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Disaggregating the Truth: A Re-Analysis of the Costs and Benefits of Michigan's Public Universities

Nathan J. Daun-Barnett
Assistant Professor, Educational Leadership and Policy
University at Buffalo

Introduction

For more than 50 years, human capital theory has been the cornerstone for understanding the value of investing in individuals' productive capacities in terms of both personal social and economic gain and the collective benefits that accrue to society. Vedder and Denhart (2007) challenge the hypothesis that public investment in higher education fuels economic growth. In their analysis focusing specifically on the state of Michigan, they ask two separate questions: (a) Have Michigan's public universities suffered from four years of declining state appropriations, and (b) Does investment in higher education influence state economic growth? The report concludes that public university revenues increased during that period and that, overall, state appropriations for higher education are negatively related to economic growth. A re-analysis suggests the opposite: Michigan's public universities have suffered from declining state support, which has resulted in higher tuition to students and declining spending on instruction and support services. Finally, higher education stimulates economic growth in ways different than those discussed by Vedder and Denhart. (Hereafter, references to Vedder and Denhart cite the 2007 study, unless otherwise indicated.) The findings relative to economic growth are misleading, but they point to an important reality facing higher education that should not be ignored—expenditures per FTE (full-time equivalent) are rising faster than inflation, and this may need to be addressed.

The analysis by Vedder and Denhart is either limited or misleading in a number of ways, which need to be considered. The following is a brief overview and will be followed by a more detailed analysis. First, in looking at the support for higher education institutions, Vedder and Denhart analyze changes in institutional revenues and expenditures per FTE student, but they do not report inflation-adjusted dollars. In addition, they report aggregated revenue and expenditure figures per FTE, neglecting the complex array of institutional missions and functions. As a consequence, actual changes in support for educating students from 2000 to 2004 are inflated, and the portions of the university budgets that experienced declines—notably instruction and student services—are hidden by changes in other expenditures including research, auxiliary services, endowment investments, capital improvements, and hospital services.

The second set of analyses on the relationship of spending on higher education and economic outcomes suffers from a different sort of problem. Vedder and Denhart propose a model for estimating the relationship between state investments in public higher education and the rate of growth of Michigan's economy. The finding of a negative relationship is, in part, a conceptual limitation and also a modeling problem. While this paper does not re-analyze state economic growth, it does suggest several conceptual limitations not accounted for in Vedder and Denhart's analysis. In particular, this paper suggests that Vedder and Denhart have not modeled the relationship correctly.

First, the relationship between appropriations and economic growth is, to a large degree, mediated through the availability of talent to fuel the economy. Michigan, like many states in the Midwest and across the country, has experienced a net out-migration of talent, minimizing some of the potential contribution universities may make to economic growth. Disaggregating revenues and expenditures makes it is possible to examine the complex relationships among state funding for higher education, increasing tuition costs, and growth in overall expenditures. Second, not all growth is the same, and some forms are more heavily valued than others. Research and development is the other major linkage between higher education and the economy, which is less likely to influence manufacturing, for example, but may make an important contribution to biomedical research and development. The final section of this paper examines alternative explanations for the growth of expenditures in higher education and the implications for institutional researchers and campus administrators responsible for balancing the public priorities served by higher education institutions and market forces calling for investments geared toward developing competitive advantage in an institution's niche market. For the purposes of this analysis, public investments in private higher education are not considered, but it is important to recognize that the private sector plays a critical role in the higher education marketplace and, by extension, in local and regional economies.

Analysis of Public Institutions

Michigan provides an important single case study because it has been on the forefront of the most recent economic decline. By virtue of its heavy reliance on the automotive manufacturing industry and the economic decline in that sector, Michigan has been wrestling with declining state revenues, shrinking budgets, and dwindling investment in higher education for several years longer than most states in the nation. From 2004 to 2009, Michigan posted the second slowest rate of growth in state appropriations to higher education (behind Rhode Island) in real dollars at 3.9%, when the average rate of growth over that same five-year period was 29.2% (Center for the Study of Education Policy, 2009). Michigan has been at the forefront of the curve during the current economic downturn, and for this reason,

it is useful to consider how public investment in Michigan has changed and what that may mean for other states in the coming years. When revenues and expenditures are disaggregated to focus on the key elements of educational and general (E&G) expenditures, institutions saw declines in inflation-adjusted dollars for instruction, student services, and academic services.

What has happened to the revenues and expenditures at Michigan's colleges and universities?

Vedder and Denhart (2007) acknowledge they report revenue and expenditure numbers inclusive of "research and other grants, hospital revenues, and other non-academic funds" (p. 2), which is inconsistent with accepted standard practice. Auxiliary services, hospital services, research grants, and other ancillary functions may indicate the health and vitality of the institution writ large, but it says very little about the central relationship between students and instructors—the portion of higher education supported by state appropriations. Research should be treated separately from the core public purpose of providing a quality education to students. The same is true for auxiliary services as it is for hospital revenues. An aggregated picture of revenues and expenditures suggests that public institutions have actually done quite well—or at least not suffered very much—from persistent cuts to state appropriations over the past four years. But a closer inspection of the elements disaggregated shows that eroding state support has forced institutions to find alternative sources of support, including an additional tax on students, frequently in the form of higher tuition and fees.

In their analysis, Vedder and Denhart chose not to report the inflation-adjusted numbers for total institutional revenues and expenditures and instead compared current dollars to the rates of inflation according to the Consumer Price Index (CPI). As Table 1 illustrates, CPI-adjusted numbers show declining revenues at three institutions including Wayne State (-7.9%) and Michigan Tech (-4.2%).

Table 1

Comparison of Total Revenues per FTE at Michigan Public Universities, 2000–2006

Institution Name	2000	2004 (Real)	2004 (Adjusted)	% Change 2000–04	2006 (Adjusted)
Central Michigan (CMU)	$11,813	$14,179	$12,925	9.40%	$11,540
Eastern Michigan (EMU)	$13,029	$15,093	$13,759	5.60%	$10,242
Ferris State (FSU)	$18,710	$18,256	$16,642	-11.10%	$13,436
Grand Valley State (GVSU)	$12,555	$13,717	$12,504	-0.40%	$11,150
Lake Superior State (LSSU)	$14,741	$20,726	$18,894	28.20%	$11,553
Michigan State (MSU)	$29,767	$36,069	$32,880	10.50%	$33,063
Michigan Tech. (MTU)	$26,025	$27,354	$24,936	-4.20%	$24,266
Northern Michigan (NMU)	$15,105	$17,189	$15,669	3.70%	$12,614
Oakland (OU)	$12,627	$13,884	$12,657	0.20%	$9,792
Saginaw Valley State (SVSU)	$10,689	$12,786	$11,656	9.00%	$9,699
Univ. of Michigan (UM-AA)	$91,500	$119,216	$108,677	18.80%	$121,222
UM – Dearborn (UM-D)	$13,596	$20,680	$18,852	38.70%	$10,889
UM – Flint (UM-F)	$13,238	$15,383	$14,023	5.90%	$11,311
Wayne State (WSU)	$29,669	$29,977	$27,327	-7.90%	$19,995
Western Michigan (WMU)	$15,291	$20,027	$18,256	19.40%	$14,851

Oakland University and Grand Valley State showed no change (less than 1% in either direction), while three other institutions demonstrated modest increases (less than 6%). The data for 2006, which were not available when Vedder and Denhart did their analysis, show that by 2006, the revenues per FTE student in adjusted dollars were down from 2000 in all but 2 of the 15 institutions, and these are the two major research universities, Michigan State University (MSU) and University of Michigan-Ann Arbor (UM-AA).

Winston, Carbone, and Lewis (as cited in Toutkoushian, 2001) observed that the price students pay for college is a function of the cost of providing that education less any subsidies received. As cost increases and subsidies remain flat, the price rises proportionally. Table 2 shows that six institutions received more than 40% of total revenue from tuition and fees, and all but one institution (WMU) saw tuition grow as a proportion of total revenue as state appropriations declined. From 2000 to 2004, the relative state contribution (meaning appropriations as a proportion of total revenues) dropped across the universities as that pattern continued through 2006–07 (the most recently available data). At the same time, tuition revenue rose at 12 of 15 institutions, with the largest percentage increases occurring at Oakland, Eastern Michigan, and Ferris State.

Table 2

State Appropriations and Tuition and Fees as Proportion of Total Revenues

	State Appropriations			Tuition and Fees		
Institution	2000	2004	2006	2000	2004	2006
CMU	33%	25%	19%	37%	39%	42%
EMU	36%	29%	24%	36%	44%	50%
FSU	33%	27%	21%	31%	38%	41%
GVSU	29%	22%	18%	37%	43%	44%
LSSU	36%	31%	28%	29%	28%	31%
MSU	31%	23%	17%	20%	21%	22%
MTU	37%	29%	25%	23%	23%	25%
NMU	42%	31%	28%	25%	27%	33%
OU	33%	27%	22%	36%	44%	48%
SVSU	36%	29%	23%	36%	41%	38%
UM-AA	11%	7%	5%	15%	11%	11%
UM-D	35%	25%	21%	44%	46%	50%
UM-F	38%	29%	21%	37%	40%	44%
WSU	39%	30%	25%	18%	17%	22%
WMU	33%	25%	22%	30%	35%	37%

In the aggregate, state appropriations and tuition and fees account for more than 60% of total revenues at the public universities in 2004. The remaining 40% comes from other sources, including research, endowments, and auxiliary services. This is an important point. Since 2004, the 15 public universities in Michigan have been asked to do more with less in state appropriations, and Vedder and Denhart illustrate that is exactly what they have done. As state appropriations dwindled, many of the public institutions found alternative revenue streams to augment their budgets and to maintain a high quality education. One such revenue stream resulted from tuition increases. Every public university saw state appropriations shrink as a proportion of their total revenues, from 2000 to 2006, and 11 of the 15 institutions relied on higher tuitions as a result. In 2000, state appropriations accounted for 34%, on average, of institutional revenues; by 2004, that number dropped to 26%; and by 2006, it was 21%. In the meantime, tuition accounted for 30% in 2000, rose to 33% in 2004, and climbed to 36% as these patterns persisted through 2006.

These numbers suggest two additional challenges. First, universities rely on external resources for more than a third of their revenues, indicating alternate priorities. In 2000, tuition and fees combined with state appropriations accounted for 64% of operating budgets on average; in 2006, the same revenue streams made up only 57% of the total. Second, tuition rose at 2% per year as a percentage of total revenue, where appropriations declined by half that rate, on average. The implication is that students may be covering more than the decline in state appropriations. This is

cause for concern, and institutions need to examine the costs driving institutional budgets. Research expenditures, for example, rose in inflation-adjusted dollars at 7 of 15 universities between 2000 and 2006. It is also informative to note that the two institutions with the largest revenue and expenditures per FTE student in the Vedder and Denhart article also have the lowest reliance on state appropriations and tuition and fees. This is discussed in more detail later in this article.

Have Michigan's public universities suffered economically from declining state support?

On the expenditure side (Table 3 below), six universities experienced inflation-adjusted declines of greater than 7%, and four others experienced negligible declines (less than 1%). Vedder and Denhart also consider whether expenditures per FTE change over time, and they find as revenues grew, so too did overall expenditures per FTE. Table 3 follows the work of Vedder and Denhart but displays the overall expenditures in inflation-adjusted dollars. While expenditures per student rose at 12 of 15 universities in real dollars between 2000 and 2004, 13 of 15 universities experienced declines when adjusted for inflation. The pattern continues for 11 of 15 universities through 2006.

Next, this study examines expenditures disaggregated for three separate categories: instruction, academic support, and student services. According to IPEDS, instruction includes all expenditures for academic instruction, occupational and vocational instruction, community education, preparatory and adult basic education, and remedial and tutorial instruction conducted by the teaching faculty for the institution's students. Academic support includes activities and services that support the institution's primary missions of instruction, research, and public service including admissions, registrar activities, and activities whose primary purpose is to contribute to students'

Table 3

Total Operating Expenditures per FTE 2000, 2004, and 2006

Institution	2000	2004	2006
CMU	$9,792	$9,499	$10,052
EMU	$10,267	$10,187	$10,463
FSU	$17,494	$13,327	$12,298
GVSU	$10,992	$9,948	$10,034
LSSU	$12,881	$12,367	$12,227
MSU	$29,459	$27,940	$28,222
MTU	$25,123	$21,633	$22,982
NMU	$14,323	$12,462	$11,756
OU	$10,089	$8,705	$8,965
SVSU	$8,619	$8,307	$8,482
UM-AA	$98,251	$88,262	$87,703
UM-D	$9,217	$10,140	$10,192
UM-F	$9,480	$9,707	$9,695
WSU	$21,294	$19,427	$18,553
WMU	$13,430	$13,225	$14,323

*All amounts reported in 2000 dollars.

Note: The University of Michigan figures include expenditures for hospital operations.

Table 4

Expenditures for Student Services per FTE 2000, 2004, and 2006

Institution	2000	2004	2006	Change (%) 2000–04	Change (%) 2000–06
CMU	$499	$476	$519	-4.6%	4.0%
EMU	$888	$935	$962	5.3%	8.4%
FSU	$989	$841	$757	-14.9%	-23.4%
GVSU	$775	$726	$738	-6.3%	-4.8%
LSSU	$596	$587	$713	-1.4%	19.7%
MSU	$528	$495	$518	-6.3%	-2.0%
MTU	$848	$800	$857	-5.7%	1.1%
NMU	$1,223	$1,166	$1,120	-4.7%	-8.5%
OU	$745	$610	$651	-18.1%	-12.7%
SVSU	$548	$384	$412	-29.9%	-24.9%
UM-AA	$1,430	$1,222	$1,228	-14.5%	-14.1%
UM-D	$679	$699	$668	3.0%	-1.5%
UM-F	$524	$549	$592	4.7%	12.9%
WSU	$944	$843	$754	-10.8%	-20.1%
WMU	$734	$659	$691	-10.2%	-5.8%

*All amounts reported in 2000 dollars.

emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program. Declining support for higher education often impacts student services first. Table 4 shows that 12 of 15 institutions cut their funding per FTE for student services when adjusted for inflation. State appropriations are most closely tied to E&G expenditures because these expenses reflect investments necessary to develop human capital through the training and support of students. As such, student services as well as instruction and academic services are most likely to decline when state appropriations decline.

Colleges and universities maintained a strong commitment to their core purpose of providing high quality instruction, but a number of institutions spent less per FTE. Table 5 illustrates that six universities experienced a decline in spending per FTE on instruction (in inflation-adjusted terms), and four grew by less than 1% per year between 2000 and 2004. Northern Michigan and Michigan Tech made the largest cuts in terms of spending on instruction per FTE in that time period. By 2006, eight institutions spent less per FTE than in 2000, and three more increased spending by slightly more than 1% annually. The four institutions with the largest increases by 2006 all spent less than $4,000 per student in 2000. Spending on instruction may be partly offset by spending on research, where faculty salaries are commonly subsidized. The effect within the institution may be that as state support declines, greater pressures are placed on faculty to seek out research grants. The trade-off may be an increase in graduate instructors to free faculty for research, a situation for which universities are routinely criticized.

Table 5

Expenditures for Instruction per FTE 2000, 2004, and 2006

Institution	2000	2004	2006	Change (%) 2000–04	Change (%) 2000–06
CMU	$3,616	$3,725	$3,973	3.0%	9.9%
EMU	$3,248	$3,520	$3,778	8.4%	16.3%
FSU	$5,519	$4,792	$4,475	-13.2%	-18.9%
GVSU	$3,826	$3,927	$3,769	2.6%	-1.5%
LSSU	$3,912	$3,788	$3,350	-3.2%	-14.4%
MSU	$8,169	$8,466	$8,625	3.6%	5.6%
MTU	$8,339	$6,431	$6,093	-22.9%	-26.9%
NMU	$4,006	$3,232	$3,191	-19.3%	-20.3%
OU	$3,706	$3,574	$3,652	-3.6%	-1.5%
SVSU	$2,644	$2,849	$2,861	7.7%	8.2%
UM-AA	$13,736	$13,804	$13,531	0.5%	-1.5%
UM-D	$3,615	$4,205	$4,038	16.3%	11.7%
UM-F	$3,527	$3,786	$3,820	7.3%	8.3%
WSU	$7,389	$6,644	$6,492	-10.1%	-12.1%
WMU	$3,869	$4,063	$4,717	5.0%	21.9%

*All amounts reported in 2000 dollars.

As noted earlier, simple interpretation of gross expenditures can be very misleading. Vedder and Denhart point specifically to the apparent largesse of the University of Michigan to suggest that the cuts have not hurt the institution. In its entirety, the University of Michigan, including its $1.8 billion hospital operation, its $5.65 billion endowment (or the portion of permanent investment in a given year), and its $809 million research and development budget, the institution appears to thrive even during periods of financial crisis. But in terms of providing a state-subsidized education, UM-AA is relatively inexpensive; nearly 74% of the operating budget comes from external sources including the hospital and endowment earnings. Students contribute 15% of revenues through tuition and fees, and the remaining 11% is provided by state appropriations.

UM is an interesting and exceptional case, but it is not the norm for public universities in Michigan. Table 2 illustrated that tuition made up an increasing percentage of an institution's operating revenue at the same time as state appropriations accounted for less. If the state believes its own claim that higher education is the engine for economic growth and development, these numbers do not bear that out. Rather, Michigan has experienced a systematic disinvestment in higher

education, and the result is that students pay more in tuition as the state pays comparatively less in appropriations. According to the annual grapevine survey of state tax appropriations for higher education conducted by the Center for the Study of Education Policy (2009), spending on higher education in Michigan declined by 9.2%. Only six states experienced larger percentage declines in state appropriations.

The costs of instruction and student services are two of the core elements of the E&G fund, and similar patterns exist for other elements as well. For example, 11 of 15 universities cut spending per FTE (in real dollars) for academic support services (e.g., writing centers, tutoring, academic advising), and 7 of 15 cut spending on public services (non-instructional services beneficial to individuals and groups external to the institution including expenses for community services, cooperative extension services, and public broadcasting services). When these numbers are adjusted for inflation utilizing the Consumer Price Index (CPI), the case is even more compelling, showing that all 15 institutions reduced spending on both academic support and public services.

Expenditures on research provide one illustration, which is less directly related to the education of students than instruction, but reflects important institutional expenditures related to the quality of education and the potential for economic growth. Between 2000 and 2004, gross expenditures for research increased at all 15 universities. During that time, enrollments grew by an average of 7.5% (Presidents Council, State Universities of Michigan, 2006). Table 6 summarizes research expenditures per FTE demonstrating that 7 of 15 universities spent more per FTE in inflation-adjusted dollars than in 2000.

In most cases, research funding originates from sources external to the institution, with the federal government and private philanthropic organizations leading the way. Research money supports faculty salaries (direct influence on instruction) and in exchange requires greater institutional investments in facilities (indirect influence). Not surprisingly, those institutions with the highest spending levels on research in 2000 (including UM, MSU, and WSU) experienced increases, whereas the opposite was true for smaller universities (including FSU, SVSU, and NMU). The remaining nonacademic elements of the budget include investment income, capital appropriations, and private gifts, most of which also rely upon sources of funding beyond tuition or state appropriations. In times of state financial crisis, public universities have found ways to bring more external money into their institutions, perhaps even mitigating potential influences of declining state support.

On the expenditure side, students continue to receive roughly the same services, but availability and accessibility of those services may have changed. During the four years in question, Michigan's universities were forced to cut costs

Table 6

Expenditures for Research per FTE 2000, 2004, and 2006

Institution	2000	2004	2006	Change (%) 2000–04	Change (%) 2000–06
CMU	$92	$240	$169	162.1%	84.3%
EMU	$224	$237	$248	6.0%	10.6%
FSU	$49	$33	$27	-33.9%	-44.4%
GVSU	$128	$189	$267	47.7%	109.3%
LSSU	$111	$157	$148	41.4%	33.4%
MSU	$5,403	$5,264	$4,825	-2.6%	-10.7%
MTU	$3,956	$4,700	$5,870	18.8%	48.4%
NMU	$132	$99	$52	-25.0%	-60.5%
OU	$703	$445	$379	-36.7%	-46.1%
SVSU	$102	$70	$59	-32.1%	-42.7%
UM-AA	$11,789	$12,181	$11,236	3.3%	-4.7%
UM-D	$452	$274	$378	-39.5%	-16.4%
UM-F	$208	$165	$96	-20.5%	-54.0%
WMU	$622	$924	$963	48.5%	54.8%
WSU	$6,240	$5,742	$5,068	-8.0%	-18.8%

*All amounts reported in 2000 dollars.

with the loss of approximately 10% of their state appropriations. Those cuts resulted in cost-saving measures, including administrative efficiencies, hiring freezes, limits on salary increases, the elimination of nonessential functions, and savings on healthcare and through reduced energy consumption. While institutions claim services have not yet been cut, the lack of state support impacts the quality of service provided. For example, counseling and advising may remain available, but hours may be limited. Similarly, the same courses may be available to students but with fewer sections or larger course, lab, or recitation sections.

On the revenue side, tuition increases have become a sort of progressive tax levied by the public universities as an extension of the state. In 2002, universities committed to increasing institutional financial aid at rates comparable to tuition increases. In most cases, those financial resources have been utilized to discount the cost of attendance for lower income students most adversely affected by tuition increases. In effect, the higher sticker price requires some students to pay more, and a portion of those funds is then utilized to maintain a lower cost threshold for students with fewer financial resources. To illustrate, in 2007 Michigan State announced a 9.7% tuition increase coupled with a 14.2% increase of institution-based financial aid. Similarly, Oakland University announced an additional $1.4 million for student financial aid in 2007–08. These choices reflect a set of institutional priorities and commitments to maintain a high level of quality for all, while remaining affordable and accessible to the larger public for which they have been established to serve.

Human Capital Theory and Economic Growth

While the current analysis pays particular attention to the state of Michigan, it has clear implications for all states across the country wrestling with declining state support per student, growing costs of operating public higher education, and tuition increases well above rates of inflation. For example, Vedder, Denhart, and Ruchti (2008) conducted a summary analysis for the state of Iowa concluding the state has not realized a return on its investment in higher education, particularly relative to its neighbors. The literature examining the relationship between state investment in higher education and economic growth is extensive, particularly from the 1960s through the early 1990s. Human capital theory serves as the theoretical foundation for this line of inquiry, which reflects the simple notion that individuals (and by extension states) benefit from higher levels of education, which in turn enhances the productive capabilities of individuals and creates positive externalities or spillovers for the greater public.

Theodore Schultz (1961) and Gary Becker (1964) brought human capital to the forefront of the economics literature (Langelett, 2002). Both Schultz and Becker explored how certain Western economies grew at much faster rates than other nations, and both recognized the limitations of current models that considered only increases in "land, man-hours, and physical reproducible capital" (Schultz, 1961, p. 1). Langelett (2002), suggested both macro- and microeconomic applications exist, and studies continue to show that, when comparing the growth of industrial economies around the world, investment in higher education is positively related to economic growth (Baldwin & Borrelli, 2008; Jorgenson & Fraumeni, 1992) even though the rate of growth may slow as the supply of education increases (Psacharopoulos & Patrinos, 2002).

Paulsen (2001) has defined human capital as "the productive capacities—knowledge, understandings, talents, and skills—possessed by an individual or society" (p. 56), and as such describes the investment in human capital as the expenditures intended to enhance the potential of each individual. The relationship between levels of education and individual economic benefit is clear and consistent—the more education, skills,

and training an individual has, the more they are likely to earn in annual wages and the less likely they are to be unemployed (Becker, 1962; Schultz, 1961)—and these findings are reinforced in the annual data provided by the U.S. Bureau of Labor Statistics (2011), demonstrating the positive relationship between educational level and median wages. Ehrenberg (2005) points out that state appropriations increased from 1974 to 2004 almost 20% (or less than 1% per year after adjustment for inflation), meaning that state investments in higher education grew modestly, particularly compared to competing public priorities including healthcare, K12 education, and corrections. Jorgenson and Fraumeni (1992), in their analysis of U.S. economic growth suggest that when analyses utilize income-based measures of investment in human capital rather than the more conventional outlay-based approach, the investment in higher education is positive and of a higher magnitude. Baldwin and Borrelli (2008) also suggest that conventional approaches underestimate the magnitude of the relationship between investment in higher education and economic growth because they do not adequately account for the indirect effects mediated through degree attainment—a limitation of Vedder and Denhart's analysis.

In other work, Vedder (2004) contends that while individuals benefit from a college education, states may not see the same return on investment in human capital. In fact, Vedder underscores the relationship between individual investment and earnings to question whether the government should play a role at all. His findings indicate that the proportion of state and local government budgets spent on higher education is negatively related to growth in real personal income per capita. The fundamental issue is whether the state benefits above and beyond the economic benefits to individuals. Vedder and Denhart (2007) argue that public universities have not suffered from declining state appropriations as evidenced by

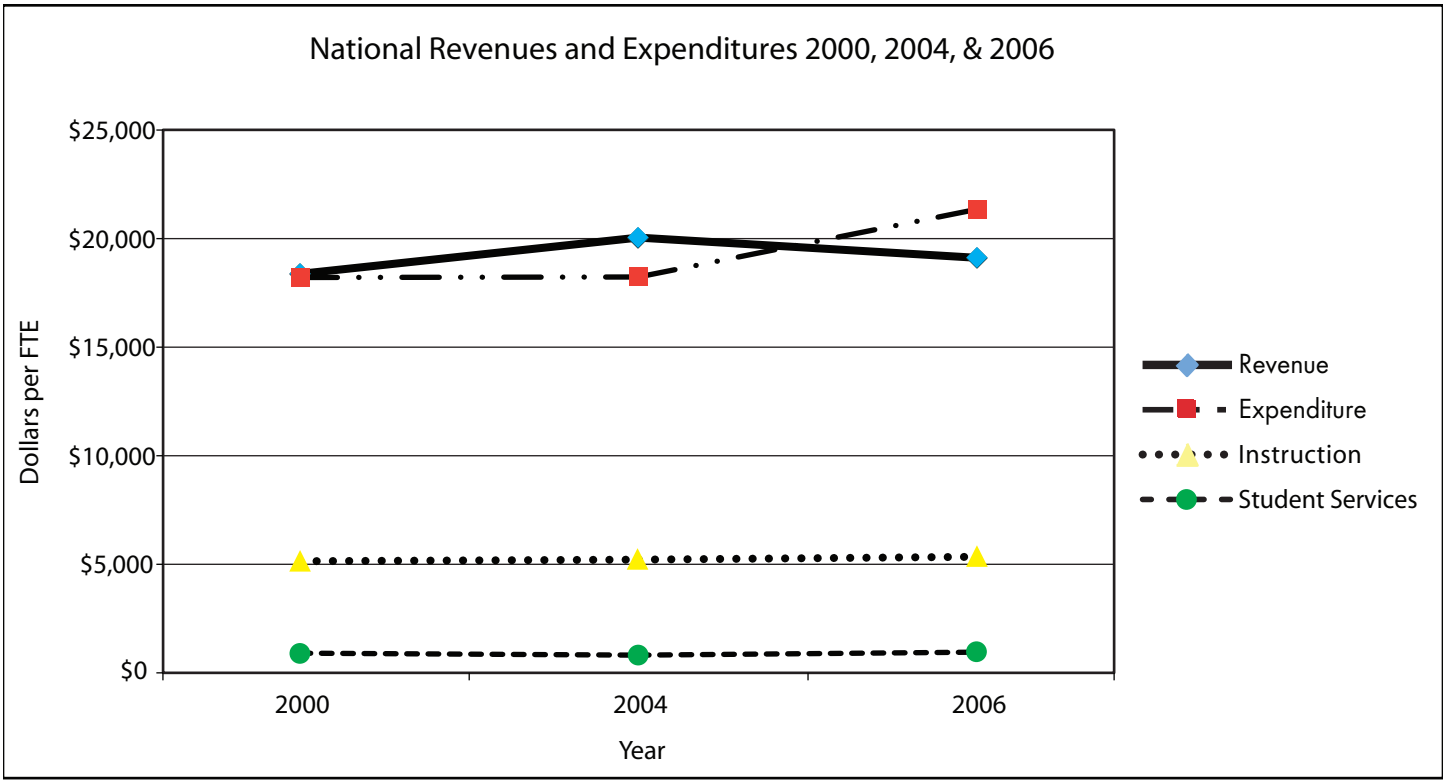

Figure 1. National patterns for revenues and expenditures per FTE student in 2000 dollars.

increasing revenues, which is an indication that increasing state support is not necessary to sustain public universities.

A National Perspective

It is possible to consider some of these trends nationally as well to examine the extent to which the Michigan example is instructive for the nation as a whole. In order to do this, I have aggregated data on all public four-year colleges in the U.S. and calculated averages for the nation on the measures considered above across the three time-points. Figure 1 provides an illustration of four of the six trends. Perhaps most striking is that while in 2000 revenues and expenditures were roughly equivalent, revenues per student exceeded expenditures in 2004 (in 2000 dollars), and as revenues per FTE declined in 2006, expenditures rose by nearly 18%. Declining revenues nationally may indicate a combination of lower appropriations per FTE and growing enrollments.

The patterns for expenditures on instruction and student services are slightly different nationally than those observed in Michigan. Spending on instruction per FTE increased slightly over each of the three years by less than 1% annually, which is similar to Michigan in the aggregate. Spending on student services nationally declined from 2000 to 2004 and increased again by 2006, resulting in a similar percentage increase annually. In Michigan, spending was down across most institutions in terms of student services, so it appears that other states may not have faced the same degree of financial challenge during the timeframe under investigation. Patterns for tuition and appropriations as proportions of total revenues are not shown in the figure, but the data reveal that while tuition consistently accounted for approximately 24% of revenues across each of the three time-points, state appropriations declined from 39% in 2000 to 33% in both 2004 and 2006. These data suggest that institutions have made up for declining state appropriations through alternative revenue sources, which might include auxiliary services, research, hospitals, and endowment income. It also means that despite tuition increases, students are responsible for the same proportion of the cost of their education as they were at the beginning of the decade.

Does higher education stimulate economic growth?

Human capital theory provides a useful framework to answer this question, and it is important to recognize this is a different question than asking whether higher education contributes to the state's economy. The 15 public universities play a key role in Michigan's economy. Consider for example, the impact analysis for Michigan State, the University of Michigan, and Wayne State. Combined, they employ more than 46,000 individuals, most of whom hold college degrees; they account for more than $5.6 billion in total operations; and they attract nearly $1.5 billion in research dollars (Anderson & Sallee, 2007). But this is not the question Vedder and Denhart ask. Rather, they are interested in the relationship between state investments in higher education and the rate of change in economic growth, specifically challenging human capital theory that investment in higher education stimulates economic growth. Universities contribute to economic growth in two ways: (a) create new knowledge through research, typically measured in terms of new patents and startup companies and (b) train students for future employment opportunities, which is most often measured in terms of credentials of value (certificates and degrees). Educated workers typically earn a higher wage, pay more into the tax base, and avoid the need for social welfare programs. By extension, communities with higher proportions of college-educated workers are attractive to potential employers, which will catalyze economic growth.

Vedder and Denhart (2007) report a negative relationship between state funding for higher

education and growth in the economy. In their own analysis, Vedder and Denhart show there is a modest but significant positive relationship between the percent of the population with a degree and the rate of growth in the economy. They dismiss this relationship as a consequence of selection. From a state's perspective, this may actually be one of the goals. Consider the state of Massachusetts, which leads the nation on virtually every metric of educational success. It has the highest percentage of adults over 25 with a bachelor's degree, ranks among the highest in terms of high school graduation rates, and is home to one of the more vital state economies in the nation. Is this a matter of selection? At least in part, as the Massachusetts economy relies upon highly educated talent, some of which comes from within and a good deal that is imported from other states and nations. The children of these workers benefit socially and economically from their parents' educational levels, and they tend to outperform students from other states, on average. From a state policy perspective, selection is actually part of the goal, and universities play an important role in terms of attracting college-educated workers.

Selection alone will not turn around the Michigan economy, but what if all residents are better off when more adults hold degrees? Bartik (2004) utilizes Moretti's model to show that in Michigan, a 1% increase in the percentage of the population that is college educated increases overall average real wages by 1.1% (controlling for individual background characteristics, even when excluding effects on those receiving more education). His analysis showed that greater proportions of college-educated adults in a community is related to higher average wages for noncollege-educated workers as well. From a policy perspective, the sort of selection Vedder and Denhart eschew is one of the goals Michigan, like other states, is trying to accomplish.

Below are three additional limitations to the Vedder and Denhart argument, much of which rests upon their assumptions relative to existing research in higher education. They fail to recognize how higher education has been systematically approached in the state budgeting process; they ignore the larger economic realities that affect whether educated individuals remain in the state past graduation; they ignore the mechanisms by which universities influence economic growth (research and training); and their analyses are insufficient to detect the actual contributions of public universities.

Catalyst or Balance Wheel?

Higher education is among the most important investments a state makes, but in comparison to other priorities, it accounts for a relatively small portion of the overall budget. In 2006, the state of Michigan spent $2.09 billion on higher education, of which $1.8 billion was spent on universities and $289 million was spent on community colleges (Michigan Office of the Budget, 2006). The state budget for Michigan in 2006 was $44.4 billion, and higher education accounted for 6.5% of all expenditures. By contrast, the K-12 budget was six times as large at $13 billion. These numbers put the debate into its appropriate context. Higher education plays an important role in ways discussed above and a few to be examined shortly but cannot reasonably be expected to turn around a declining state economy. Vedder and Denhart would agree, but where they might suggest higher education is a poor investment for state economic growth, this analysis suggests that the return on investment is tremendous—but it is only one piece of the larger picture.

In a review of research on state budgets and higher education funding, Delaney and Doyle (2007) found evidence supporting Hoyle's theory that higher education serves as a balance wheel to the state budget. Their findings are important for two reasons. First, they observe that higher education funding varies positively with state budgets, meaning that as the state budget grows,

so does the level of appropriation for higher education. Second, they find the relationship is not linear. When state budgets decline, higher education is cut even further than other line items. Similarly, when state budgets are good, higher education experiences greater gains than others. The findings of Delaney and Doyle are consistent with what has been observed in Michigan, and the result is a volatile environment within which public colleges and universities operate. It is difficult to "grow" in any meaningful and predictable way when 30% or more of an institution's revenues can be expected to vary in this way. And, uncertainty has the potential to drive up tuition to offset potential declines in state support. With average annual increases of more than 10% throughout much of the decade, this may have been direct contribution to the state economy is the training of the case in Michigan and other places.

Brain Drain and Net Migration

Statistical models are always subject to debate, and Vedder and Denhart present a model, which is limited in two ways: it fails to consider the role of out-migration or sector of the economy when analyzing the relationship between higher education spending and economic growth. Statistical models are nothing more than a mathematical presentation of a theory. An important limitation of the Vedder and Denhart analysis is that they have miss-specified the outcome variable or, at very least, failed to account for the role of out-migration in their model of economic growth. The majority of state support for higher education is unlikely to influence economic growth directly—except perhaps through the small portion of revenue dedicated to research—but its effect is most likely to be seen through the training of students as future workers, which is consistent with Vedder and Denhart's positive finding on degree attainment. Michigan, like much of the Midwest, has experienced a net out-migration of college-trained talent. According to Austin and Affolter-Caine (2006), only 2 of 10 states in the region experience a net in-migration of bachelor's level adults ages 25–44 (Minnesota and Illinois). The rest suffer from "brain drain" or the loss of a highly educated workforce. If more workers are trained than can secure gainful employment in the state, then the contributions of colleges and universities are under-estimated by Vedder and Denhart. In statistical modeling terms, the influence of state appropriations to higher education are mediated through net migration, meaning that higher education may have a positive impact on training the workforce, but if that workforce leaves the state, the impact of the state's investment is not fully realized.

Vedder and Denhart might argue that higher education funding is a leaking sieve in this analysis and should be shut off in favor of lower taxes and incentives for business. The development of talent is a necessary but insufficient condition for economic growth. Instead of closing the tap on higher education—which is effectively what Michigan has done for the past six years—the state must focus attention on both training a talented workforce AND attracting businesses to employ this talent pool. Changes in the Michigan Business Tax have been constructed with this in mind. An alternative model would look at the relationship between state investments in higher education and degrees earned annually, because this is the talent pool. Conceptually, their model should have specified some form of degree production as an endogenous variable mediating the influence of appropriations on economic growth. At very least, Vedder and Denhart should have controlled statistically for net-migration across states and years.

Growth by Sector

Higher education makes strong and important contributions to the state economy, but it does not contribute equally across all sectors of the economy. This distinction is perhaps more

important in Michigan than almost anywhere else in the nation today. The Michigan economy has long relied on manufacturing, particularly in the automotive sector. The staple of manufacturing has been a modestly educated blue-collar workforce. Higher education has played a very small role in manufacturing, which is where the greatest losses have occurred. From 1990 to 2004, Michigan lost nearly 140,000 jobs from the manufacturing sector alone, and very few of the jobs required a college degree (Department of Energy, Labor & Economic Growth, 2009). By 2009, the manufacturing sector dropped an additional 125,000 jobs, and losses are anticipated in the future as well.

By contrast, more than 90,000 jobs were created in business services, followed by 50,000 positions in education and knowledge-creation sectors, 20,000 in entertainment, and 12,000 jobs in financial services. The majority of these jobs (with the possible exception of entertainment) required some college education, typically at the baccalaureate or above. These numbers illustrate that sector matters when analyzing the relationship between higher education expenditures and economic growth. It is implausible to suggest that higher education can overcome substantial losses to the overall economy or even to those sectors that comprise manual and blue-collar labor. If however, Michigan hopes to expand opportunities in knowledge sectors and effectively diversify the economy, higher education is likely to have a far greater impact. The Vedder and Denhart analysis does not take the sector of the economy into account—either in its conceptualization of the outcome or as an independent variable—which has a very real impact on growth observed in the knowledge sectors of the economy.

Implications

The analyses by Vedder and Denhart may have much greater consequences for higher education because they point out an important reality facing our institutions, and particularly those drawing a substantial portion of their resources from state tax dollars. Colleges and universities are caught between achieving the public purposes for which most of them were chartered and surviving and thriving in a highly competitive higher education marketplace. And, this excludes the important positive associations between the level of education of the population and their levels of health and engagement in the community (Institute for Higher Education Policy, 1998). The analyses by Vedder and Denhart suggest that in this tug of war, Michigan's universities are doing quite well. In fact, if we think of them as simple players in the higher education market, then it would appear they are doing just that. In the face of declining state support, public universities are finding other ways to sustain the work they do and to expand those functions likely to improve profitability and market share. The disaggregated picture of revenues and expenditures shows that lower levels of state support are associated with lower levels of spending per student in the areas most directly related to the success of undergraduate students: instruction and academic and student support. Conversely, increasing expenditures are more commonly found in research and other functions typically ancillary to teaching and learning.

Vedder and Denhart may have miss-diagnosed the problem, but they are correct that higher education faces a serious problem. Johnstone (2001) describes the cost disease associated with "productivity-immune" sectors, where unit costs increase at rates faster than inflation because they are labor-intensive industries where infusions of capital and improved technology do not increase the efficient production of outputs. Vedder and Denhart are suggesting this is exactly the problem, and we should not invest additional resources where efficiency gains are not possible. The cost disease may be a part of the problem, but it is also a reality that as state support for public higher education declines, universities seek to produce

other outputs. Leslie and Rhoades (1995) propose, "The more an institution emphasizes the generation of alternative revenues, the greater the proportion of resources that are directed to administrative units perceived as (potentially) generating such revenues" (p. 341). The analysis above demonstrates and, in part, supports this proposition as it shows that additional resources have been spent on research while proportionally less is spent on instruction and student services. This is clearly the area within the institution where the perception of growth exists. Similarly, they propose that as the institution grows in complexity, a greater share of expenditures will be devoted to administrative functions. Table 3 illustrated that only the branch campuses of the University of Michigan spent more in 2004. The trend is similar in 2006, where five universities increased spending per FTE since 2000. Equally, some of the largest declines occurred at the smallest institutions suggesting that relationship may exist in Michigan.

Higher education faces another challenge with respect to revenues. As state support declines as a share of the total revenues of public universities, institutions have become increasingly dependent upon tuition dollars. The reality is that, in most cases, the marginal cost associated with admitting one more student is less than the revenue from added tuition. This is particularly true when fixed costs make up a substantial proportion of the budget and will generally hold for public universities until adding more students necessitates expanding the capital infrastructure. During the five years under investigation and despite declining state support (or perhaps because of it), Michigan public universities grew their enrollments. Between 2000 and 2004, FTE enrollments grew 7.5% from 232,000 to more than 250,000 students. By 2006, enrollments had grown by an additional 1.2%. The enrollment growth alone accounts for a portion of the decline in state revenues per FTE. This is a critical piece of the puzzle because neither the state nor its universities suggest shrinking enrollments: the former wants to double the number of college-educated residents in the state, and the latter are dependent upon the tuition dollars to maintain the work they do.

Finally, institutions are now facing difficult decisions regarding which students to admit. Pressures to eliminate remedial education and the range of intervention strategies and programs designed to serve students who might otherwise not succeed at the same rates force institutions to rethink admissions in ways that could effectively stack the deck and leave out first generation, low-income, and under-represented minority students. One of the hidden costs of higher education is the increasing time-to-degree and the lower than acceptable student persistence rates. One way to be more efficient in the production process is to invest in and accept only those students highly likely to complete a degree and to do so in an efficient manner. Doing so shifts admissions priorities, and it can influence institutional financial aid patterns, where greater emphasis is placed upon "merit" aid programs designed to attract students who are already likely to succeed.

These trends, if left unchecked, could result in fewer opportunities for the very populations of students that are the focus of increasing college access interventions and programs. The criticisms made by Vedder and Denhart are not simple rhetorical arguments. They are largely political, and they have very real implications for the public mission of higher education across the country. The more public universities are subject to the forces of the marketplace, the more tempting it will become to abandon their public purposes of educating students. State policy-makers and higher education professionals must weigh carefully the trade-offs of these decisions while continuing to recognize that both greater efficiency and expanded opportunity are worthy of time, energy, and investment.

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MANAGING EDITOR:

Dr. Randy L. Swing
Executive Director
Association for Institutional Research
1435 E. Piedmont Drive
Suite 211
Tallahassee, FL 32308
Phone: 850-385-4155
Fax: 850-385-5180
air@airweb.org

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