	16.7	16.5	16.1	15.8	15.4	15.1	14.8	14.6
OR	15.7	15.7	15.6	15.4	15.3	15.0	15.1	15.0	15.0
SD	16.9	16.7	17.0	16.2	15.7	15.5	15.2	15.1	15.6
UT	21.0	20.8	20.6	20.3	20.1	19.7	19.6	21.1	20.1
WA	16.8	16.7	16.6	16.5	16.3	16.2	15.9	15.7	15.6
WY	18.2	17.7	17.7	17.4	16.7	16.5	16.3	16.2	16.0

Source: U. S. Census Bureau.

Appendix C: Panel Data Tables (continued)

Table C7

Research and Development Investment per capita, 2010 constant dollars

	2001	2002	2003	2004	2005	2006	2007	2008	2009
AK	147.99	166.75	182.2	193.75	208.62	221.44	222.40	160.30	185.98
AZ	76.55	81.01	93.07	98.66	108.9	114.17	117.33	126.61	129.72
CA	103.76	115.79	127.01	138.68	156.15	164.68	174.99	190.16	196.36
CO	104.81	119.02	128.35	145.9	159.39	158.42	170.53	185.37	206.4
HI	103.76	115.54	124.24	166.34	169.83	185.29	203.11	214.34	227.22
ID	50.54	57.69	64.51	72.82	75.51	70.01	72.39	73.55	76.54
MT	96.31	111.55	129.28	145.2	164.43	167.72	177.65	190.01	182.58
NV	44.79	48.56	57.88	61.07	66.60	71.76	70.02	72.25	67.48
NM	121.42	131.14	137.09	138.94	161.64	199.64	197.89	207.79	212.31
ND	107.65	138.86	177.32	207.41	212.76	231.01	251.66	279.00	281.36
OR	85.37	91.13	102.98	122.32	132.66	138.92	145.64	155.70	163.07
SD	34.43	42.00	54.94	64.55	77.85	84.92	97.28	112.96	123.40
UT	120.12	128.73	136.00	148.94	144.63	147.2	148.11	154.52	176.12
WA	95.50	102.42	119.11	125.72	128.88	142.6	144.12	159.55	159.38
WY	68.28	69.31	100.46	103.27	147.6	160.45	144.78	138.79	139.79

Sources: NCHEM Information Center for Higher Education Policymaking and Analysis and U. S. Census Bureau.

Appendix C: Panel Data Tables (continued)

Table C8

*Total State Tuition and Fees per FTE,
FY 2001 to FY 2009 (Adjusted by EMI & COLA, in 2010 Dollars)*

	2001	2002	2003	2004	2005	2006	2007	2008	2009
AK	3,071	3,060	3,084	3,217	3,529	3,868	4,040	4,267	4,414
AR	3,203	3,107	2,981	3,332	3,510	3,788	4,019	4,152	4,416
CA	913	860	881	1,205	1,375	1,457	1,476	1,415	1,565
CO	3,965	4,059	4,005	4,545	4,334	4,685	4,441	4,863	5,170
HI	1,690	1,568	1,612	1,768	1,822	1,924	2,240	2,417	2,758
ID	2,222	1,682	2,033	2,204	2,414	2,513	2,655	2,308	2,471
MT	3,269	3,376	3,882	3,866	4,140	4,314	4,480	4,380	4,445
NV	2,521	2,582	2,583	2,535	2,614	2,640	2,595	2,703	2,866
NM	1,032	1,044	952	1,297	1,300	1,724	1,335	1,053	1,851
ND	3,976	3,366	3,710	4,701	5,560	6,088	6,421	6,248	6,421
OR	3,895	4,009	4,373	4,731	4,974	4,985	5,138	5,079	4,682
SD	4,821	4,933	4,893	5,312	5,437	5,296	5,561	5,296	5,353
UT	2,348	2,241	2,605	2,796	2,899	3,126	3,219	3,457	3,289
WA	1,733	1,775	1,919	1,967	2,176	2,138	2,238	1,976	1,979
WY	3,942	2,965	3,041	2,699	2,757	2,797	2,676	2,615	2,097
WICHE	1,686	1,647	1,699	2,010	2,152	2,263	2,287	2,261	2,389

Source: WICHE

Appendix C: Panel Data Tables (continued)

Table C9

Share of Pell Grant Recipients among college population, percent

	2001	2002	2004	2003	2005	2006	2007	2008	2009
AK	20.81	20.17	21.34	21.70	21.97	21.39	21.45	21.70	22.06
AZ	25.65	27.37	29.19	31.07	31.86	28.90	27.06	27.79	30.04
CA	22.99	24.47	24.27	25.19	25.40	25.82	24.50	25.40	27.25
CO	26.32	27.16	28.67	30.28	31.01	30.50	29.56	29.21	29.81
HI	23.29	24.57	25.19	25.48	24.60	22.67	21.84	23.76	25.71
ID	42.86	45.12	48.38	49.04	48.54	44.51	42.09	41.46	42.93
MT	42.04	44.47	43.69	47.24	46.98	43.66	40.43	39.68	38.39
NV	20.93	25.22	25.87	26.83	24.47	21.50	20.12	20.97	24.66
NM	46.22	47.95	47.95	48.27	49.70	47.68	44.00	44.38	46.40
ND	34.71	34.61	33.41	34.52	33.83	29.78	27.60	26.59	24.60
OR	32.10	35.15	36.90	37.60	38.19	36.39	34.96	35.83	38.57
SD	45.90	49.67	43.32	45.89	43.12	37.32	36.82	37.58	35.43
UT	32.15	34.77	35.83	37.52	38.19	36.04	33.69	31.71	33.29
WA	26.33	27.81	29.67	30.71	31.71	30.30	29.28	29.60	30.57
WY	30.15	30.81	31.23	32.78	31.52	28.29	25.24	24.23	23.11

Source: U. S. Department of Education

Appendix C: Panel Data Tables (continued)

Table C10

Share of Private Sector in State Higher Education System (percent)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
AK	4.99	4.00	4.00	3.91	4.39	4.52	4.21	4.03	5.05
AR	16.93	20.00	23.00	28.71	35.23	41.19	41.56	46.78	52.96
CA	14.58	14.00	14.00	15.46	16.29	16.32	15.90	15.55	15.56
CO	17.42	17.00	17.00	18.15	20.47	22.52	24.80	26.61	27.66
HI	25.93	26.00	26.00	25.44	24.78	25.23	25.27	24.24	23.65
ID	18.06	19.00	20.00	19.78	20.46	22.40	23.96	23.24	23.95
MT	11.49	12.00	10.00	10.15	10.35	10.14	9.49	9.53	8.94
NV	5.43	7.00	6.00	6.59	8.67	9.63	9.28	9.87	9.90
NM	8.39	8.00	8.00	7.71	7.78	7.89	7.71	7.15	6.62
ND	10.52	10.00	10.00	10.37	12.63	13.32	13.27	13.87	13.75
OR	15.46	15.00	15.00	16.43	17.31	18.14	19.00	18.56	17.67
SD	19.35	18.00	21.00	31.60	22.81	23.01	22.28	21.77	21.21
UT	24.87	24.00	24.00	23.54	25.29	25.78	26.67	27.35	27.25
WA	14.62	15.00	14.00	13.74	14.67	14.84	14.68	14.28	13.92
WY	4.30	5.00	6.00	6.02	6.94	7.71	5.28	4.37	4.20

Source: The National Center for Education Statistics

Appendix C: Panel Data Tables (continued)

Table C11
Effective Tax Rate (ETR), percent

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Alaska	8.8	6.7	6.6	6.4	7.1	8.1	10.5	19.2	13.5
Arizona	7.5	7.7	7.5	7.6	7.5	7.3	8.2	7.8	7.6
California	9.2	8.2	8.1	8.1	8.1	8.3	8.4	8.8	8.6
Colorado	7.2	7.1	6.9	6.6	6.5	6.7	6.9	6.9	6.9
Hawaii	9.5	9.0	8.8	8.8	9.1	9.5	9.5	9.3	9.1
Idaho	8.6	7.6	7.6	7.6	7.8	7.7	7.6	7.6	7.5
Montana	8.6	7.9	7.6	7.6	7.8	7.9	7.9	8.2	8.8
Nevada	6.7	7.0	6.7	6.8	6.8	6.6	6.7	7.0	7.3
New Mexico	8.9	8.3	7.9	7.8	7.8	8.7	8.8	9.0	8.4
North Dakota	8.3	7.9	7.7	7.6	7.6	8.2	8.2	9.1	9.7
Oregon	7.6	7.1	7.3	7.0	6.9	7.1	6.9	6.6	6.8
South Dakota	6.7	6.5	6.2	5.8	6.0	5.9	5.7	5.7	5.9
Utah	8.0	7.8	7.6	7.5	7.4	7.6	7.6	7.6	7.3
Washington	7.6	7.7	7.6	7.6	7.5	7.5	7.6	7.5	7.4
Wyoming	8.2	7.8	7.8	8.0	8.3	8.5	8.2	8.3	10.1

Source: SHEF SHEEO Reports 2001-2010

Appendix C: Panel Data Tables (continued)

Table C12

*Total State and Local Appropriations to Higher Education per FTE, FY 2001 to FY 2009
 (Adjusted by EMI & COLA, in 2010 Dollars)*

	2001	2002	2003	2004	2005	2006	2007	2008	2009
AK	11,659	11,354	10,967	10,200	10,634	11,164	12,376	12,637	13,081
AR	7,119	7,179	6,553	6,323	6,299	6,705	7,160	7,574	7,306
CA	8,071	8,123	7,440	6,950	6,450	7,057	7,252	7,241	6,787
CO	4,838	4,523	3,442	3,128	3,173	3,419	3,511	3,670	3,982
HI	6,953	6,553	6,815	6,957	6,799	7,656	8,307	8,703	8,830
ID	9,541	10,756	9,338	8,680	8,693	8,824	9,116	9,592	9,380
MT	4,343	4,338	3,940	3,848	3,803	4,182	3,988	4,455	4,524
NV	7,896	8,052	7,430	9,132	8,882	9,235	9,439	9,283	8,879
NM	8,253	8,632	9,761	9,332	9,481	10,184	9,035	9,889	8,472
ND	5,867	5,921	5,601	5,187	5,149	5,355	5,262	5,862	5,551
OR	6,966	6,206	5,781	5,169	5,037	5,272	5,343	5,618	5,247
SD	5,654	5,677	5,110	5,108	5,116	4,871	5,150	5,568	5,195
UT	6,476	6,259	5,772	5,521	5,685	6,099	6,264	6,869	6,179
WA	6,967	6,649	6,398	6,133	6,321	6,725	6,838	6,957	6,571
WY	10,682	10,944	12,029	11,823	12,469	13,482	15,083	14,908	15,572
WICHE Average	7,343	7,306	6,751	6,385	6,130	6,631	6,811	6,936	6,560

Appendix D: Descriptive Data Tables

Table D1

WICHE States Higher Education Expenditure Effort (Actual Expenditure/Expenditure Need) per FTE, indexed

	2002	2006	2010
US	1.00	1.00	1.00
Alaska	1.72	1.63	4.72
Arizona	0.83	0.85	0.81
California	0.78	0.79	0.86
Colorado	1.14	1.04	0.40
Hawaii	1.42	1.39	1.50
Idaho	0.99	1.05	0.99
Montana	0.86	1.00	0.64
Nevada	0.96	1.02	0.93
New Mexico	1.25	1.24	1.32
North Dakota	0.91	1.01	1.40
Oregon	1.27	1.23	0.37
South Dakota	0.94	0.79	0.94
Utah	1.30	1.19	0.94
Washington	1.10	1.17	0.87
Wyoming	1.02	1.16	2.45

Appendix D: Descriptive Data Tables (continued)

Table D2

50 States Higher Education Expenditure Effort (Actual Expenditure/Expenditure Need) per FTE, indexed

	2002	2006	2010
US	1.00	1.00	1.00
Alabama	0.93	1.09	1.09
Alaska	1.72	1.63	4.72
Arizona	0.83	0.85	0.81
Arkansas	0.93	1.00	0.95
California	0.78	0.79	0.86
Colorado	1.14	1.04	0.40
Connecticut	1.44	1.53	1.40
Delaware	1.31	1.47	1.08
Florida	0.78	0.78	0.87
Georgia	0.91	0.81	0.85
Hawaii	1.42	1.39	1.50
Idaho	0.99	1.05	0.99
Illinois	1.09	1.02	0.84
Indiana	1.06	1.04	1.06
Iowa	1.25	1.27	0.98
Kansas	1.00	1.06	0.87
Kentucky	1.11	1.03	1.25
Louisiana	0.71	0.74	1.05
Maine	1.08	1.07	1.06
Maryland	1.17	1.10	1.07
Massachusetts	1.20	1.35	0.82
Michigan	1.24	1.17	0.62
Minnesota	0.99	0.95	2.16
Mississippi	1.02	0.95	1.05
Missouri	0.96	1.02	0.74
Montana	0.86	1.00	0.64

Appendix D: Descriptive Data Tables (continued)

Table D2 (continued)

50 States Higher Education Expenditure Effort (Actual Expenditure/Expenditure Need) per FTE, indexed

	2002	2006	2010
US	1.00	1.00	1.00
Montana	0.86	1.00	0.64
Nebraska	1.04	1.06	1.24
Nevada	0.96	1.02	0.93
New Hampshire	1.20	1.28	0.59
New Jersey	1.27	1.14	1.30
New Mexico	1.25	1.24	1.32
New York	1.01	1.03	1.18
North Carolina	1.07	1.22	1.35
North Dakota	0.91	1.01	1.40
Ohio	0.98	0.99	0.89
Oklahoma	1.03	1.02	2.15
Oregon	1.27	1.23	0.37
Pennsylvania	1.15	1.07	0.81
Rhode Island	1.06	1.12	0.80
South Carolina	0.91	1.03	0.66
South Dakota	0.94	0.79	0.94
Tennessee	1.07	0.89	1.25
Texas	1.05	1.01	1.21
Utah	1.30	1.19	0.94
Vermont	1.54	1.90	0.68
Virginia	1.00	1.07	0.97
Washington	1.10	1.17	0.87
West Virginia	0.91	0.93	0.98
Wisconsin	1.07	1.12	0.86
Wyoming	1.02	1.16	2.45

Appendix D: Descriptive Data Tables (continued)

Table D3

50 States Ranked by Higher Education Expenditure Effort (Actual Expenditure/Expenditure Need) per FTE, indexed

2002			2006			2010		
1	2	3	1	2	3	1	2	3
	US	1.00		US	1.00		US	1.00
1	Alaska	1.72	1	Vermont	1.90	1	Alaska	4.72
2	Vermont	1.54	2	Alaska	1.63	2	Wyoming	2.45
3	Connecticut	1.44	3	Connecticut	1.53	3	Minnesota	2.16
4	Hawaii	1.42	4	Delaware	1.47	4	Oklahoma	2.15
5	Delaware	1.31	5	Hawaii	1.39	5	Hawaii	1.50
6	Utah	1.30	6	Massachusetts	1.35	6	North Dakota	1.40
7	Oregon	1.27	7	New Hampshire	1.28	7	Connecticut	1.40
8	New Jersey	1.27	8	Iowa	1.27	8	North Carolina	1.35
9	New Mexico	1.25	9	New Mexico	1.24	9	New Mexico	1.32
10	Iowa	1.25	10	Oregon	1.23	10	New Jersey	1.30
11	Michigan	1.24	11	North Carolina	1.22	11	Kentucky	1.25
12	New Hampshire	1.20	12	Utah	1.19	12	Tennessee	1.25
13	Massachusetts	1.20	13	Washington	1.17	13	Nebraska	1.24
14	Maryland	1.17	14	Michigan	1.17	14	Texas	1.21
15	Pennsylvania	1.15	15	Wyoming	1.16	15	New York	1.18
16	Colorado	1.14	16	New Jersey	1.14	16	Alabama	1.09
17	Kentucky	1.11	17	Rhode Island	1.12	17	Delaware	1.08
18	Washington	1.10	18	Wisconsin	1.12	18	Maryland	1.07
19	Illinois	1.09	19	Maryland	1.10	19	Maine	1.06
20	Maine	1.08	20	Alabama	1.09	20	Indiana	1.06
21	Wisconsin	1.07	21	Maine	1.07	21	Louisiana	1.05
22	North Carolina	1.07	22	Pennsylvania	1.07	22	Mississippi	1.05
23	Tennessee	1.07	23	Virginia	1.07	23	Idaho	0.99
24	Rhode Island	1.06	24	Kansas	1.06	24	Iowa	0.98
25	Indiana	1.06	25	Nebraska	1.06	25	West Virginia	0.98

Legend: 1-rank, 2-state, 3-effort.

Appendix D: Descriptive Data Tables (continued)

Table D3 continued

50 States Ranked by Higher Education Expenditure Effort (Actual Expenditure/Expenditure Need) per FTE, indexed

2002			2006			2010		
1	2	3	1	2	3	1	2	3
	US	1.00		US	1.00		US	1.00
26	Texas	1.05	26	Idaho	1.05	26	Virginia	0.97
27	Nebraska	1.04	27	Colorado	1.04	27	Arkansas	0.95
28	Oklahoma	1.03	28	Indiana	1.04	28	South Dakota	0.94
29	Mississippi	1.02	29	New York	1.03	29	Utah	0.94
30	Wyoming	1.02	30	Kentucky	1.03	30	Nevada	0.93
31	New York	1.01	31	South Carolina	1.03	31	Ohio	0.89
32	Kansas	1.00	32	Nevada	1.02	32	Kansas	0.87
33	Virginia	1.00	33	Oklahoma	1.02	33	Washington	0.87
34	Minnesota	0.99	34	Missouri	1.02	34	Florida	0.87
35	Idaho	0.99	35	Illinois	1.02	35	Wisconsin	0.86
36	Ohio	0.98	36	North Dakota	1.01	36	California	0.86
37	Missouri	0.96	37	Texas	1.01	37	Georgia	0.85
38	Nevada	0.96	38	Arkansas	1.00	38	Illinois	0.84
39	South Dakota	0.94	39	Montana	1.00	39	Massachusetts	0.82
40	Alabama	0.93	40	Ohio	0.99	40	Pennsylvania	0.81
41	Arkansas	0.93	41	Mississippi	0.95	41	Arizona	0.81
42	South Carolina	0.91	42	Minnesota	0.95	42	Rhode Island	0.80
43	Georgia	0.91	43	West Virginia	0.93	43	Missouri	0.74
44	West Virginia	0.91	44	Tennessee	0.89	44	Vermont	0.68
45	North Dakota	0.91	45	Arizona	0.85	45	South Carolina	0.66
46	Montana	0.86	46	Georgia	0.81	46	Montana	0.64
47	Arizona	0.83	47	South Dakota	0.79	47	Michigan	0.62
48	California	0.78	48	California	0.79	48	New Hampshire	0.59
49	Florida	0.78	49	Florida	0.78	49	Colorado	0.40
50	Louisiana	0.71	50	Louisiana	0.74	50	Oregon	0.37

Legend: 1-rank, 2-state, 3-effort.

Appendix E: Adjustment Coefficients

Table E1
CPI-U and HECA

Fiscal Year	CPI-U	HECA
2001	81.22	77.99
2002	82.50	80.42
2003	84.38	82.92
2004	86.63	85.80
2005	89.56	88.75
2006	92.45	91.42
2007	95.09	94.55
2008	98.74	97.31
2009	98.39	98.66
2010	100.00	100.00

Source: SHEF SHEEO Report 2010

Appendix E: Adjustment Coefficients

Table E2
COLA & EMI

State	COLA (Cost of Living)	EMI (Enrollment Mix)
Alabama	0.90	0.98
Alaska	1.22	1.03
Arizona	0.96	1.12
Arkansas	0.89	0.92
California	1.09	0.91
Colorado	1.05	1.15
Connecticut	1.20	1.02
Delaware	0.99	1.26
Florida	0.92	1.02
Georgia	0.93	1.01
Hawaii	1.35	1.11
Idaho	0.96	1.00
Illinois	1.05	0.96
Indiana	1.00	1.14
Iowa	0.99	1.10
Kansas	1.00	1.12
Kentucky	0.90	1.00
Louisiana	0.90	1.05
Maine	1.09	0.94
Maryland	1.00	0.99
Massachusetts	1.22	0.99
Michigan	1.03	1.07
Minnesota	1.05	0.99
Mississippi	0.88	0.92
Missouri	1.00	1.05

State	COLA (Cost of Living)	EMI (Enrollment Mix)
Montana	0.95	1.17
Nebraska	1.01	1.05
Nevada	1.01	0.95
New Hampshire	1.15	1.01
New Jersey	1.19	0.94
New Mexico	0.95	1.03
New York	1.15	0.94
North Carolina	0.93	1.01
North Dakota	1.00	1.03
Ohio	1.01	1.07
Oklahoma	0.89	0.94
Oregon	1.02	1.00
Pennsylvania	1.07	1.06
Rhode Island	1.15	0.97
South Carolina	0.92	0.99
South Dakota	1.01	1.03
Tennessee	0.91	1.03
Texas	0.89	0.96
Utah	1.01	1.05
Vermont	1.12	1.04
Virginia	0.96	1.04
Washington	1.05	0.97
West Virginia	0.89	0.99
Wisconsin	1.03	1.02
Wyoming	0.97	0.91
US	1.00	1.00

Source: SHEF SHEEO Report 2010

Appendix F: Various Capacity Factors

Table F1

Per capita real GDP (all industry total) by State, percent change from preceding period

	2000- 2001	2001- 2002	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009
Alaska	3.61	2.43	-3.02	3.59	-2.14	4.11	1.47	-1.42	7.1
Arizona	1.53	0.04	2.93	1.13	3.98	3.82	0.16	-3.53	-6.66
California	-1.29	0.85	2.02	3.77	3.58	2.75	0.55	-1.09	-4.62
Colorado	1.08	-0.14	-0.5	1.06	2.53	0.69	0.72	0.13	-2.16
Hawaii	-1.89	1.48	2.93	3.41	3.41	2.27	0.79	-0.41	-3.65
Idaho	-1.86	0.87	0.8	6.18	6.04	-1.17	1.62	-1.96	-4.68
Montana	3.03	0.38	3.41	2.83	2.00	1.29	2.97	-1.98	-2.26
Nevada	-2.81	-1.1	1.89	4.63	5.57	0.39	0.66	-5.27	-7.78
New Mexico	2.19	1.08	1.53	5.5	-1.36	0.63	-0.75	-1.79	2.11
North Dakota	1.87	5.19	5.64	-0.56	2.53	1.84	4.12	7.46	0.88
Oregon	-2.21	3.53	1.78	7.37	1.44	8.29	1.77	2.9	-5.93
South Dakota	2.42	7.44	1.69	1.14	1.48	-0.52	2.77	5.82	-0.37
Utah	0.04	-0.86	0.27	1.27	3.32	3.78	2.16	-1.54	-3.71
Washington	-2.71	-0.22	0.75	0.44	3.67	2.23	3.74	-0.50	-3.89
Wyoming	6.99	0.68	0.93	2.10	-1.80	7.56	1.53	3.30	7.05

Source: Bureau of Economic Analysis

Appendix F: Various Capacity Factors (continued)

Table F2

Total Taxable Resources (TTR) Per Capita Indexed

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Alaska	1.150	1.209	1.214	1.247	1.320	1.335	1.315	1.388	1.344
Arizona	0.874	0.877	0.871	0.860	0.871	0.881	0.848	0.851	0.828
California	1.049	1.049	1.036	1.049	1.060	1.082	1.071	1.087	1.067
Colorado	1.129	1.099	1.086	1.078	1.089	1.077	1.061	1.081	1.081
Hawaii	0.953	0.962	0.973	0.997	1.014	1.022	1.028	1.058	1.085
Idaho	0.799	0.805	0.773	0.803	0.797	0.797	0.798	0.797	0.780
Montana	0.741	0.761	0.783	0.792	0.790	0.803	0.818	0.819	0.817
Nevada	1.080	1.079	1.085	1.150	1.170	1.185	1.151	1.086	1.048
New Mexico	0.802	0.794	0.808	0.833	0.855	0.827	0.819	0.817	0.825
North Dakota	0.850	0.886	0.918	0.901	0.928	0.907	0.950	1.026	1.061
Oregon	0.913	0.912	0.924	0.957	0.938	0.942	0.936	0.949	0.960
South Dakota	0.936	0.975	0.993	1.003	0.965	0.960	0.994	1.027	1.058
Utah	0.842	0.851	0.833	0.819	0.835	0.837	0.828	0.852	0.854
Washington	1.054	1.056	1.045	1.047	1.035	1.052	1.071	1.095	1.088
Wyoming	1.153	1.180	1.215	1.259	1.332	1.425	1.438	1.574	1.473

Source: SHEF SHEEO Reports 2001- 2010

Appendix F: Various Capacity Factors (continued)

Table F3

Table Actual Tax Revenue (ATR) Per Capita Indexed

State	2001	2002	2003	2004	2005	2006	2007	2008	2009
Alaska	1.242	1.030	1.015	1.053	1.204	1.355	0.713	3.244	2.203
Arizona	0.800	0.844	0.830	0.835	0.834	0.807	0.866	0.811	0.757
California	1.186	1.096	1.062	1.088	1.099	1.134	1.121	1.166	1.110
Colorado	0.994	0.985	0.896	0.923	0.911	0.907	0.907	0.912	0.903
Hawaii	1.110	1.096	1.140	1.113	1.176	1.216	1.212	1.200	1.194
Idaho	0.844	0.781	0.779	0.795	0.793	0.771	0.751	0.741	0.708
Montana	0.783	0.748	0.784	0.764	0.789	0.799	0.806	0.817	0.866
Nevada	0.885	0.946	0.937	0.995	1.016	0.983	0.964	0.928	0.928
New Mexico	0.879	0.838	0.808	0.834	0.854	0.900	0.895	0.894	0.843
North Dakota	0.864	0.870	0.912	0.871	0.906	0.930	0.963	1.135	1.240
Oregon	0.851	0.815	0.846	0.850	0.827	0.843	0.805	0.759	0.789
South Dakota	0.764	0.772	0.805	0.762	0.736	0.712	0.709	0.712	0.761
Utah	0.826	0.826	0.812	0.796	0.795	0.801	0.787	0.788	0.758
Washington	0.976	1.025	1.022	1.005	0.989	0.990	1.006	0.998	0.980
Wyoming	1.155	1.162	1.275	1.293	1.423	1.530	1.463	1.589	1.798

Source: SHEF SHEEO Reports 2001-2010

Appendix F: Various Capacity Factors (continued)

Table F4

Tax Effort Per Capita Indexed (ATR/TTR)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Alaska	1.080	0.852	0.837	0.844	0.912	1.015	1.303	2.337	1.639
Arizona	0.916	0.963	0.954	0.971	0.959	0.916	1.021	0.954	0.915
California	1.130	1.045	1.025	1.037	1.037	1.048	1.046	1.073	1.040
Colorado	0.888	0.896	0.826	0.857	0.837	0.841	0.855	0.844	0.835
Hawaii	1.164	1.139	1.171	1.116	1.159	1.189	1.178	1.134	1.100
Idaho	1.056	0.969	1.008	0.990	0.995	0.967	0.941	0.931	0.907
Montana	1.056	0.983	1.002	0.965	0.999	0.994	0.985	0.997	1.059
Nevada	0.820	0.877	0.864	0.865	0.868	0.829	0.837	0.855	0.886
New Mexico	1.097	1.056	1.000	1.001	0.999	1.088	1.092	1.095	1.021
North Dakota	1.016	0.982	0.993	0.966	0.976	1.026	1.014	1.106	1.168
Oregon	0.932	0.893	0.916	0.888	0.882	0.895	0.860	0.800	0.822
South Dakota	0.816	0.792	0.810	0.760	0.763	0.742	0.713	0.694	0.720
Utah	0.982	0.971	0.975	0.972	0.952	0.957	0.950	0.925	0.888
Washington	0.926	0.971	0.978	0.961	0.956	0.941	0.940	0.912	0.901
Wyoming	1.001	0.985	1.050	1.028	1.068	1.074	1.017	1.009	1.221
United States	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Source: SHEF SHEEO Reports 2001-2010