

A Cost-Benefit Analysis of Higher Education in Tennessee

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Abstract

In 1993, Professor Barry Bluestone published his innovative cost-benefit study on the economic impact of the University of Massachusetts at Boston. His benefit calculations were based on the additional income earned and taxes paid by college graduates. In 1998 the Tennessee Board of Regents conducted a similar study on higher education in Tennessee. The present paper uses the Bluestone methodology to estimate the benefits of higher education, and with the main focus on the financial return to the state government. The study finds that every dollar invested by Tennessee in higher education returns nearly two dollars in additional tax revenue. At a time of structural deficits in the state budget, it is important to understand that higher education can best be considered an investment of scarce state resources rather than a spending category with no discernable return to state coffers.

Introduction

In 1993, Professor Barry Bluestone of the McCormack Institute of Public Affairs, University of Massachusetts at Boston, conducted an innovative economic impact analysis of his institution. Previously, such studies had focused solely on the impact of current spending by the institution and students. Bluestone argued that college graduates, over their lifetime, earn additional income and subsequently pay higher taxes.

Rather than use the published national statistics on the monetary benefits of a college education, Bluestone developed estimates for the New England region which he used in his cost-benefit calculations for UMass/Boston. The statistics on educational attainment and income are found in the "Income and Poverty" survey conducted each March by the U.S. Census Bureau and the U.S. Bureau of Labor Statistics. This special survey "piggybacks" on the Current Population Survey (CPS) which is conducted each month by the BLS to produce statistics on employment and unemployment. The CPS consists of 50,000 households selected at random in the United States.

Bluestone used the raw CPS data of the "Income and Poverty" survey to develop estimates of education and income for the New England states for 1988. This required working with the 50,000 individual observation sets (the "microdata") in the survey -- not an easy thing to do at the time! Today, the "Income and Poverty" survey is published on CD-ROM and is bundled with powerful software to do any type of desired sorting and collating of the microdata files.

The reason that Bluestone undertook this impact analysis is a familiar one to state-supported higher education -- state budget problems. Bluestone's results showed that graduates of UMass/Boston, over their lifetime, paid more in additional taxes than the cost of their higher education to the state of Massachusetts. These results were presented in an article in the *Chronicle of Higher Education*. There he suggested that every tax dollar used to support higher education at the state level returned more than a dollar to the state in additional tax revenues.

In 1997, with a looming state budget problem, the Tennessee Board of Regents requested Victor Ukpolo and Thomas Dernberg, both of Austin Peay State University, to conduct a "Bluestone" type analysis on the costs and benefits of higher education in Tennessee. The results were released in March 1998 and were based on "Income and Poverty" data from 1992. The study was very technical in its approach.

The budget problem that was on the horizon in 1997 is now here in 2001. Last fall, the Board of Advisors of the College of Business, East Tennessee State University, requested the author to conduct a cost-benefit analysis of higher education in Tennessee. The intent was to create a study that could be shared with business, community, and political leaders. This study uses the "Bluestone" methodology, and is written with the lay reader in mind.

When the study was prepared, the most recent "Income and Poverty" data was for 1997 and was based on the CPS survey conducted in March 1998. The 2000 Decennial Census will provide far more authoritative and detailed data, even for small geographic areas. Additional data for 1997 was taken from the Southern Regional Education Board (SREB) and the U.S. Census Bureau. These sources are listed at the end of the paper.

The Challenge in Tennessee

Table 1 shows the educational attainment in 1997 for the United States, Tennessee, Virginia, and North Carolina. These data are taken from "Income and Poverty 1997". The levels of educational attainment are divided into six categories.

**Table 1: Educational Attainment in 1997
(Percent Shares)**

	USA	TN	VA	NC
1. Children and Students	22.2%	22.2%	21.5%	21.4%
2. Less Than High School	17.4	21.6	16.6	17.4
3. High School	24.6	28.6	22.9	25.8
4. Less Than Bachelors Degree	19.4	16.4	17.7	19.2
5. Bachelors Degree	11.2	7.7	14.3	11.8
6. Graduate Degree	5.1	3.4	7.0	4.4
Total	100.0	100.0	100.0	100.0
No Higher Education (2+3)	42.0	50.2	39.5	43.2
Higher Education (4+5+6)	35.7	27.5	39.0	35.4
Bach. Degree or Higher (5+6)	16.3	11.1	21.3	16.2

According to these data, nearly 36% of the U.S. population has had at least some exposure to college, while over 16% has attained a bachelors degree or better. As we know, Tennessee educational attainment is significantly below national levels -- about 20% lower in "Higher Education" and about 33% lower in "Bachelors Degree or Higher". From the perspective of Tennessee, we must increase our number of four-year college graduates by 50% just to achieve national averages.

Both Virginia and North Carolina have higher levels of educational attainment than Tennessee. Virginia is well over the national averages, while North Carolina is very similar to national patterns.

Table 2 shows income levels and educational attainment in 1997 for the United States, Tennessee, Virginia, and North Carolina.

**Table 2: Average Income Levels in 1997
(Thousands of Dollars)**

	USA	TN	VA	NC
1. Less Than High School	\$13.3	\$13.6	\$13.3	\$13.5
2. High School	27.3	26.1	25.7	25.6
3. Less Than Bachelors Degree	33.3	33.1	33.2	30.6
4. Bachelors Degree	53.6	59.2	47.6	48.6
5. Graduate Degree	85.9	85.6	85.4	82.6
Average Per-Capita Income	33.3	30.0	34.1	30.8

The table clearly shows that additional education can lead to substantial growth in income levels. In the nation as a whole, college graduates can expect to double their income compared to high school graduates. In Tennessee, the ratio is even higher. (The lower per-capita income level for Tennessee reflects the lower number of college graduates in the state.)

The average income levels shown in the table vary from state to state and when compared to the national profile. These differences reflect the economic structure of each state and the composition of the education attainment group. The income level in Tennessee of the "Bachelors Degree" category is well above national levels, while it is lower in Virginia and North Carolina.

These figures have been compared to earlier "Income and Poverty" surveys and are accurate.

The income gains from higher education can be looked at on an annual basis or over a lifetime. Table 3 shows these figures. The lifetime figures assume longer work lives for high school graduates.

**Table 3. Bachelors Degree versus High School
(Thousands of Dollars)**

	USA	TN	VA	NC
Annual Gain	\$ 26	\$ 33	\$ 22	\$ 23
Lifetime Gain	1,024	1,319	838	885

The annual gain for a college graduate in the United States is \$26,000 per year. In Tennessee, the income increase is \$33,000 per year, and is around \$22,000 or more in Virginia and North Carolina. This comparison becomes more interesting when we look at lifetime gains.

In the United States, a college graduate can expect to make a million dollars more than a high school graduate over a lifetime. In Tennessee, the figure is over \$1.3 million, while the income gains in Virginia and North Carolina are around \$800,000 to \$900,000. These income gains are in line with the levels of educational attainment -- a higher number of college graduates in a state will actually reduce the average level of income for the group. This pattern is consistent across all three states.

The Opportunity in Tennessee

Higher education results in much higher income for the individual, and is a very good investment of time and money. But is it a good investment for public money? Do the public funds invested in higher education provide a net return to the public coffers? Do the public benefits exceed the public costs?.

We will approach this question from the perspective of an individual student and for higher education as a whole. The figures on the cost of education are taken from the Southern Regional Education Board (SREB) database and the tax collections are taken from the U.S. Bureau of the Census database on state government finances.

Higher income leads to increased spending and increased tax collections. In the following analysis, the increased tax receipts are the sum of increases in general sales taxes, selective sales taxes, and personal income taxes. These are Census Bureau categories, and in Tennessee correspond to the state general sales tax, local option sales tax, and the "Hall" income tax. Other types of taxes, such as property taxes, are not included.

Table 4 shows the cost-benefit calculations for an individual student. There are two different figures on the annual cost to the state for a full time student. The first figure is \$6,083 which is calculated by dividing total state spending on higher education by the number of full time equivalent (FTE) students. The second figure of \$4,571 comes from SREB and represents the operating budgets of higher education institutions divided by the number of FTE students. It is assumed that the typical student requires five years to complete a bachelors degree program.

**Table 4. Analysis for an Individual Student,
Combined Tax Receipts (Tennessee 1997)**

	Total Budget	Operating Budget
Cost of Bachelors Degree per Year	\$ 6,083	\$ 4,571
Cost for Five Years	30,416	22,853
Increased Lifetime Tax Receipts	56,232	56,232
Cost-Benefit Ratio	1.849	2.461

These figures show that over a lifetime, a student will pay more in taxes than the cost to the state for the bachelors degree. If we look at operating budgets alone, the C-B ratio is a payback of \$2.46 for each state dollar. Even under the total higher education budget, the payback is still a \$1.84 for each state dollar.

The "Increased Lifetime Tax Receipts" in Table 4 are the sum of higher state general sales taxes, local option sales taxes, and the "Hall" income tax. Local option sales taxes go to local governments (counties and cities) and the "Hall" income tax is small. In Table 5, we have limited the increased tax receipts to the state general sales tax alone.

**Table 5. Analysis for an Individual Student,
General Sales Tax Receipts (Tennessee 1997)**

	Total Budget	Operating Budget
Cost of Bachelors Degree per Year	\$ 6,083	\$ 4,571
Cost for Five Years	30,416	22,853
Increased Lifetime Tax Receipts	41,360	41,360
Cost-Benefit Ratio	1.360	1.810

From the perspective of the Tennessee state government (as opposed to "local" government), the payback in the form of just increased state general sales tax receipts is still very large. The return on a state dollar invested in the higher education operating budget is \$1.81 and for the total higher education budget is \$1.36.

A second way of looking at the costs and benefits of higher education spending is to look at higher education as a whole. Table 6 shows the cost-benefit calculations for Tennessee in 1997. The spending on higher education is the total higher education budget based on SREB data. The increased tax revenues for 1997 are the sum of higher general sales taxes, local option sales taxes, and the Hall income tax.

**Table 6. Analysis for Higher Education Spending
Combined Tax Receipts (Tennessee 1997)**

Annual TN Spending on Higher Education	\$ 970,357,500
Increased Annual Tax Receipts	1,654,113,791
Cost-Benefit Ratio for Tennessee	1.705

The table shows that the higher income levels of Tennesseans who had some higher education resulted in increased tax receipts of \$1.65 billion for the year 1997. These enhanced revenues are the 1997 dividend on investments the state has made in higher education in past years. When compared to the 1997 state spending on higher education, the payback is \$1.70 for each new dollar invested.

The equivalent payback figure for Virginia is \$3.20 and for North Carolina is \$1.84. These higher ratios represent both a larger college educated population and a higher and different tax structure. For comparison, let us assume that the higher education group in Tennessee (27.5%) is the same as Virginia (39.0%) or as North Carolina (35.4%).

If 39.0% of the population of Tennessee had some higher education as in Virginia, then the Tennessee tax structure would generate an additional \$1.84 billion in tax receipts, compared to the actual figure of \$1.65 billion. The payback ratio would be 1.901 compared to the actual 1.705. If Tennessee had made the same investment in higher education in the past as Virginia, our tax revenues would be higher by around \$200 million per year.

If 35.4% of the population of Tennessee had some higher education as in North Carolina, then the Tennessee tax structure would generate an additional \$1.78 billion in tax receipts, compared to the actual figure of \$1.65 billion. The payback ratio would be 1.839 compared to the actual 1.705. If Tennessee had made the same investment in higher education in the past as North Carolina, our tax revenues would be higher by some \$130 million per year.

Conclusion

From the perspective of the individual student, or from the perspective of higher education as a whole, state support of higher education is a very good use of public money. At a time of growing structural deficits in the state budget, it is important to understand that higher education can best be considered as an *investment* of scarce state resources, rather than a spending category with no discernable financial return to the state.

Sources

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