



North Carolina benefits from the education that PCC provides through the earnings that students create in the state and through the savings that they generate through their improved lifestyles. To receive these benefits, however, members of society must pay money and forego services that they otherwise would have enjoyed if PCC did not exist. Society's investment in PCC stretches across a number of investor groups, from students to employers to taxpayers. We weigh the benefits generated by PCC to these investor groups against the total social costs of generating those benefits. The total social costs include all PCC expenditures, all student expenditures less tuition and fees, and all student opportunity costs, totaling a present value of \$30.9 million.

On the benefits side, any benefits that accrue to North Carolina as a whole—including students, employers, taxpayers, and anyone else who stands to benefit from the activities of PCC—are counted as benefits under the social perspective. We group these benefits under the following broad headings: 1) increased earnings in the state, and 2) social externalities stemming from improved health, reduced crime, and reduced unemployment in the state (see the Beekeeper Analogy box for a discussion of externalities). Both of these benefits components are described more fully in the following sections.

Growth in state economic base

In the process of absorbing the newly acquired skills of students who attend PCC, not only does the productivity of the North Carolina workforce increase, but so does the productivity of its physical capital and assorted infrastructure. Students earn more because of the skills they learned while attending the college, and businesses earn more because student skills make capital more productive (buildings, machinery, and everything else). This in turn raises profits and other business property income. Together, increases in labor and non-labor (i.e., capital) income are considered the effect of a skilled workforce.

Estimating the effect of PCC on the state's economic base follows a similar process used when calculating increased tax revenues in the taxpayer perspective. However, instead of looking at just the tax revenue portion, we include all of the

SOCIAL COSTS



PCC expenditures



Student out-of-pocket expenses



Student opportunity costs

SOCIAL BENEFITS



Increased state earnings



Avoided costs to society



Beekeeper analogy

Beekeepers provide a classic example of positive externalities (sometimes called “neighborhood effects”). The beekeeper’s intention is to make money selling honey. Like any other business, receipts must at least cover operating costs. If they don’t, the business shuts down.

But from society’s standpoint, there is more. Flowers provide the nectar that bees need for honey production, and smart beekeepers locate

near flowering sources such as orchards. Nearby orchard owners, in turn, benefit as the bees spread the pollen necessary for orchard growth and fruit production. This is an uncompensated external benefit of beekeeping, and economists have long recognized that society might actually do well to subsidize activities that produce positive externalities, such as beekeeping.

Educational institutions are like beekeepers. While their principal

aim is to provide education and raise people’s earnings, in the process they create an array of external benefits. Students’ health and lifestyles are improved, and society indirectly benefits just as orchard owners indirectly benefit from beekeepers. Aiming at a more complete accounting of the benefits generated by education, the model tracks and accounts for many of these external social benefits.



added earnings and business output. First, we calculate the students’ future higher earnings stream. We factor in student attrition and alternative education opportunities to arrive at net higher earnings. We again apply multipliers derived from Emsi Burning Glass’s MR-SAM model to estimate the added labor and non-labor income created in the state as students and businesses spend their higher earnings and as businesses generate additional profits from this increased output (added student and business income in Figure 3.3). We also include the operations and student spending impacts discussed in Chapter 2 that were created in FY 2019-20, measured at the state level (added income from college activities in Figure 3.3). The shutdown point does not apply to the growth of the economic base because the social perspective captures not only the state and local taxpayer support to the college, but also the support from the students and other non-government sources.

Using this process, we calculate the present value of the future added income that occurs in the state, equal to \$165.8 million. Recall from the discussion of the student and taxpayer return on investment that the present value represents the sum of the future benefits that accrue each year over the course of the time horizon, discounted to current year dollars to account for the time value of money. As stated in the taxpayer perspective, given that the stakeholder in this case is the public sector, we use the discount rate of 0.4%.

Social savings

Similar to the government savings discussed above, society as a whole sees savings due to external or incidental benefits of education. These represent the avoided costs that otherwise would have been drawn from private and public resources absent the education provided by PCC. Social benefits appear in Table 3.5 and break down into three main categories: 1) health savings, 2) crime savings, and 3) income assistance savings. These are similar to the categories from the taxpayer perspective above, although health savings now also include





lost productivity and other effects associated with smoking, alcohol dependence, obesity, depression, and drug abuse. In addition to avoided costs to the justice system, crime savings also consist of avoided victim costs and benefits stemming from the added productivity of individuals who otherwise would have been incarcerated. Income assistance savings are comprised of the avoided government costs due to the reduced number of welfare and unemployment insurance claims.

Table 3.5 displays the results of the analysis. The first row shows the increased economic base in the state, equal to \$165.8 million, from students' higher earnings and their multiplier effects, increases in non-labor income, and spending impacts. Social savings appear next, beginning with a breakdown of savings related to health. These include savings due to a reduced demand for medical treatment and social services, improved worker productivity and reduced absenteeism, and a reduced number of vehicle crashes and fires induced by alcohol or smoking-related incidents. Although the prevalence of these health conditions generally declines as individuals attain higher levels of education, prevalence rates are sometimes higher for individuals with certain levels of education. For example, adults with college degrees may be more likely to spend more on alcohol and become dependent on alcohol. Thus, in some cases the social savings associated with a health factor can be negative. Nevertheless, the overall health savings for society are positive, amounting to \$2.6 million. Crime savings amount to \$601.3 thousand, including savings associated with a reduced number of crime victims, added worker productivity, and reduced expenditures for police and law

Table 3.5: PRESENT VALUE OF THE FUTURE INCREASED ECONOMIC BASE AND SOCIAL SAVINGS IN THE STATE (THOUSANDS)

Increased economic base	\$165,770
Social savings	
Health	
Smoking	\$3,959
Alcohol dependence	-\$1,188
Obesity	\$789
Depression	-\$924
Drug abuse	\$3
Total health savings*	\$2,640
Crime	
Criminal justice system savings	\$524
Crime victim savings	\$13
Added productivity	\$65
Total crime savings	\$601
Income assistance	
Welfare savings	\$517
Unemployment savings	\$37
Total income assistance savings	\$555
Total social savings	\$3,795
Total, increased economic base + social savings	\$169,566

* In some cases, health savings may be negative. This is due to increased prevalence rates at certain education levels.
Source: Emsi Burning Glass impact model.

enforcement, courts and administration of justice, and corrective services. Finally, the present value of the savings related to income assistance amount to \$554.7 thousand, stemming from a reduced number of persons in need of welfare or unemployment benefits. All told, social savings amounted to \$3.8 million in benefits to communities and citizens in North Carolina.

The sum of the social savings and the increased state economic base is \$169.6 million, as shown in the bottom row of Table 3.5 and in Figure 3.3. These savings accrue in the future as long as the FY 2019-20 student population of PCC remains in the workforce.

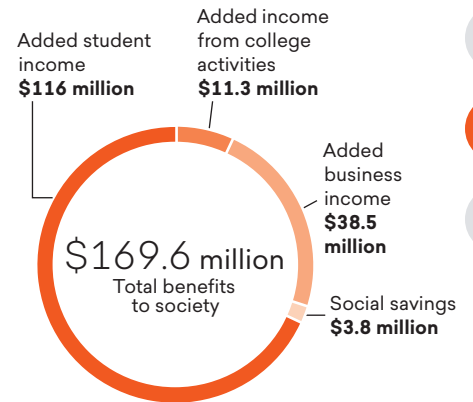
Return on investment for society

Table 3.6 presents the stream of benefits accruing to the North Carolina society and the total social costs of generating those benefits. Comparing the present value of the benefits and the social costs, we have a benefit-cost ratio of 5.5. This means that for every dollar invested in an education from PCC, whether it is the money spent on operations of the college or money spent by students on tuition and fees, an average of \$5.50 in benefits will accrue to society in North Carolina.³⁸

With and without social savings

Earlier in this chapter, social savings attributable to education (improved health, reduced crime, and reduced demand for income assistance) were defined as externalities that are incidental to the operations of PCC. Some would question the legitimacy of including these benefits in the calculation of rates of return to education, arguing that only the tangible benefits (higher earnings) should be counted. Table 3.4 and Table 3.6 are inclusive of social savings reported as attributable to PCC. Recognizing the other point of view, Table 3.7 shows rates of return for both the taxpayer and social perspectives exclusive of social savings. As indicated, returns are still above threshold values (a benefit-cost ratio greater than 1.0 and a rate of return greater than 0.4%), confirming that taxpayers and society receive value from investing in PCC.

Figure 3.3: PRESENT VALUE OF BENEFITS TO SOCIETY



Source: v Burning Glass impact model.

Table 3.7: TAXPAYER AND SOCIAL PERSPECTIVES WITH AND WITHOUT SOCIAL SAVINGS

	Including social savings	Excluding social savings
Taxpayer perspective		
Net present value (millions)	\$3.7	\$2.2
Benefit-cost ratio	1.3	1.2
Internal rate of return	2.4%	1.7%
Payback period (no. of years)	20.1	23.6
Social perspective		
Net present value (millions)	\$138.7	\$134.9
Benefit-cost ratio	5.5	5.4

Source: Emsi Burning Glass impact model.

³⁸ The rate of return is not reported for the social perspective because the beneficiaries of the investment are not necessarily the same as the original investors.

Table 3.6: PROJECTED BENEFITS AND COSTS, SOCIAL PERSPECTIVE

1	2	3	4
Year	Benefits to society (millions)	Social costs (millions)	Net cash flow (millions)
0	\$14.5	\$30.9	-\$16.4
1	\$4.1	\$0.0	\$4.1
2	\$4.4	\$0.0	\$4.4
3	\$4.9	\$0.0	\$4.9
4	\$5.4	\$0.0	\$5.4
5	\$6.4	\$0.0	\$6.4
6	\$6.4	\$0.0	\$6.4
7	\$6.4	\$0.0	\$6.4
8	\$6.4	\$0.0	\$6.4
9	\$6.4	\$0.0	\$6.4
10	\$6.3	\$0.0	\$6.3
11	\$6.3	\$0.0	\$6.3
12	\$6.2	\$0.0	\$6.2
13	\$6.2	\$0.0	\$6.2
14	\$6.1	\$0.0	\$6.1
15	\$6.0	\$0.0	\$6.0
16	\$5.9	\$0.0	\$5.9
17	\$5.8	\$0.0	\$5.8
18	\$5.7	\$0.0	\$5.7
19	\$5.5	\$0.0	\$5.5
20	\$5.4	\$0.0	\$5.4
21	\$5.2	\$0.0	\$5.2
22	\$5.1	\$0.0	\$5.1
23	\$4.9	\$0.0	\$4.9
24	\$4.8	\$0.0	\$4.8
25	\$4.6	\$0.0	\$4.6
26	\$4.4	\$0.0	\$4.4
27	\$4.2	\$0.0	\$4.2
28	\$4.1	\$0.0	\$4.1
29	\$3.9	\$0.0	\$3.9
30	\$3.7	\$0.0	\$3.7
31	\$3.5	\$0.0	\$3.5
Present value	\$169.6	\$30.9	\$138.7

Source: Emsi Burning Glass impact model.



Benefit-cost ratio

5.5



Payback period (years)

3.6