ECONOMIC IMPACT OF CHESLA ON THE CONNECTICUT ECONOMY

CCM Economics, LLC

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www.ccmeconomics.com

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Executive Summary

This report was undertaken at the request of the Connecticut Higher Education Supplemental Loan Authority (CHESLA) to determine the economic impact of its college loan and scholarship program. CHESLA is a quasi-public entity of the state of Connecticut charged with helping to make college more affordable and attainable for the citizens of the state of Connecticut. Through CHESLA's In-School loan program, residents can borrow money to attend any public or private non-profit 2-year or 4-year college or university in the United States. Need-based scholarships are available to residents as well, but only if the resident is studying at a Connecticut based college or university. National data indicates that financial considerations are a major impediment to high school graduates being able to attend and/or complete college and students have turned more and more towards loans and scholarships to pay for college. Currently, total student loan debt in the country is $1.75 trillion up from $330 billion in 2003.

Spending for higher education by the state government in Connecticut has increased substantially since 1993 when it totaled $1.4 billion. Today it is $3.38 billion. Furthermore, state support is currently at $14,449 per full time equivalent (FTE) student which is far higher than the national average of $7,566 per FTE student. Only three states exceed Connecticut's level of support on an FTE basis. At the same time, in inflation adjusted dollars, today's FTE spending in Connecticut is slightly below the value it was in the year 2000; however, this is better than the national rate which currently is 13% below the inflation adjusted FTE from the year 2000.

Connecticut is known as a powerhouse for education, both private and public. It has several research schools within the state which attract students from all over the world. Furthermore, the state has a higher percentage of high school students who go to college and a higher percentage of college students who complete college than the nation. Connecticut high schoolers go to college between 4 to 8 percentage points higher than the national average and college students in Connecticut complete college almost 10 percentage points higher than at the national rate. It is well known and understood that education has a tendency to raise income levels. This is true within the state of Connecticut as well which has a population with a high rate of college education—and these educated persons tend to earn more than their national peers. For example, the median earnings for a person with a bachelor's degree in Connecticut is $66,131 which is 18% higher than the national average.

To determine the economic impact of CHESLA's student loan and scholarship program, CHESLA data was combined with Connecticut specific higher education, income, employment, and tax data to build an economic model. A time frame of 2015 to 2021 was examined. The model was divided up into two components—a short run model and a long run model. In the short run, the CHESLA student loan and scholarship program helps to fund university activities and spending. This short run economic impact is large. The program has helped to create 597 jobs, increased wage income in the state by more than $72 million, and increased output by almost $129 million while increasing state Gross Domestic Product by $74 million between 2015 and 2021.

The long run model examines the probable outcomes of students who received a CHESLA student loan or scholarship during this same time frame and projects their future income and taxes paid over the rest of their working lives—from age 18 to 65. Some of the students who received a loan or scholarship will not graduate and their economic impact will be limited. Others will graduate, but leave the state for employment so that their economic impact in Connecticut becomes in effect non-existent. However, a large portion of these students will complete college, and even go on to graduate school, and will remain in the state. These students will earn a combined increase in lifetime incomes of $3.5 billion in net present value terms over a similar sized cohort that graduated from high school only. This will translate into an additional $406 million in net present value of taxes for the state of Connecticut and $837 million in net present value of taxes for the federal government.

I. INTRODUCTION

This report is an economic impact analysis on the Connecticut economy of the loan and scholarship activities for the Connecticut Higher Education Supplemental Loan Authority (CHESLA). The economic impact is examined in a short run and long run framework. In the short run, CHESLA loans and scholarships are given to students who use them to pay for educational expenses. Schools and colleges use these dollars to fund current operations. In addition, college students spend money on entertainment, restaurant meals, clothes, gas, etc. This spending by students and colleges creates short run economic impacts on the state economy. However, the loans and scholarships also have a long run economic impact on the economy in that they help to create more educated persons. Generally speaking, a person with postsecondary education will earn more income over the course of their life than someone who only completed high school. This higher level of income translates into higher levels of consumption and taxes paid over the person's lifetime. In this sense, the future economic impact from today's scholarships and loans can last for decades.

CHESLA provided extensive proprietary data on the number and size of different loans and scholarships from 2002 to 2022 Year-to-Date. This data was combined with existing publicly available economic and education related data covering many different facets to create an Input-Output model. No survey data of CHESLA borrowers was used. This model was employed to understand the full short run and long run economic impact of CHESLA loans and scholarships. State level education and economic data was used when available; if state level data was not available for a particular component, then pertinent national data was substituted in its place. Although survey data has many uses in economic impact analyses, it also has many limitations and restrictions on its ability to elaborate beyond its scope. The same is true for publicly available economic and education related data. Nevertheless, it is the most practical way to appraise the economic impact.

This report is divided up into several sections. The second section discusses school loans and education in general, while section three covers Input-Output Methodology. Section four involves a brief overview of the intricacies of the Connecticut economy. This is followed by section five which outlines CHESLA loan and scholarship data in a general sense. The economic impact analysis results are reported in section six.

II. SCHOOL LOAN PRIMER

The Connecticut Higher Education Supplemental Loan Authority (CHESLA) was established by an act of the Connecticut Legislature in 1982 with Public Act No. 82-313. The purpose of establishing CHESLA was to assist Connecticut college students and their parents in paying for the cost of their education. Currently, CHESLA can make loans to Connecticut residents who are studying at an accredited not-for-profit college within the state of Connecticut. This includes community colleges, public colleges and universities, and private not-for-profit colleges and universities. Furthermore, CHESLA can make loans to Connecticut residents who study at an out-of-state accredited not-for-profit college or university. In addition to the loan program, a scholarship program exists whereby Connecticut residents can apply for and possibly receive a need-based scholarship to attend a not-for-profit college or university within the state of Connecticut.[1]

Although CHESLA is a quasi-public entity, its ability to finance loans and scholarships comes from the issuance of revenue bonds in the public debt markets. Generally, there is one bond issue per year. Since CHESLA began, it has issued $689,485,000 in bonds with all bonds prior to 2013 having been fully paid. Bond issuance from 2013 to 2021 totals $234,560,000 with $166,740,000 of this still outstanding. The ability to repay these bonds is dependent on CHESLA making creditworthy loans that are expected to be repaid and astute fiscal management of day-to-day operations. The State of Connecticut has a contingent liability for these bonds through a Special Capital Reserve Fund structure, but CHESLA has never drawn upon this reserve fund. This is indicative of CHESLA's sensible policies in its loan programs and day-to-day operations.

Table 1 shows that there are a variety of reasons that people do not attend college. These results are based upon a national annual Federal Reserve Bank survey of household's economic status and decision-making processes. Although respondents could select multiple responses, there is a clear indication that financial considerations are a major impediment to people's decision to either attend college or complete college.

In the same survey, respondents were asked to self-assess the value of their higher education. The answers are broken down by education and debt status in Figure 1 and point to several interesting trends. Among students who currently have education debt, between 35% to 39% feel that the costs of education exceed the benefits regardless of whether one has a bachelor's degree, an associate's degree, or did not finish (DNF) college. However, among students who never had any student loan debt, these number drop dramatically for all of the different education level cohorts—between 22% for those who DNF to 10% for those who finished a 4-year degree. Interestingly enough, the perceived value of a degree goes up once students who have college debt pay it off.

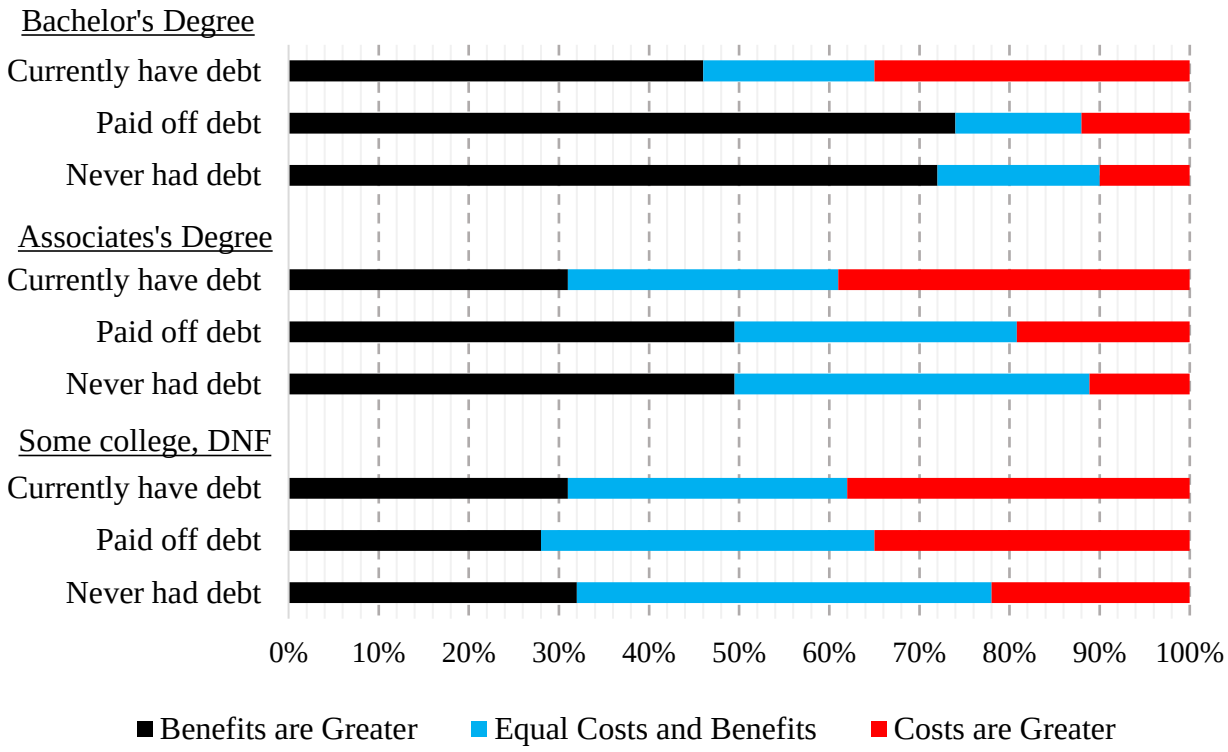
[1] Students can also use these loans and scholarships to attend 2-year colleges. Unless stated otherwise, the general term 'college' for this report should be understood to mean any institution of higher education be it a 2-year community college, a 4-year college, or a university.

Table 1. Reasons Given for Not Attending or Completing College

Reason	Did not Attend College	Did Not Complete College	Overall
	Financial Considerations		
Too Expensive	37%	32%	34%
Needed to earn money	29%	41%	36%
Not worth it financially	22%	14%	17%
	Family Considerations		
Child Care Responsibilities	14%	19%	17%
Parental/Sibling Care Responsibilities	6%	5%	6%
	Personal Considerations		
Not interested in college	31%	17%	22%
Wanted to work	36%	22%	27%
	Education Considerations		
Low Grades	NA	11%	11%

Source: Federal Reserve Bank Board of Governors, 2018

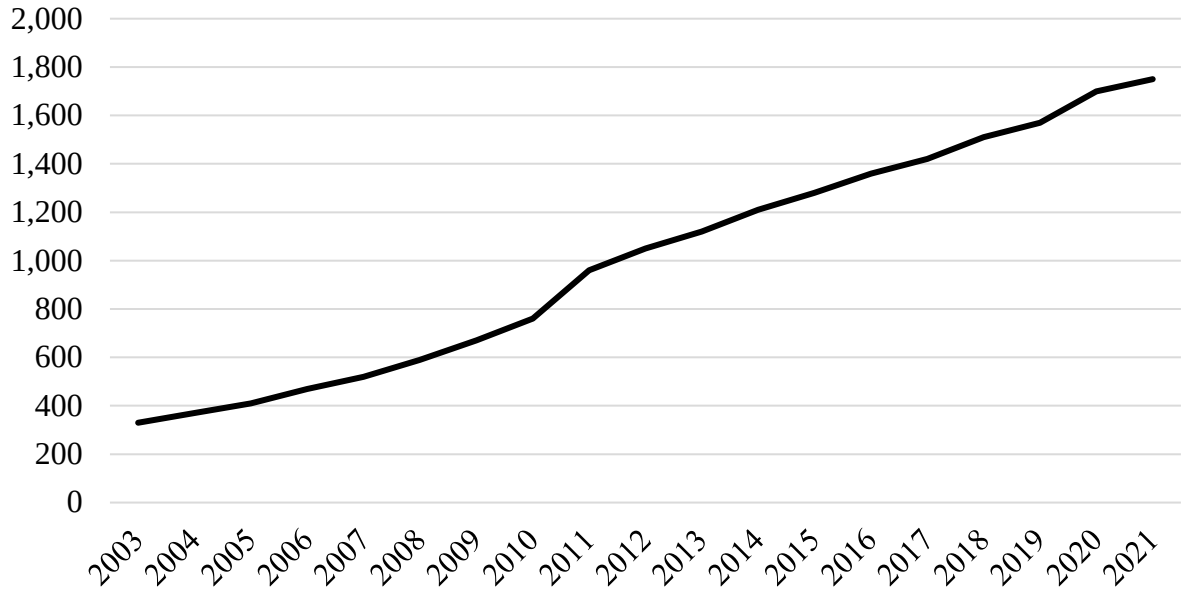
Figure 1. Self-Assessed Value of the Benefits of Higher Education Relative to Costs (Percent of Total Respondents)



Source: Federal Reserve Bank Board of Governors, 2021

In short, when someone is in the process of paying off a student loan, they are reminded of the costs on a monthly basis and it has a tendency to alter their perspective of the actual benefits of a college degree. Figure 2 shows total national student loan debt in billions of dollars. (The reader should note that prior to 2011, private loan debt is excluded from the figure). Student loan debt has increased from $330 billion in 2003 to around $1.75 trillion in 2021.

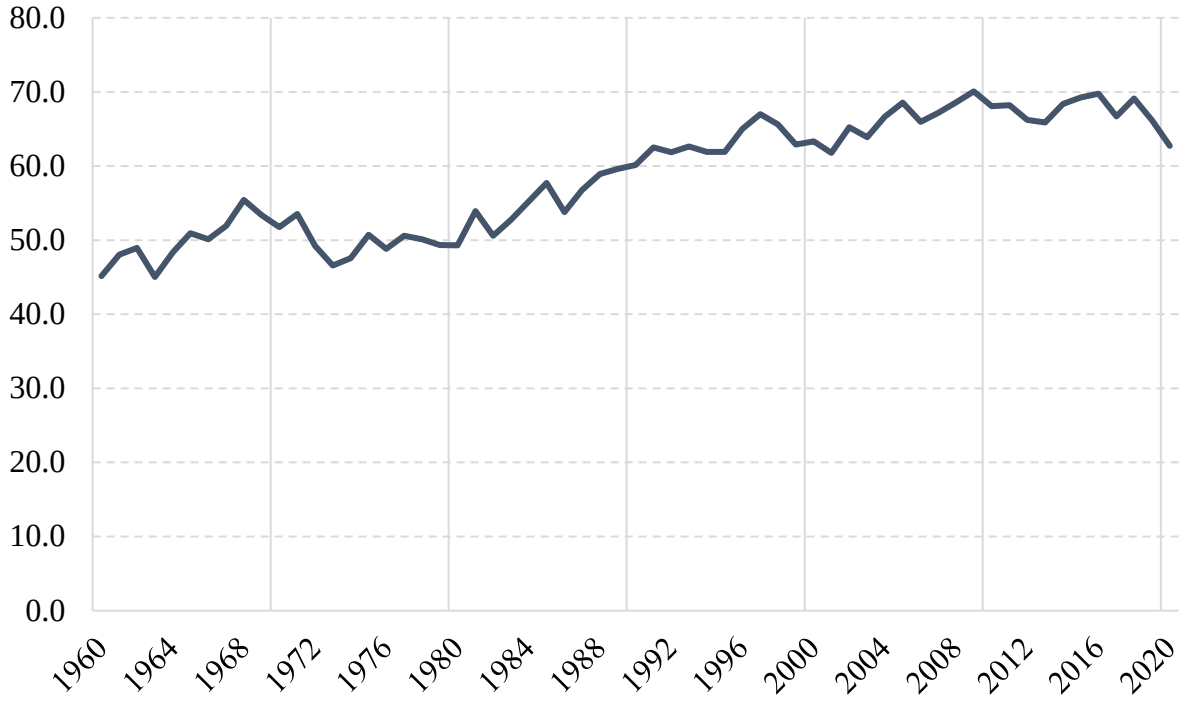
Figure 2. National Student Loan Debt ($ billions)



Source: US Department of Education, Office of Federal Student Aid
Note: Before 2011, private loan debt is excluded

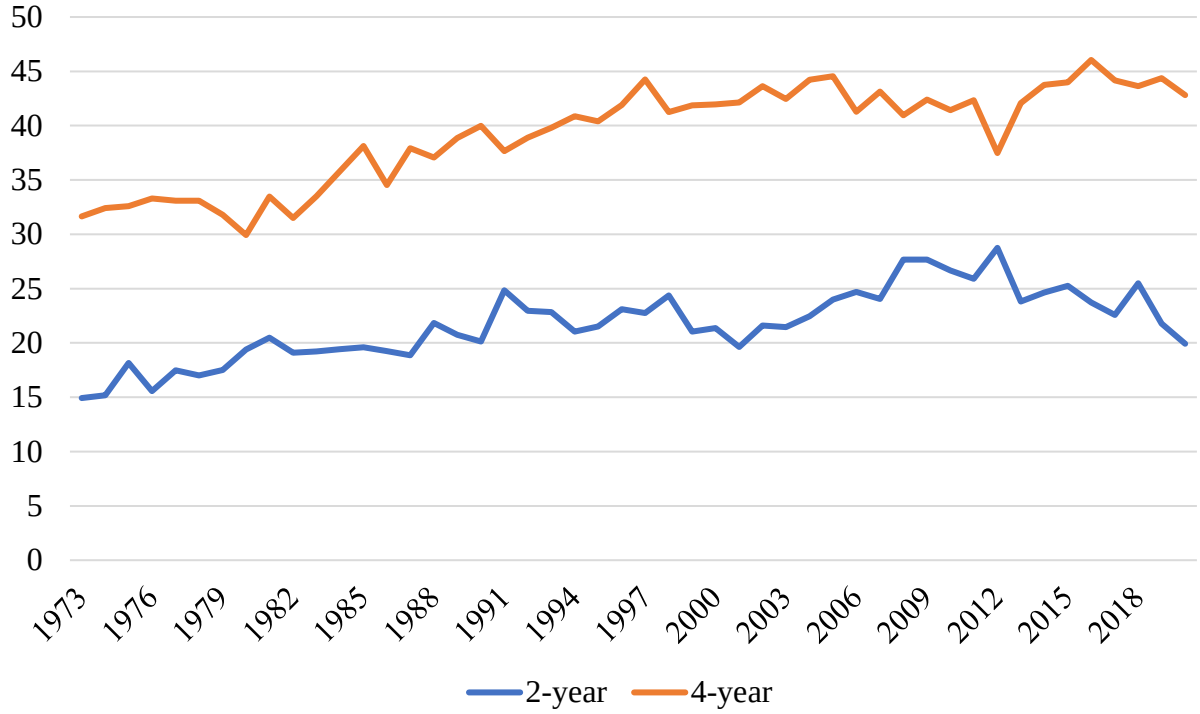
As one can observe in Figure 3, there has been a dramatic shift in the number of high schoolers who attempt to go to college. From 1960 until 1980, this percentage hovered around 50%. Since 1980, there has been a steady upward trend until as recently as a few years ago. Today almost 70% of high school graduates are enrolling in a college. Figures 4 and 5, breaks this enrollment out by 4-year and 2-year institutions and the 4-year/2-year ratio. In 1973, around 15% of high school graduates were enrolling in a 2-year school while 31.6% of high school graduates were going to 4-year schools. Today almost 43% of high schoolers enroll in a 4-year college while 20% enroll in a 2-year school. This 4-year/2-year ratio, the number of enrollees in a 4-year college relative to every enrollee in a 2-year college, averages 1.8 and has fluctuated over time, but has tended to remain roughly within a band of 1.5 to 2. In other words, the data is clear that all institutions of higher education are receiving more and more students. Although there might be short-term trends where students are more likely to attend a 4-year or 2-year program based upon short term economic conditions, as a general rule, 4-year colleges will average 1.8 high schoolers for every 1 high schooler who attends a 2-year school.

Figure 3. Percentage of Recent High School Completers Who Enroll in College



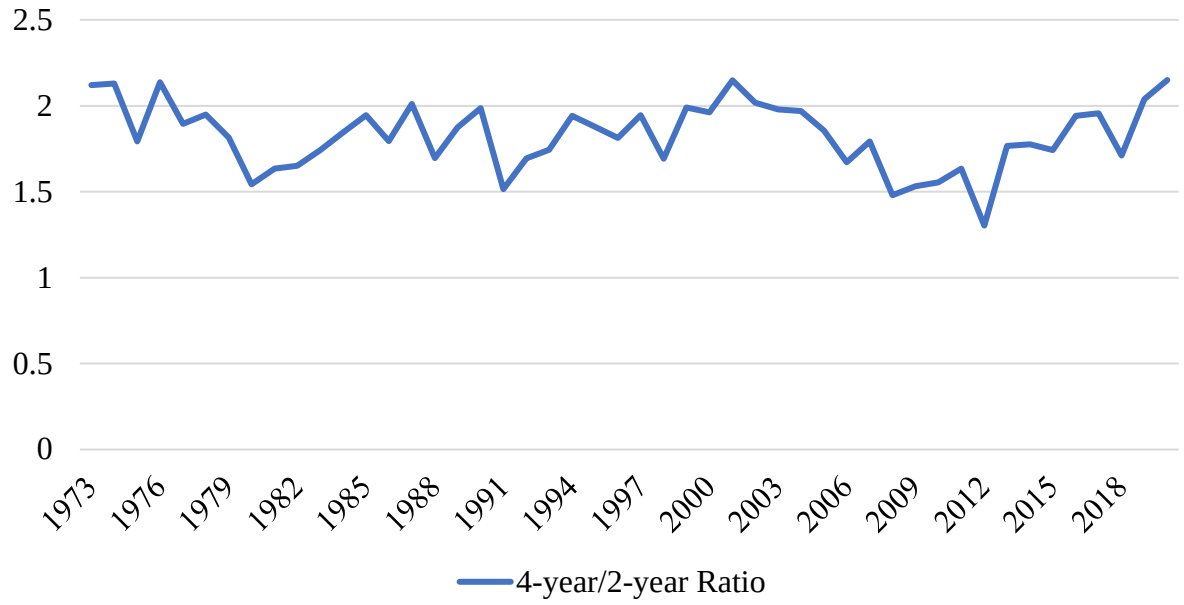
Source: National Center of Education Statistics, 2022

Figure 4. Percentage of Recent High School Completers who Enroll in College by Instituiton



Source: National Center of Education Statistics, 2022

Figure 5. Ratio of 4-year college enrollees to 2-year college enrollees

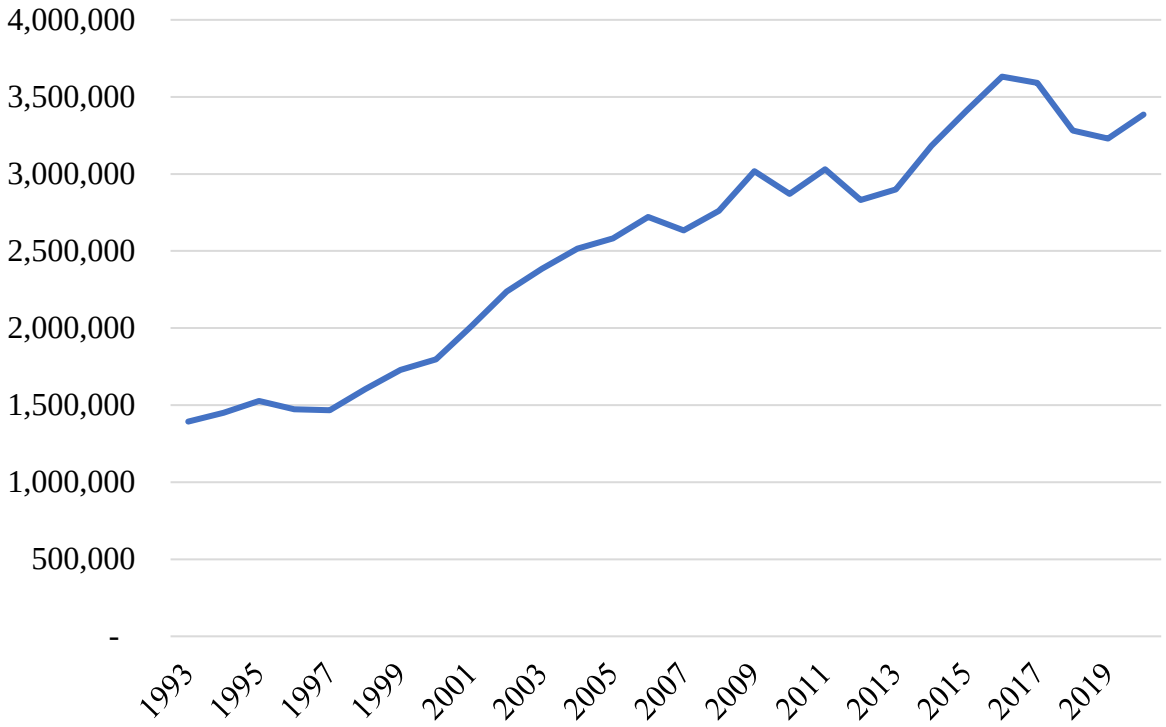


Source: National Center of Education Statistics, 2022

Government support for higher education in Connecticut has grown substantially since 1993 when it totaled $1.4 billion in inflation adjusted spending—today it stands at $3.38 billion. Further evidence of this can be seen by looking at real, i.e. inflation adjusted, state government expenditures for higher education when compared to the national levels in terms of indexing and as a percentage of state government budgets. If one indexes real state spending to 100 in 1993, Connecticut spending has increased 143% relative to the national change of increasing slightly more than 100% since 1993. An alternative way to see the importance of higher education in state government budgets is the percentage of the general budget spent on higher education. In 1993, Connecticut spent 4.2% of its budget on higher education compared to 6.9% for all state governments nationwide—a spending shortfall of 2.7%. Connecticut has worked to close this gap which today is substantially smaller at only 1%—6.5% of state government budgets are dedicated to higher education in Connecticut vs. 7.5% for the nation overall.[2] Figures 6 through 8 show these long-term trends.

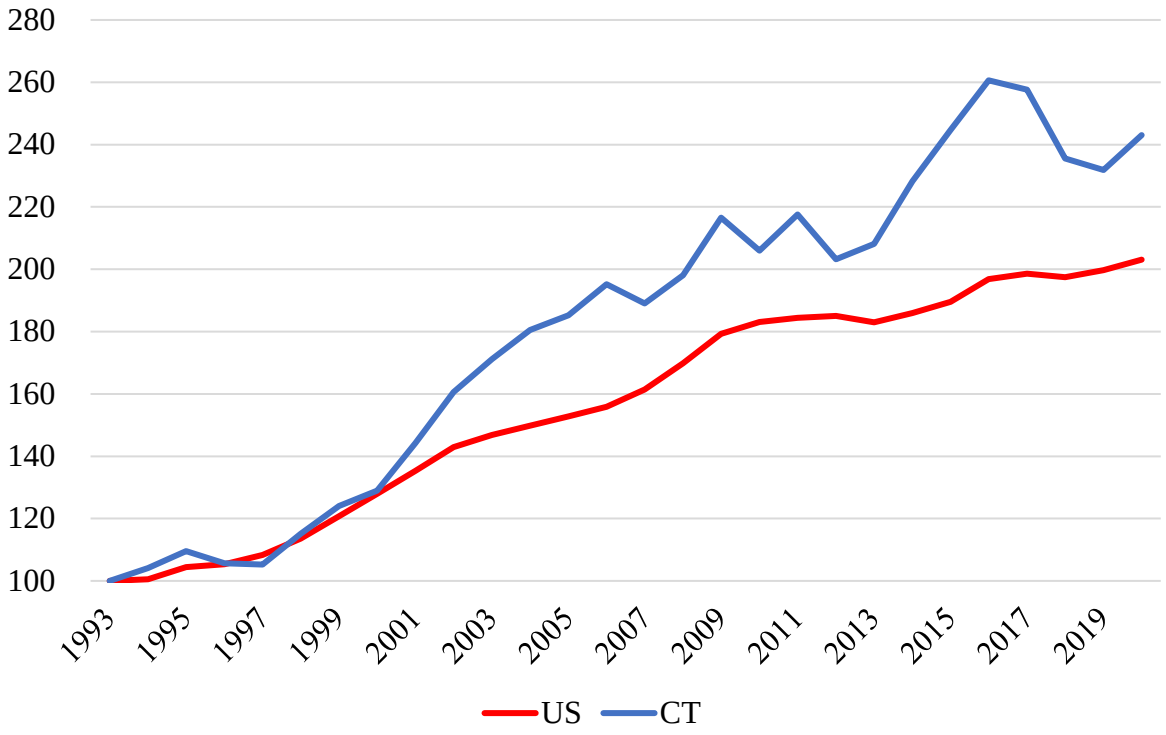
[2] Some of these education spending statistics point to Connecticut being a leader in education spending while others seem to indicate the opposite. Although it would appear at first glance that these ideas are at odds with each other, they are not. They are a function of what is actually being measured. As an example, consider the amorphous idea of 'income' which can be measured with or without adjustments for inflation, on a per-person or per-household basis, as a rate of growth, or be measured relative to someone else's income. Analysis of each of the different ways to measure income could suggest vastly different conclusions.

Figure 6. Real State Government Spending on Higher Education in Connecticut



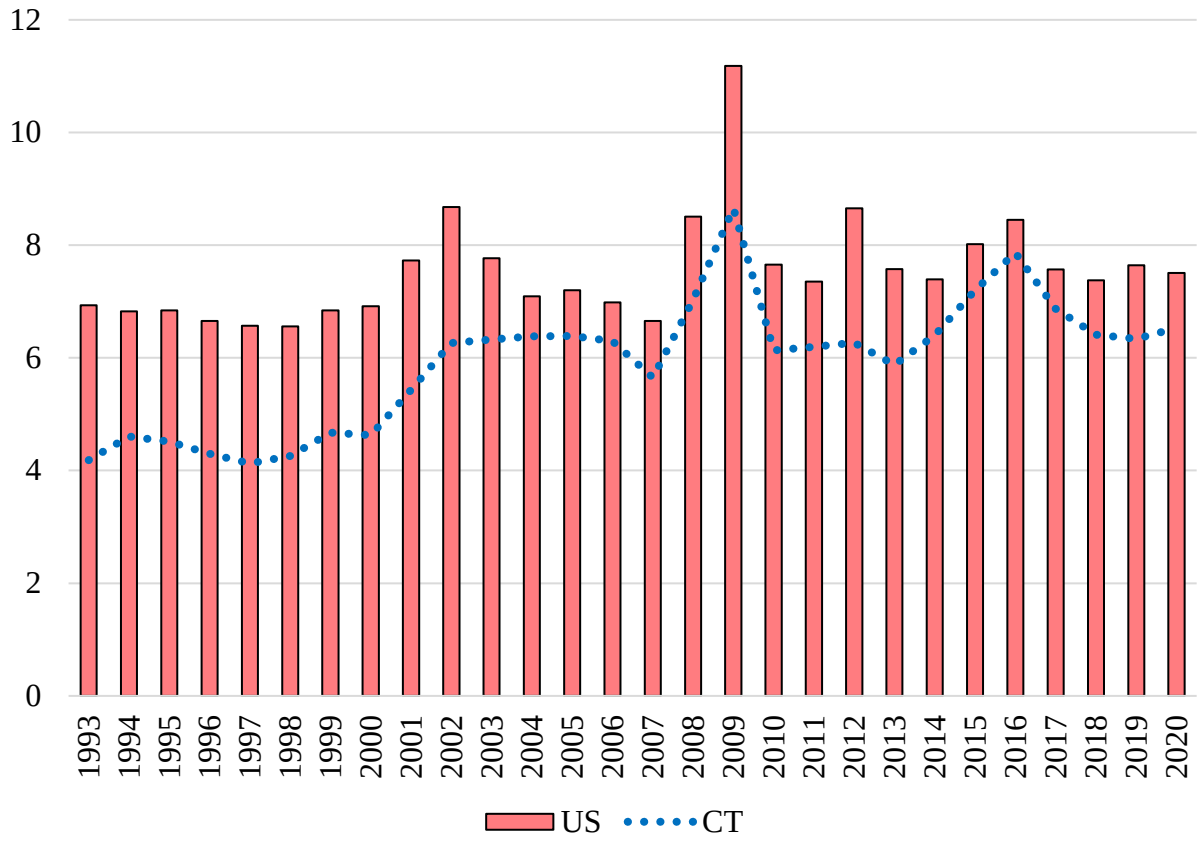
Source: Census Bureau, Census of Governments

Figure 7. Index Real State Government Spending on Higher Education



Source: Census Bureau, Census of Governments

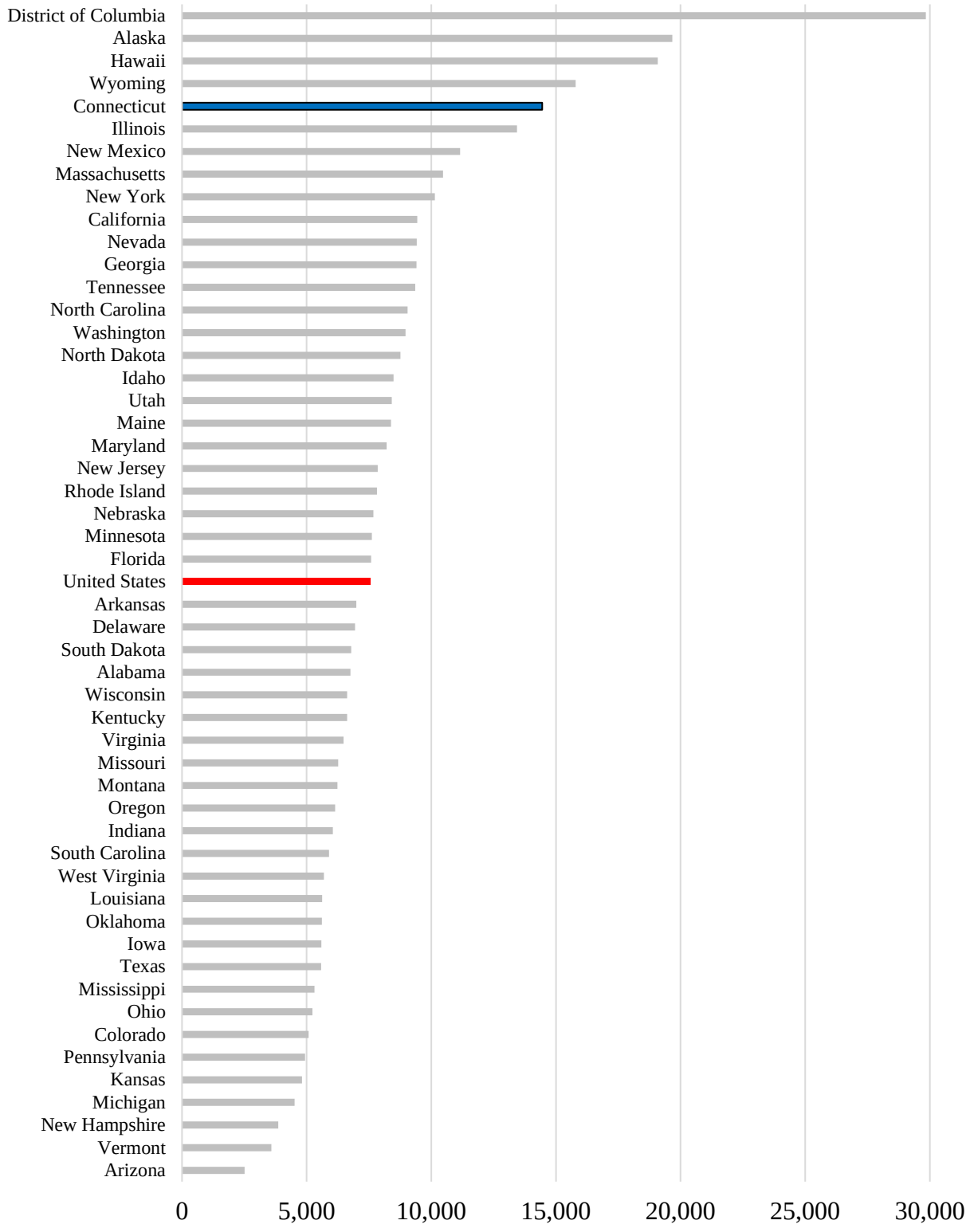
Figure 8. Percentage of State Government Budget Spent on Higher Education



Source: Census Bureau, Census of Governments

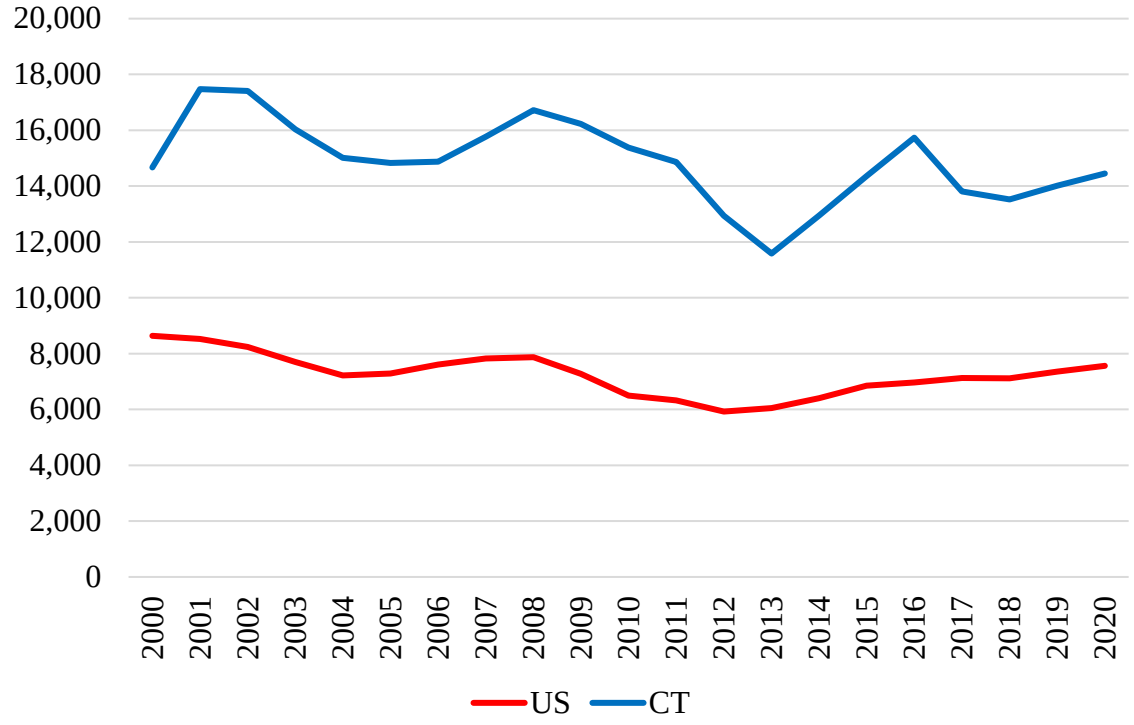
State government support for higher education is relatively strong in Connecticut when compared to the rest of the nation. Figure 9 shows that Connecticut is in the top decile when it comes to higher education funding. In 2020, Connecticut support was $14,449 per full time equivalent (FTE) student in a public higher education institution. This compares with Arizona which spend the lowest amount at $2,515 and a national average of $7,566. However, as a long-term trend, the news is bit more mixed. Figures 10 and 11 illustrate that over time there has been a lot of fluctuation within inflation adjusted state level support per FTE. Although spending per FTE is off of its lows in 2013 of $11,500, it is still slightly below the level it was in 2000. Nevertheless, when inflation adjusted state spending per FTE is indexed to 100, it is obvious that Connecticut is doing better than the national average. Other than for two time periods (2000-2002 and 2016-2018), Connecticut tends to mirror the national trend in higher education spending. However, it should be noted that indexed Connecticut spending is always greater than the national average. Even at the lowest value in 2012, the national spending declined by 31% relative to the year 2000 while it only declined 21% in Connecticut in 2013. Today, on average, real state spending per FTE student is down 13% compared to the year 2000—in Connecticut, it is down only 1.5%.

Figure 9. State Support for Higher Education per FTE Student in 2020 (Public Schools Only)



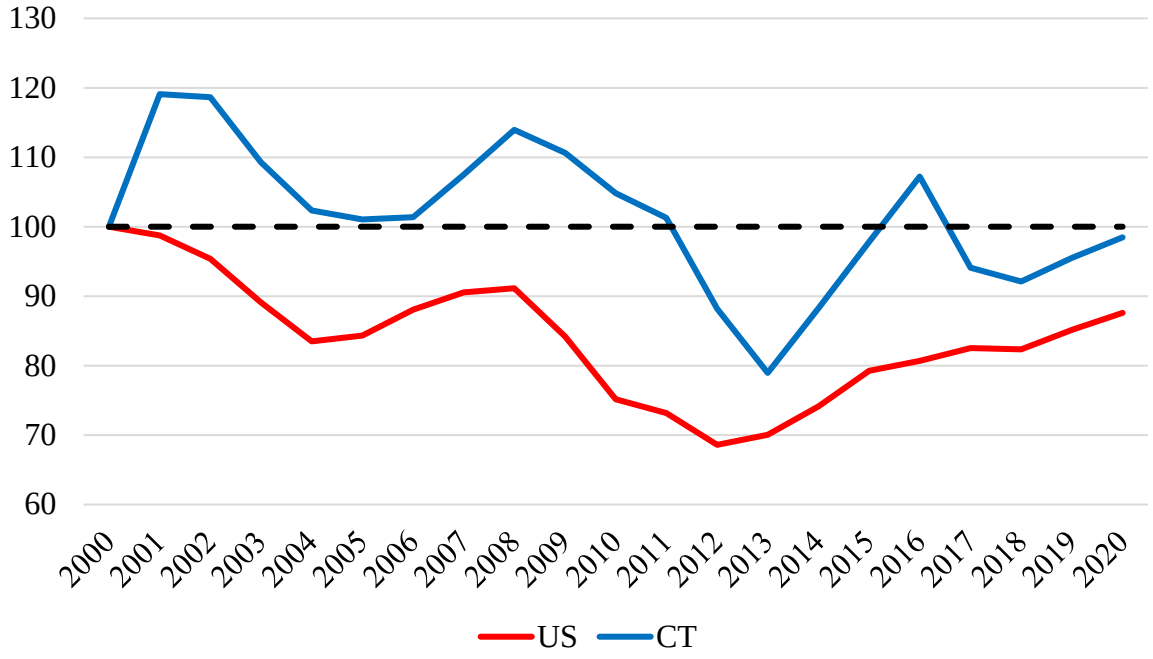
Source: National Science Board, 2021

Figure. 10 Inflation Adjusted State Support for Higher Education per FTE in 2020 dollars (Public Schools only)



Source: National Science Board, 2021

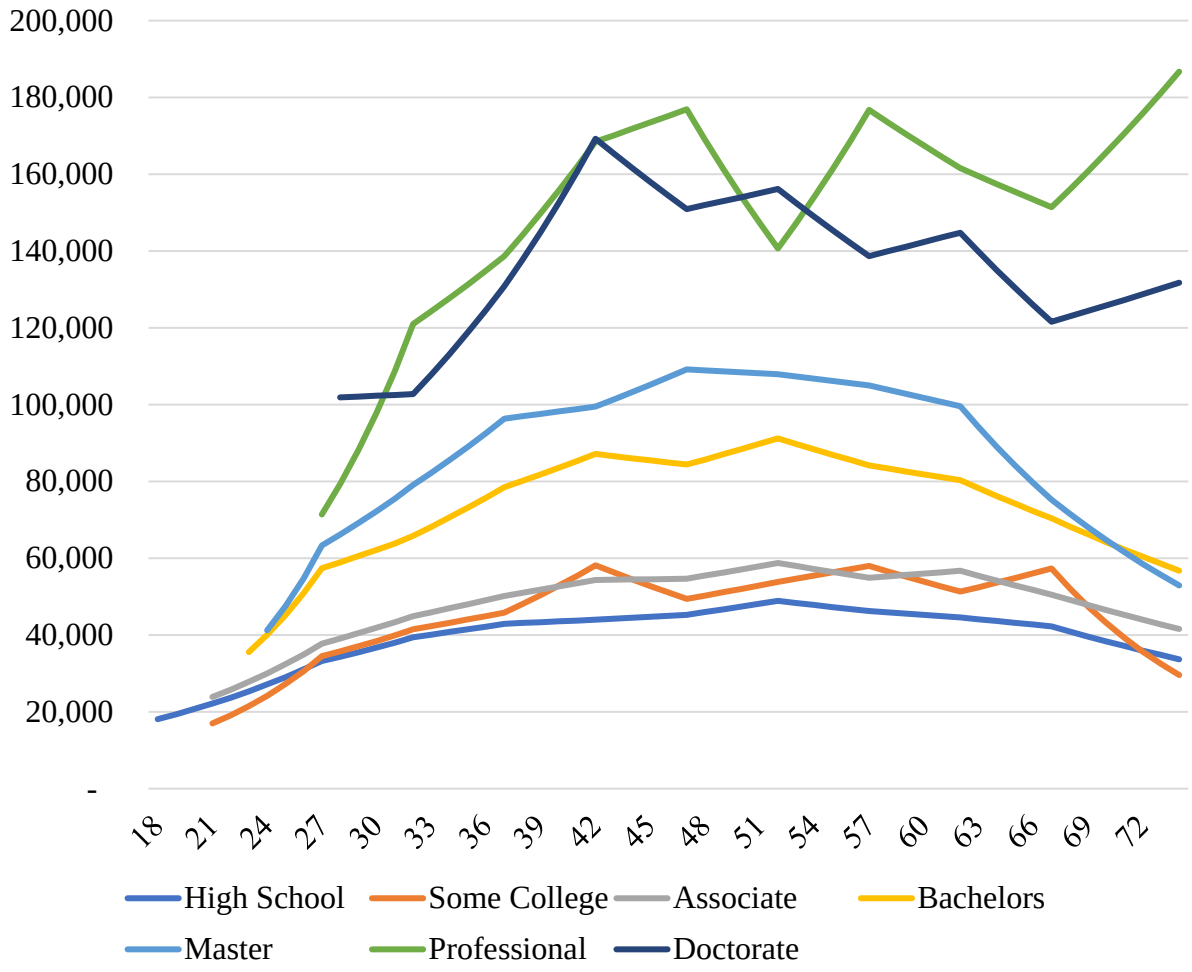
Figure 11. Index of Inflation Adjusted State Support for Higher Education per FTE in 2020 dollars (Public Schools only; Year 2000 indexed to 100)



Source: National Science Board, 2021

Still, it should be noted that higher education pays off.[3] Figure 12 demonstrates average wages a person can earn at each year of life based upon several different educational attainment categories: High School only, Some College but did not finish, Associate's degree, Bachelor's degree, Master's degree, Professional degree (such as physicians and lawyers), and Doctorate degree. There are several things to note about the data. First, the income life-cycle is apparent. Most people mistakenly believe that a person's income continues to increase as they get older. However, this is not the case. On average, a person will reach their peak earning years in their late 40s/early to mid-50s, at which point their income will begin to decline.[4] This is a reflection of the diminished productivity that people typically face in their 50s. Examining the figure, one can easily see climbing income, a peak around the 50s, and then a decline.

Figure 12. Wages by Age by Educational Attainment



Source: Census Bureau, Current Population Survey, 2021

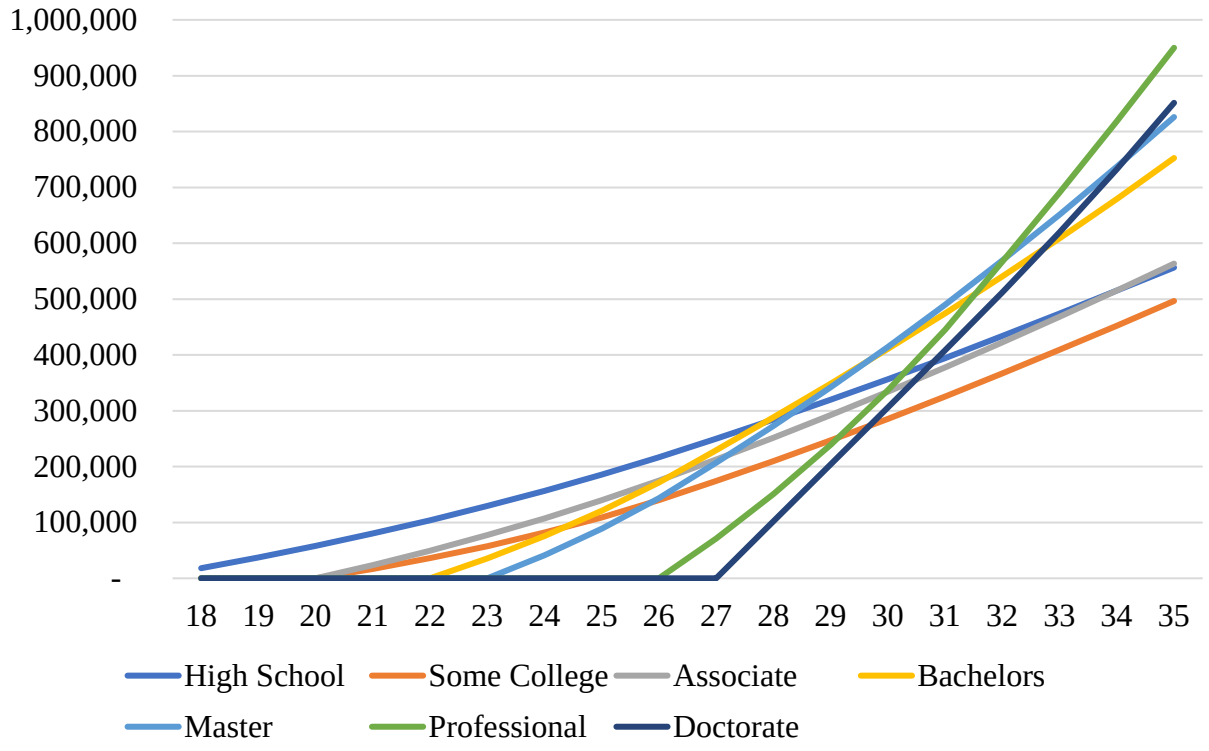
[3] Of course, some degrees and majors pay higher wages on average than others; but as a general rule, higher education is a good investment for a person to undertake.

[4] The literature on this phenomenon is vast, but see Gary Becker's "*Human Capital*" which was published in 1964 as the groundbreaking work.

Secondly, although persons earing a professional degree or a doctorate degree will often have to wait until their late 20's/early 30's to begin earning income, they earn a substantial amount of income over the course of their life and might have their peak earnings occur later in life. Thirdly, it appears from the graph that persons who earn a high school diploma, Associate's degree, or attend college but do not finish earn roughly equal salaries. Although these salaries appear roughly equal to each other in Figure 12, this is more of an artifact of the scale of the graph than their earnings actually being equal. For example, recall that earnings have a tendency to peak when a person is in their late 40s/early 50s in age. At age 50, the typical high school graduate will be earning $47,416 while someone who went to college but did not finish will be earning $52,037—an increase of 9.7% over the high school graduate. For the person with an Associate's degree, they can expect to be earning $57,094 at age 50—which is 20% more than the high school graduate.

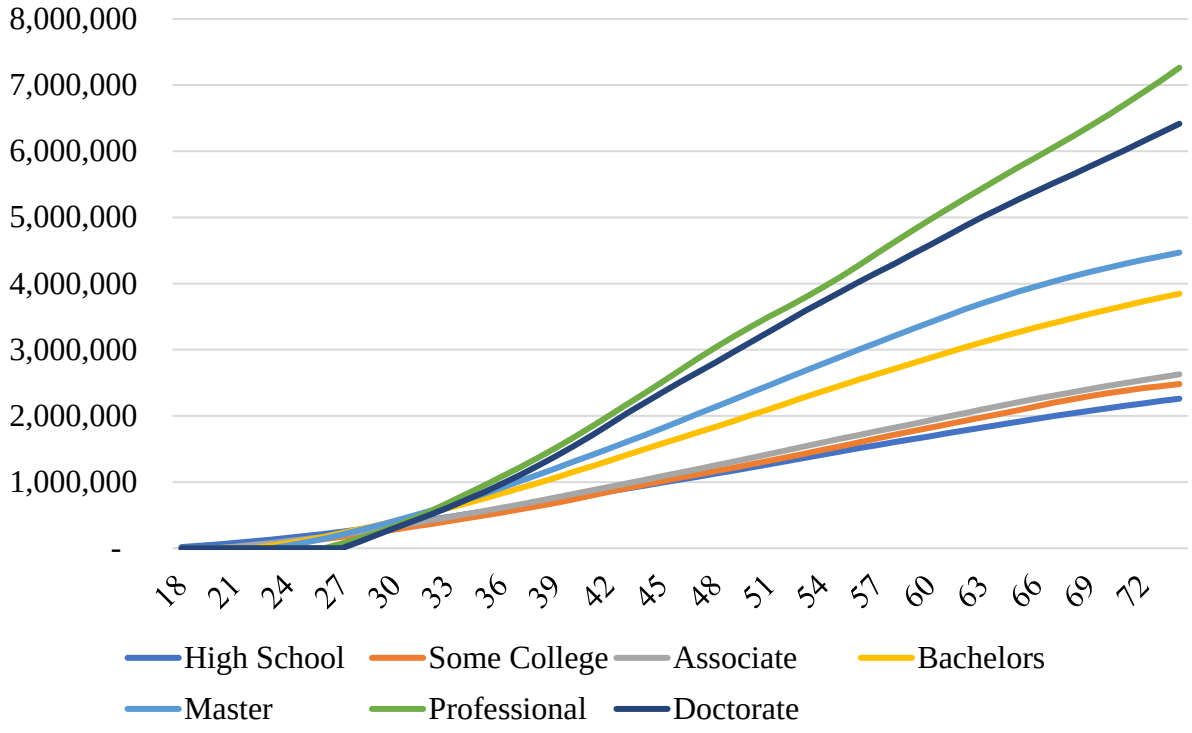
The fact that persons with more education earn more income, but that they are delayed in earning income while they are in school, leads to some interesting results when looking at lifetime earnings. Figures 13 and 14 show average lifetime earnings for each age for each of the different educational attainment categories—except Figure13 stops at age 35 while Figure 14 goes to age 74. It is obvious from the graph that the high school graduate has earned more income than all of the other education categories combined until age 28 is reached. At this point, persons with a Bachelors and Masters degree begin to take over the high school graduate in lifetime earnings. Those earning professional degrees and doctors overtake the lifetime earnings of a high school graduate around age 30 to 31 (this analysis assumes that professional and doctorate degrees are earned within 4 and 5 years off graduating from college respectively). By the time age 34, the person with the Associate's degree has also earned more in lifetime earnings than the high school graduate. Someone who goes to college but does not finish will not exceed the high school graduate in lifetime earnings until they are 43. By the time one's working career is done, the person with the professional degree has earned far more income than anyone over the course of their life—around $7.2 million. In fact, Figure 15 and Table 2 shows these lifetime earnings for different education levels and for working until 65 or age 74. Those with a Bachelor's degree can expect to earn income of $3.26 million by age 65 which is $1.35 million more than a high school graduate. For those with a Master's degree, they could expect to earn $4.47 million if they worked until age 74—which is $2.21 million more than the high school graduate would earn during this same time frame. The evidence is clear—with rare exception, college pays and is a good investment. This is even more true in Connecticut. As Table 3 shows, wages are higher in Connecticut than in the rest of the country.

Figure 13. Lifetime Earnings by Age and Education (Age 18-35)



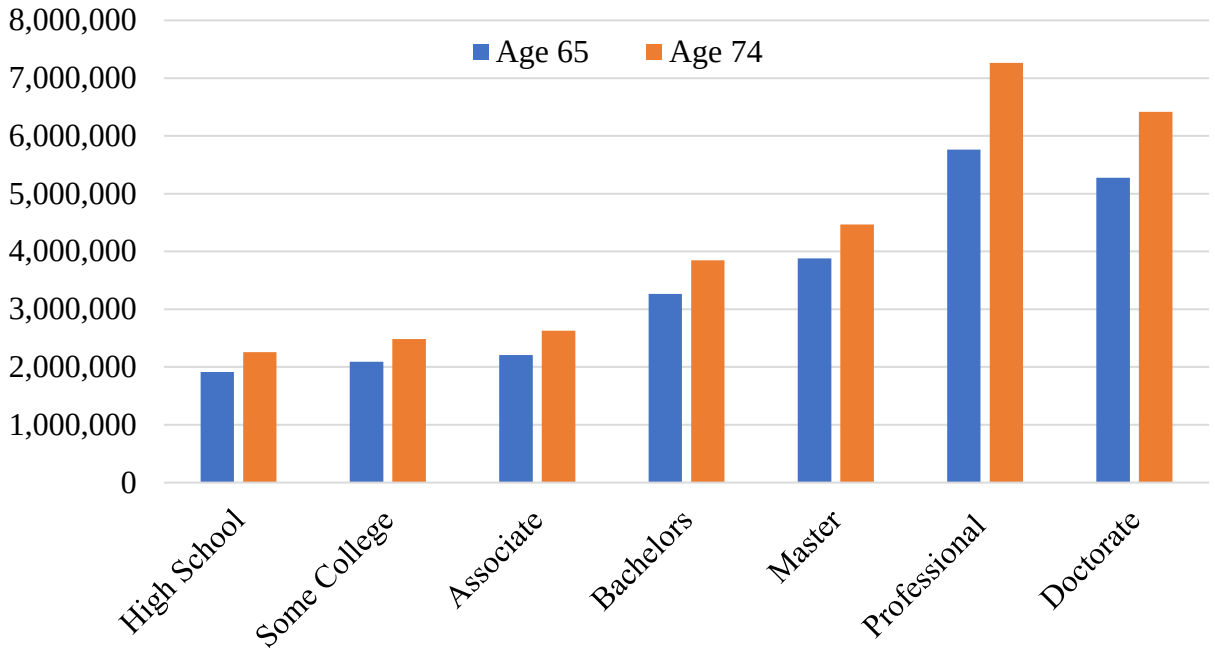
Source: Census Bureau, Current Population Survey, 2021

Figure 14. Lifetime Earnings by Age and Education (Age 18 to 74)



Source: Census Bureau, Current Population Survey, 2021

Figure 15. Lifetime Earnings by Education at Ages 65 and 74



Source: Census Bureau, Current Population Survey, 2021

Table 2. Total Lifetime Earnings and Earnings Differential by Education at Ages 65 and 74

Age	High School	Some College	Associate	Bachelors	Master	Professional	Doctorate
65	$1,914,106	$2,088,960	$2,209,107	$3,267,294	$3,881,309	$5,762,136	$5,277,459
74	$2,259,609	$2,482,166	$2,628,401	$3,846,705	$4,469,290	$7,263,679	$6,416,097
	Differential Relative to High School Graduate Only						
65	*0*	*$174,854*	*$295,001*	*$1,353,188*	*$1,967,203*	*$3,848,030*	*$3,363,353*
74	*0*	*$222,557*	*$368,792*	*$1,587,096*	*$2,209,681*	*$5,004,070*	*$4,156,488*

Source: Census Bureau, Current Population Survey, 2021

Table 3. Median Earnings in 2020 by Education Level and Location

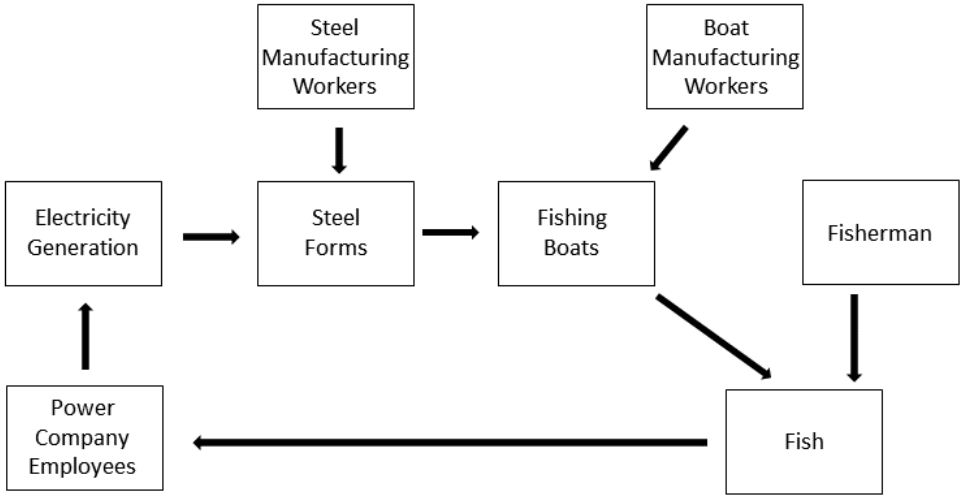
Education Level	United States	Connecticut	Differential
Less than High School	$25,351	$25,926	+2.3%
High School	$32,002	$37,365	+16.7%
Some College/Associate's	$38,258	$43,221	+13.0%
Bachelor's	$56,152	$66,131	+17.8%
Graduate/Professional	$75,328	$85,786	+13.9%

Source: Census Bureau, American Community Survey, 2021

III. ECONOMIC IMPACT METHODOLOGY EXPLAINED

An Input-Output (IO) model was developed and implemented using IMPLAN to trace the economic impacts of the different component of CHESLA's student loan program. [5] These economic impacts were broken down into two different time frames—short run and long run. Input-Output analysis assumes that in order for the economy of a region (such as a state or county) to generate output, it requires inputs. These inter-industry linkages between different industries are traced, compiled, and then aggregated to understand the backward and forward flow of economic activity within the region. Therefore, when there is an increase in demand for the output of industry Z, it requires inputs from industries X and Y in order to make the additional output. Of course, the outputs from industry X and Y, which are the inputs for industry Z, also require inputs. Figure 16 illustrates the concept more clearly.

Figure 16. The Input-Output Model Illustrated



As the reader can see, a Connecticut steel company combines inputs of labor and electricity to produce steel forms as its output. However, this steel form is used as an input by a fishing boat production company and they are combined with boat manufacturing workers to create fishing boats. These fishing boats are then used by fisherman to produce fish which is purchased for dinner by employees of a Connecticut power company. The power company combines the use of their labor, along with other inputs like natural gas or coal, to produce the electricity which was used by the steel company in making steel forms for fishing boats.

As Figure 16 shows, IO modeling creates a useful framework for identifying how changes in one industry can impact other industries. For example, a decrease in the demand for fish for dinner reduces the amount of fish caught by fisherman and thus decreases ultimately the number of fishing boats that are needed. Furthermore, since fewer fishing boats are needed, there is less work for fishing boat production companies and they require fewer employees and

[5] IMPLAN is a software package that is used in Input-Output analysis to determine the size and nature of economic shocks using a classification system of 546 different sub-sectors of the economy

steel forms. This leads to additional layoffs and less purchasing of inputs in the steel form production industry and thus decreases the demand for electricity which can lead to layoffs or electric power employees. IO modeling allows the researcher to trace all of these changes, both forward in the production process and backwards in the production process, and determine their aggregate impact.

The impacts from changes in economic activity are divided up into three different parts: direct effects, indirect effects, and induced effects. An example will help to clarify the different impacts. Suppose that a new golf course is to be built in Connecticut. The actual construction and operation of the golf course would generate direct effects which would be associated with the direct purchase of inputs used in the production of golf games. These purchases can be from people in the area or visitors to the area.

The economic impact does not stop with the direct impact, as it has a ripple effect on other industries and households in the form of induced and indirect effects. For purposes of classification, the indirect effects are the increased use of inputs that are produced by other firms that are needed to meet the increased initial demands. The induced effects are created from the additional income generated and spent by households and business from the direct and indirect effects. Returning to the golf course example, the indirect effects could be in the form of increased commerce for local landscaping businesses that would plant and maintain the golf course. This generates additional income for the employees of the golf course and the landscaping company, who then purchase movie tickets, haircuts, restaurant meals, and other assorted goods and services which further generates additional income and consumption spending by these companies and their employees. This final effect is the induced effect.

We have developed a model of the economic activity of the state in order to measure how much of an impact the CHESLA student loan program has on the state-level economy. Through this model, we will be able to determine the number of jobs created, how much wages have increased, gross state product, and output. Gross state product (GSP) is identical in nature to gross domestic product (GDP) except that GDP is a measure of economic activity at the national level while GSP is a measure of economic activity at the state level. It is important to draw a distinction between GSP and output for the purposes of this report. GSP measures the increase in value-added from economic activity and focuses on the value of final production—counting intermediate economic activity would lead to double counting. Output on the other hand measures intermediate economic activity that occurs in the production of goods and services. An example will help to clarify the distinction. A shipyard in Connecticut needs to purchase $40,000 of steel to produce a $300,000 boat. The purchase of steel is an economic transaction and the steel becomes an input into the final value of the boat of which is sold and valued at $300,000. When the boat is made, GSP increases by $300,000. Output increases by $340,000 which is the value of the boat and the value of the steel. Furthermore, by knowing how much these different sectors of the economy are changing due to the production of boats, we can determine the change in tax revenues.

However, it is important to note that in order to calculate the true economic impact one needs to consider how much ‘new spending’, i.e., net spending, is actually created. Suppose that

there is no golf course in the local area and that sports and entertainment spending is $10 million per year. After the golf course is built, spending on golf games is $2 million per year while total sports and entertainment in the local area is now $11 million. It is erroneous to attribute a $2 million economic impact from spending on golf games onto the local economy. This is because residents and visitors simply rearranged some of their original spending and now spend $1 million less on other forms of sports and entertainment such as movies, baseball games, and bowling. In other words, building the golf course only increased new spending in the area by $1 million, not $2 million.[6]

The same methodology is followed when analyzing the economic impact of CHESLA student loan program. Consider another example to clarify the methodology. Assume that a university in a small town has 1,000 students in attendance. Of these 1,000 students, 200 are from outside of the state of Connecticut and 800 are from the local area. All 1,000 of these students purchase food, housing, gas, clothes, entertainment, and other goods and services which obviously have an effect on the local economy. It is specious to attribute all of the spending by these 1,000 students to the university's economic impact on the town. The only students whose economic impact can be attributed to the university are the 200 out-of-town students and the local students who stayed in town because of the university. Had the university in this town not existed, some of these 800 local students, perhaps 100 in this simple example, would not have moved to go to college in another town. These 100 students would have simply stayed where they were and gotten a job. Therefore, the university's economic impact comes from the spending of 900 students, not 1,000 students.[7]

It should also be noted that this report focuses on both the short run effects of the CHESLA student loan program, the economic impact from student loans and scholarships which help to fund education today, as well as the long run effects of this program. There are long run effects in that student loans and scholarships help fund a student's education. Students who graduate, and students who attend college but don't graduate, are very likely to have a higher skill and knowledge set than people who do not attend a higher education setting. This higher set of skills and knowledge leads to higher productivity of the student and higher wages. Usually, these higher wages by former college students translate into higher levels of consumption, savings, and taxes paid than a person who did not attend college.[8]

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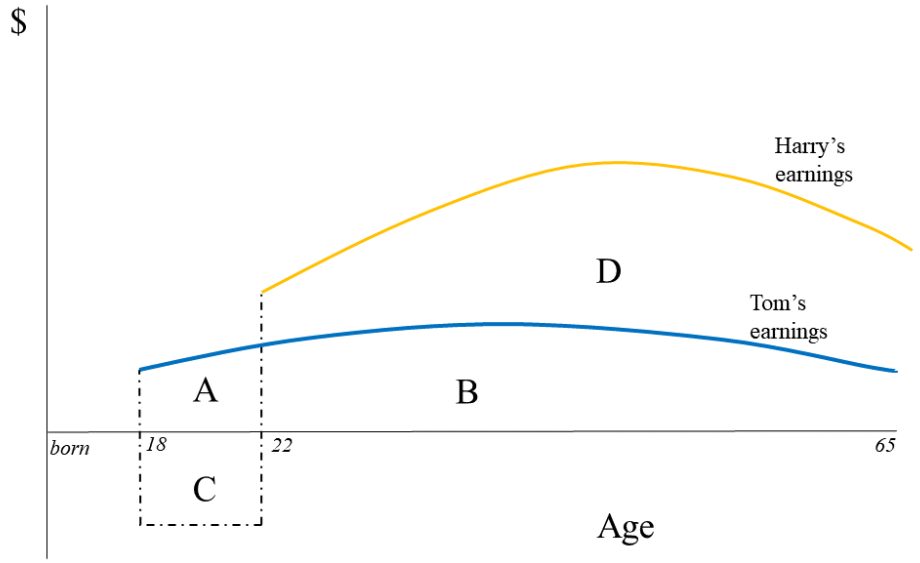
[6] This is a very common error in most Economic Impact Analysis studies commissioned by local, state, and federal governments. This error exaggerates the size of the true Economic Impact of the activity being examined.

[7] If we separate out the economic impact of the university in the long run from the short run, we would be able to include the 100 local students who stayed in town and attended school. We cannot count their spending in the short run as having an impact on the local community (recall: they would have stayed in town anyway), but we could count their increased productivity from the education they received at the university if they would not have attended any school had the university not being there.

[8] Keeping everything else constant, or *ceteris paribus*, which is a well-known economic mantra. Obviously, there can be special circumstances where this is not true—but generally it is. Education can have other advantages as well. See for example, Helliwell, John, and Robert Putnam. "Education and Social Capital", *Eastern Economic Journal*, 2007, 33(1): 1-21. DiPasquale, Denise, and Edward Glaeser. "Incentives and Social Capital: Are Homeowners Better Citizens?", *Journal of Urban Economics*, 1999, 45(2): 354-384.

Figure 17. The Return on Investment of a College Education



Source: Created by author

To illustrate this long-run economics effect from education, consider a simple example of Tom and Harry who both graduate from high school in the same year. Tom begins working immediately and Harry attends college. Whether this college is private or public, in-state or out-of-state, doesn't matter for this illustration. Regardless of which college Harry attends, college has a cost and Harry needs to take out student loans in order to pay these costs. Four years later, Harry has graduated with student loan debt that must be paid off; but he also has a higher salary because of his college education. Harry can, and should, think of his student loan debt not as debt per se, but as borrowing to invest in his own human capital. The returns to his investment in his own future earnings potential will be more than enough to pay both the amount borrowed plus the interest. This can be illustrated in Figure 17 which shows the lifecycle earnings of Tom and Harry. Tom begins working at age 18 and stops working at age 65 and his earnings are represented by the blue line. Tom's total lifetime earnings are represented by the area (A + B). Harry goes to college at 18 and graduates at 22 at which point he begins working. Like Tom, he works till age 65, except his earnings are represented by the yellow line. However, Harry spends area C to attend college and loses out on area A in earnings while he is in college. Harry will earn area (B + D) as his lifetime income but have 'net' earnings of (B + D – C – A). The reader will note that this area is much larger than just Tom's earnings of area (A +B) illustrating that college was a good investment to Harry.[9]

However, there are provisos for the long run effect just as there were for the short run. The long run economic benefits from having a more educated workforce only occur in

[9] This analysis holds regardless of whether Harry paid for school outright or borrowed money to attend. Since money is fungible, the result is the same. The only difference is whatever interest Harry pays on any money borrowed to attend college.

Connecticut if persons with the education remain in Connecticut to work. If Harry graduates from public college in Connecticut but takes a job in Texas, then Connecticut taxpayers will have helped to finance Harry's education at the local public university while the taxes that Harry pays over his working career accrue to the state of Texas.[10] The situation can of course work in reverse. Harry can move from Connecticut to Texas to attend college and then return to Connecticut to work after he graduates. Finally, Harry can graduate from high school in Texas, move to Connecticut for college using a CHESLA loan, and remain in Connecticut to work after he graduates. Whether colleges help to retain their graduates within the state that they are located in has important implications on their long run economic impact for the state.[11]

[10] Even if Harry attends a private college, Connecticut taxpayers have helped to finance his education. Private universities use public goods and services like sewers, roads, police and fire protection also.

[11] To see that this is true, consider that real K-12 education spending for the past 13 years in Texas totals to $131,378 per pupil. If Harry received all of his K-12 education in Texas and works in Connecticut the remainder of his life, the state of Texas in effect never gets back its 'investment' of $131,378 in Harry's primary education. The state of Connecticut becomes the beneficiary of Texas' K-12 spending. This same logic applies to college education.

IV. The Connecticut Economy and the State of Education in Connecticut

In order to conduct an Economic Impact Analysis for CHESLA using an Input-Output model, one must have an understanding of the size, structure, and interrelationships of the different components of the Connecticut economy. This section provides a broad outline of the economic relationships within the state. Although the state of Connecticut is small both geographically and in population, it has a relatively strong economy with high wages and good jobs. Table 4 outlines the income distribution within the state of Connecticut compared to the US which clearly shows that Connecticut is a high-income state. Almost one-fourth, 22.8% of Connecticut households have an income that exceeds $150,000. For the United States as a whole about one-in-seven, or 15.4%, of households reach this criterion. Similarly, 13.2% of all Connecticut households have an income that exceeds $200,000 per year while only 8.3% of households in the US fall into this income range. On the other hand, 18.4% of all US households have an income that falls below $25,000—however, only 15.1% of Connecticut households have incomes that low.

Table 4. US and Connecticut Income Distribution Comparison

	United States		Connecticut	
Income Level	Number of Households	Percent	Number of Households	Percent
Less than $10,000	7,145,751	5.8%	68,078	4.9%
$10,000 to $14,999	5,020,097	4.1%	47,492	3.4%
$15,000 to $24,999	10,359,700	8.5%	94,433	6.8%
$25,000 to $34,999	10,569,484	8.6%	94,907	6.9%
$35,000 to $49,999	14,690,382	12.0%	138,385	10.0%
$50,000 to $74,999	21,034,779	17.2%	214,021	15.4%
$75,000 to $99,999	15,613,243	12.8%	169,430	12.2%
$100,000 to $149,999	19,128,938	15.6%	243,261	17.6%
$150,000 to $199,999	8,688,154	7.1%	132,437	9.6%
$200,000 or more	10,103,691	8.3%	182,993	13.2%
Median household income	$64,994	NA	$79,855	NA
Mean household income	$91,547	NA	$115,337	NA

Source: Census Bureau, American Community Survey, 2021

Similar analysis is shown in Tables 5 through 7 which display average wages, employment, and Gross Domestic Product by industries within Connecticut and the US.[12] Examining these tables the reader can get a sense of the general and specific strengths of the Connecticut economy. For example, the reader can note that average wages in Connecticut are 14.8% higher than in the US.[13] There are several industries though that standout specifically.

[12] These tables list all of the major industry classifications but not all of the subindustry classifications that operate within the state. Therefore, percentages might not add up to 100%.

[13] It should be noted that the average wages in Table 5 includes all forms of compensation that accrues to employees including wages, employer contributions to government mandated social insurance like Social Security and

Table 5. Average Wages in Connecticut Compared with the US by Industry

Industry	CT Wages	US Wages	Percent Difference
All Nonfarm	90,251	78,635	14.8%
All Private	89,594	77,061	16.3%
Farming	26,640	35,927	-25.8%
Utilities	197,115	172,390	14.3%
Construction	89,845	80,489	11.6%
Manufacturing	109,890	92,847	18.4%
Durable goods	112,326	97,546	15.2%
Wood product	64,587	64,896	-0.5%
Nonmetallic mineral product	85,409	79,441	7.5%
Primary metal	94,121	90,254	4.3%
Fabricated metal product	88,101	74,380	18.4%
Machinery	110,715	92,568	19.6%
Computer and electronic product	100,709	160,819	-37.4%
Electrical equipment and appliance	115,352	101,055	14.1%
Furniture	67,084	60,612	10.7%
Miscellaneous	103,639	97,572	6.2%
Nondurable Goods	100,748	85,083	18.4%
Food	61,109	66,147	-7.6%
Beverage/tobacco product	67,331	74,175	-9.2%
Textile mills	73,723	61,295	20.3%
Paper	95,613	90,096	6.1%
Printing and related support activities	73,488	65,378	12.4%
Petroleum and coal products	167,421	191,229	-12.4%
Chemical	185,397	136,466	35.9%
Plastics and rubber products	82,203	73,417	12.0%
Wholesale trade	119,838	99,669	20.2%
Retail trade	47,660	45,078	5.7%
Transportation and warehousing	60,169	71,236	-15.5%
Air transportation	126,577	124,706	1.5%
Truck transportation	80,592	73,032	10.4%
Warehousing and storage	48,916	51,815	-5.6%
Information	160,702	157,235	2.2%
Publishing industries (except Internet)	140,456	168,920	-16.9%
Motion picture and sound recording industries	151,964	113,568	33.8%
Broadcasting (except Internet)	149,001	120,771	23.4%
Telecommunications	225,953	123,282	83.3%

Table continued on next page

Medicare, employer contributions to employee retirement plans, etc. Furthermore, the reader will recall that average wages will almost always exceed median wages in any industry.

Table 5. Average Wages in Connecticut Compared with the US by Industry (Continued)

Industry	CT Wages	US Wages	Percent Difference
Finance and insurance	206,857	140,459	47.3%
Credit intermediation and related activities	140,091	118,572	18.1%
Insurance carriers and related activities	161,810	110,951	45.8%
Real estate and rental and leasing	87,917	75,946	15.8%
Professional, scientific, and technical services	131,533	123,244	6.7%
Management of companies and enterprises	176,220	154,645	14.0%
Admin/support/waste management	62,204	56,762	9.6%
Educational services	73,416	61,434	19.5%
Health care and social assistance	71,305	68,138	4.6%
Ambulatory health care services	93,175	82,602	12.8%
Hospitals	91,443	86,293	6.0%
Nursing and residential care facilities	53,065	46,734	13.5%
Social assistance	38,105	35,017	8.8%
Arts, entertainment, and recreation	48,137	57,713	-16.6%
Accommodation and food services	30,955	29,381	5.4%
Accommodation	42,931	47,469	-9.6%
Food services and drinking places	30,018	26,775	12.1%
Other services	48,344	50,294	-3.9%
Government and government enterprises	94,073	86,611	8.6%
Federal civilian	112,336	124,769	-10.0%
State and local government	93,900	81,850	14.7%

Source: Bureau of Economic Analysis, 2020

Table 6. Employment in Connecticut Compared with the US by Industry

Industry	CT Employment	Percent of CT Employment	Percent of US Employment
All Nonfarm	1,623,757	100.0%	100.0%
All Private	1,385,842	85.3%	83.5%
Farming	4,382	0.3%	0.6%
Utilities	5,095	0.3%	0.4%
Construction	58,325	3.6%	5.1%
Manufacturing	153,961	9.5%	8.3%
Durable goods	121,575	7.5%	5.2%
Wood product	1,024	0.1%	0.3%
Nonmetallic mineral product	2,240	0.1%	0.3%
Primary metal	3,570	0.2%	0.2%
Fabricated metal product	27,814	1.7%	0.9%
Machinery	12,875	0.8%	0.7%
Computer and electronic product	10,288	0.6%	0.7%
Electrical equipment and appliance	7,122	0.4%	0.3%
Furniture	2,369	0.1%	0.2%
Miscellaneous	8,374	0.5%	0.4%
Nondurable Goods	32,386	2.0%	3.1%
Food	7,732	0.5%	1.1%
Beverage/tobacco product	2,332	0.1%	0.2%
Textile mills	1,473	0.1%	0.2%
Paper	2,948	0.2%	0.2%
Printing and related support activities	4,439	0.3%	0.3%
Petroleum and coal products	261	0.0%	0.1%
Chemical	7,650	0.5%	0.6%
Plastics and rubber products	5,349	0.3%	0.5%
Wholesale trade	56,166	3.5%	3.9%
Retail trade	161,782	10.0%	10.2%
Transportation and warehousing	56,409	3.5%	3.9%
Air transportation	970	0.1%	0.3%
Truck transportation	7,542	0.5%	1.0%
Warehousing and storage	19,751	1.2%	1.0%
Information	29,255	1.8%	1.9%
Publishing industries (except Internet)	7,286	0.4%	0.5%
Motion picture and sound recording industries	3,736	0.2%	0.2%
Broadcasting (except Internet)	5,844	0.4%	0.2%
Telecommunications	6,260	0.4%	0.5%

Table continued on next page

Table 6. Employment in Connecticut Compared with the US by Industry (Continued)

Industry	CT Employment	Percent of CT Employment	Percent of US Employment
Finance and insurance	104,831	6.5%	4.4%
Credit intermediation and related activities	21,975	1.4%	1.8%
Insurance carriers and related activities	61,195	3.8%	1.9%
Real estate and rental and leasing	19,321	1.2%	1.5%
Professional, scientific, and technical services	93,521	5.8%	6.5%
Management of companies and enterprises	31,705	2.0%	1.6%
Admin/support/waste management	82,815	5.1%	5.9%
Educational services	73,668	4.5%	2.4%
Health care and social assistance	267,352	16.5%	13.5%
Ambulatory health care services	87,868	5.4%	5.1%
Hospitals	59,723	3.7%	3.5%
Nursing and residential care facilities	56,931	3.5%	2.2%
Social assistance	62,830	3.9%	2.7%
Arts, entertainment, and recreation	20,300	1.3%	1.2%
Accommodation and food services	98,212	6.0%	7.6%
Accommodation	7,125	0.4%	1.0%
Food services and drinking places	91,087	5.6%	6.7%
Other services	72,026	4.4%	4.5%
Government and government enterprises	237,915	14.7%	16.5%
Federal civilian	19,235	1.2%	2.0%
State and local government	206,833	12.7%	13.1%

Source: Bureau of Economic Analysis

Table 7. GDP in Connecticut Compared with the US by Industry

Industry	CT GDP ($ Millions)	Percent of CT GDP	Percent of US GDP
All Nonfarm	276,422.9	100.0%	100.0%
All Private	248,821.1	90.0%	87.2%
Farming	287.2	0.1%	0.6%
Utilities	4,895.7	1.8%	1.6%
Construction	7,539.4	2.7%	4.3%
Manufacturing	30,267.7	10.9%	10.9%
Durable goods	21,637.4	7.8%	6.1%
Wood product	87.0	0.0%	0.2%
Nonmetallic mineral product	236.7	0.1%	0.3%
Primary metal	474.6	0.2%	0.3%
Fabricated metal product	3,542.7	1.3%	0.7%
Machinery	1,684.1	0.6%	0.8%
Computer and electronic product	2,090.0	0.8%	1.5%
Electrical equipment and appliance	1,416.0	0.5%	0.3%
Furniture	183.0	0.1%	0.2%
Miscellaneous	2,848.1	1.0%	0.5%
Nondurable Goods	8,630.3	3.1%	4.8%
Food	1275.7	0.5%	1.2%
Beverage/tobacco product	384.8	0.1%	0.2%
Textile mills	113.7	0.0%	0.1%
Paper	483.8	0.2%	0.3%
Printing and related support activities	504.5	0.2%	0.2%
Petroleum and coal products	117.0	0.0%	0.5%
Chemical	5,095.9	1.8%	1.9%
Plastics and rubber products	612.9	0.2%	0.4%
Wholesale trade	14,260.4	5.2%	6.0%
Retail trade	14,120.3	5.1%	5.8%
Transportation and warehousing	5,125.0	1.9%	2.7%
Air transportation	141.8	0.1%	0.3%
Truck transportation	877.2	0.3%	0.8%
Warehousing and storage	1,013.3	0.4%	0.4%
Information	15,480.9	5.6%	5.6%
Publishing industries (except Internet)	2,464.7	0.9%	1.5%
Motion picture and sound recording industries	1,488.7	0.5%	0.3%
Broadcasting (except Internet)	4,580.4	1.7%	0.6%
Telecommunications	4,906.5	1.7%	1.6%

Table continued on next page

Table 7. GDP in Connecticut Compared with the US by Industry (Continued)

Industry	CT GDP ($ Millions)	Percent of CT GDP	Percent of US GDP
Finance and insurance	44,036.1	15.9%	8.6%
Credit intermediation and related activities	7,395.1	2.7%	3.7%
Insurance carriers and related activities	21,702.2	7.9%	3.1%
Real estate and rental and leasing	38,785.6	14.0%	13.4%
Professional, scientific, and technical services	18,774.4	6.8%	7.8%
Management of companies and enterprises	6,446.4	2.3%	2.0%
Admin/support/waste management	7,427.0	2.7%	3.1%
Educational services	6,504.3	2.4%	1.2%
Health care and social assistance	22,610.2	8.2%	7.4%
Ambulatory health care services	9,955.1	3.6%	3.5%
Hospitals	6,809.0	2.5%	2.5%
Nursing and residential care facilities	3,437.6	1.2%	0.7%
Social assistance	2,408.6	0.9%	0.7%
Arts, entertainment, and recreation	1,689.4	0.6%	0.8%
Accommodation and food services	5,558.7	2.0%	2.4%
Accommodation	871.0	0.3%	0.6%
Food services and drinking places	4,687.8	1.7%	1.9%
Other services	4,796.2	1.7%	2.0%
Government and government enterprises	27,601.8	10.0%	12.8%
Federal civilian	3,351.7	1.2%	2.4%
State and local government	21,513.1	7.8%	8.7%

Source: Bureau of Economic Analysis

Employment within Finance and Insurance is large at 6.5% of total Connecticut employment with the industry contributing 16% to the state's Gross Domestic Product (GDP). This strength shows up in wages that exceed that national average by almost 50% and a GDP share that is almost twice as large and the national average. Other industries are rather large in terms of employment, but might not contribute to employment or GDP in the same manner. For example, Retail employs one-in-ten people in Connecticut, but only contributes 5% to GDP and has wages that are roughly equal to the national average. Other examples include Manufacturing and Health Care. The percentage of people employed in Manufacturing in Connecticut is roughly equal to the national rate while Health Care exceeds the national rate slightly; but as a contributor to GDP, both of these industries are relatively identical in their contribution to state GDP as would be expected on a national scale.

Education is similar in that it seems to have more importance in Connecticut that the rest of the nation. Table 8 lists the current education status of persons over the age of 25 in both the country and the state of Connecticut. Currently slightly more than one-quarter of a million persons in Connecticut did not complete high school; however, this is less than 10% and less

than the 12% for the nation. On the other hand, almost 5% of the Connecticut population has a professional or doctorate degree while only 3.5% of the US does. Furthermore, it's interesting to look at those who have some college or an Associate's degree. The reader will note that in Connecticut, both of these percentages are smaller than in the US—for instance, 16.8% for Connecticuters versus 20.4% in the US for those with 'Some College'. It would appear that the US has the upper hand here, but this is not the case as can be seen when comparing Bachelor's and other advanced degrees. All of these degrees are held at a higher percentage in Connecticut than in the nation overall. Although an Associate's degree is laudable and having some college is certainly better than having none, the lower percentages for these two statuses by Connecticuters indicated that people in Connecticut are not satisfied with 'just' an Associate's degree or with 'just' having some college—they want to ensure that they have a college degree.

Table 8. Education Status of People Over Age 25

Education Status	Connecticut	Percent of CT Population	US	Percent of US Population
Population over Age 25	2,483,095		220,622,076	
Did Not Complete HS	232,663	9.4%	26,472,261	12.0%
High School/GED	666,828	26.9%	59,472,748	27.0%
Some College	416,175	16.8%	45,044,698	20.4%
Associate's Degree	191,964	7.7%	18,712,207	8.5%
Bachelor's Degree	541,380	21.8%	43,646,104	19.8%
Master's Degree	315,473	12.7%	19,454,174	8.8%
Professional Degree	76,404	3.1%	4,681,075	2.1%
Doctorate Degree	42,208	1.7%	3,138,809	1.4%

Source: Census Bureau, American Community Survey

Citizens in Connecticut are even more likely to go to college than the national average. In any given year approximately 61% to 69% of US high school graduates will enroll in college (Table 9) while this is between 67% to 73% for Connecticut. Furthermore, once Connecticuters enter college, they are more likely to finish as shown in Figure 18 which shows the outcomes for the 2015 college enrollee cohort. It is also broken down by 2-year colleges, Private not-for-profit colleges, 4-year public college. The students in this cohort had several different options: they could complete the degree of study at the college that they started at, they could complete their degree at a different 2-year of 4-year college, they can still be enrolled, or they could have dropped out. Of particular interest is the category 'not enrolled' which consists of these college dropouts.[14] In Connecticut, this number is 24.5% while it is 28.5% for the country. When examining 4-year public and private colleges, it falls even further to 16.4% and 11.5% respectively. Both of these percentages are below the national average. The percent of students who complete their degree, either at their original school or at another school is 67.9% for

[14] It is of course possible that these students will return to college later in life and therefore this number can be thought of as an upper bound on the percentage of students who begin college, but fail to finish. This is discussed later in Table 19 which shows this.

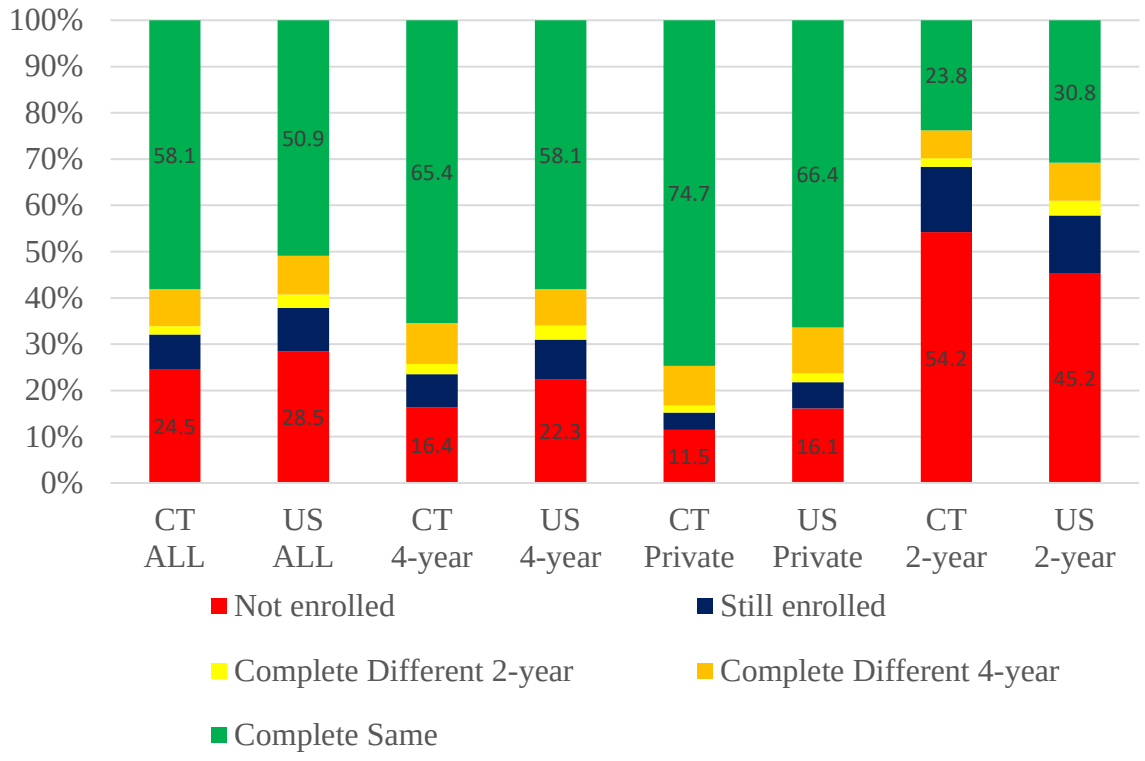
Connecticut students overall, 76.5% for public 4-year colleges, 84.8% for private colleges, and 31.7% for 2-year colleges. The completion percentage for 2-year colleges in Connecticut is significantly lower than the national rate of 42.2%; but the Connecticut results surpass the national results for the other groupings.[15]

Table 9. College Enrollment Rates for Recent High School Graduates

	Connecticut	US
2013	73.3	65.9
2014	72.6	68.4
2015	72.3	69.2
2016	72.2	69.7
2017	71.4	66.7
2018	71.3	66.7
2019	71.8	66.0
2020	67.4	63.0
2021	NA	61.8

Source: Bureau of Labor Statistics and Connecticut State Department of Education

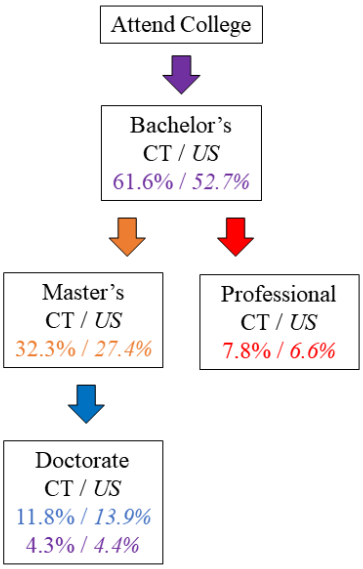
Figure 18. Six Year Education Outcomes for College Enrollees (2015 High School Graduating Cohort)



Source: National Student Clearinghouse, 2022

[15] National rates are 62.2%, 69%, 78.2% for the overall rate, 4-year public, and private college respectively.

Figure 19. Lifetime Completion Rates in Connecticut and the US



Source: Census Bureau, American Community Survey and author's calculations

Over time though, these completion rates are higher than the six-year outcome as demonstrated in Figure 19. This figure shows the completion rate for each educational outcome with the Connecticut rate being in regular print and the *US rate in italics*. For example, of those who attend college, 52.7% of US citizens will earn a Bachelor's degree. Since a Bachelor's degree is a prerequisite for either a Master's or a Professional degree, the rates shown for those degrees can be thought of as the percentage of those with a Bachelor's who go on to get that next degree. In the last row, Doctorate degree, there are two rows of percentages. The first row, colored in Blue, is the percentage of those have a Master's degree who go on to get a Doctorate.[16] The second row, colored in purple, is the percentage of those who earned a Bachelor's degree who will go on to eventually earn a Doctorate. In short, it's the probability of earning a Doctorate once one gets past the Bachelor's which is the first stage of higher education. Of all of those who attend college, 61.6% of them will graduate with a Bachelors in Connecticut while 52.7% will in the US which is almost a ten-point difference. Almost one-third of Connecticut citizens who got a Bachelor's degree will go on to get a Masters while this is only slightly more than one-fourth for the US. Similarly, almost 8% of Connecticuters who get a Bachelor's degree will get a professional degree which is higher than the 6.6% for the US. Finally, about 12% of persons in Connecticut who get a Master's degree will go on to get a doctorate. This is slightly lower than the 14% in the US. However, when looking at the probability of getting a doctorate from those who have a Bachelor's degree, the percentages are

[16] It is of course possible to earn a Doctorate without first earning a Master's—there are numerous doctorate programs out there that do this. Nevertheless, the normal flow is Bachelor's, Master's, then Doctorate. Furthermore, it is possible to have a professional degree and a Master's or Doctorate as well, but this model assumes that students pick one path over the other.

nearly identical at 4.3% for Connecticut and 4.4% for the US. As one can see, in general, Connecticut citizens' completion rates for education exceed the US average.

One final point on completion rates. It is possible that the process of taking out a loan or receiving a scholarship impacts college completion rates. Unfortunately, there are no comprehensive studies that can answer this question one way or the other. There is however a result from a NCES survey on the 6-year completion rates of the 2011 entering college freshman cohort. This limited survey found that 38.5% of students who borrowed to attend college did not complete college within 6-years; however, 50.9% of students who *did not* borrow money to attend college also failed to complete college within 6-years. In other words, fewer students failed to complete college if they borrowed money. Therefore, there is at least some evidence that borrowing money to complete college will not negatively impact competition rates and it is possible that it will actually increase completion rates.

Table 10. General Characteristics of Connecticut Colleges

Type of College	2020 Tuition	2021 tuition	Percent of Students with a Grant	Percent of Students with a Loan
2-year	4,527	4,531	87.0%	1.4%
Public 4-year	14,302	14,635	82.1%	48.9%
Private, Not profit	46,463	47,681	88.8%	59.3%
For Profit	17,516	17,594	92.7%	71.7%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2022

Finally, Table 10 outlines some general characteristics of Connecticut colleges by examining tuition for 2020 and 2021 as well as the percentage of the student body that receives grant assistance or student loan assistance.[17] These figures are weighted averages based upon the size of the student body.[18] There has been almost no change in tuition and fees for Connecticut's 2-year and 4-year public schools between 2020 and 2021. However, private not-for-profit colleges have increased their costs by 2.6%. There is a slight, but incredibly large, difference in who receives grant assistance at the different categories of colleges. This grant assistance can take the form of Pell and other federal grants, state and local government grants, and institutional grants and scholarships. At public 4-year colleges about four-out-of-five

[17] Costs of room and board are not considered because they are irrelevant to the costs to attend college. Whether students live on campus or off-campus doesn't change the fact that they still have to purchase food and have a place to live. Whether these payments are made to the college or to an off-campus landlord doesn't alter the existence of the cost. Even if students live at home, this cost does not disappear—it is simply borne implicitly by the student's parents or guardians.

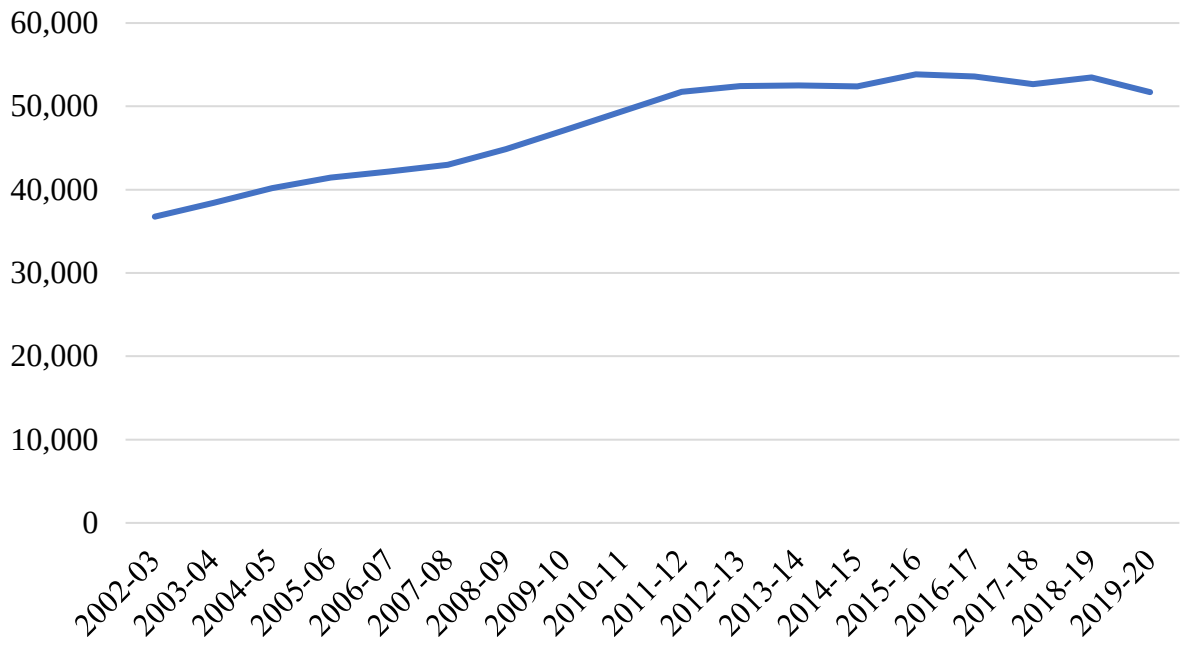
[18] Calculating these results via a weighted average is more appropriate than a simple average. To see why, consider there are only two public universities in the state: Large University which has 20,000 students and Small University which has 1,000. Ninety percent of the students at Large U receive grants while only 20% do at Small U. If one took a simple average, they would conclude that 55% of the students in the state receive grants when in fact the actual number is 18,200 or 86.6%.

students receive this grant assistance while the other schools are closer to nine-out-of-ten students.

There is a substantial difference between the schools in terms of student loans. Almost no one at a 2-year public college borrows to go to school while three-fourths of private for-profit students do. The public 4-year and private non-profit colleges are a little closer together with approximately 50% and 60% respectively taking out student loans.

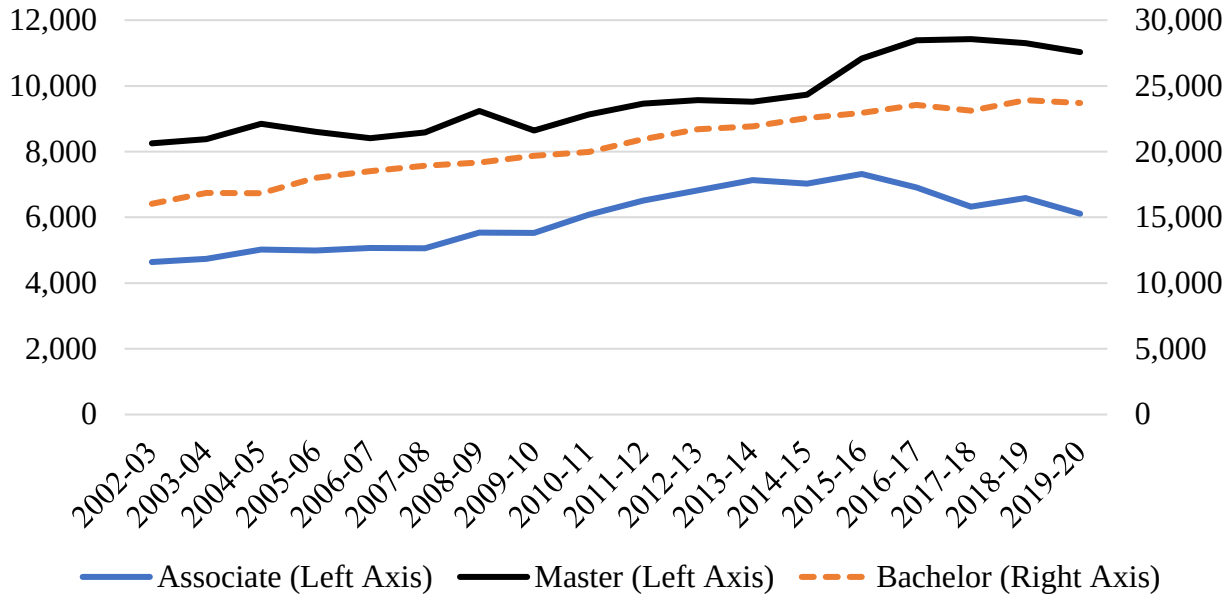
The number of degrees awarded within Connecticut has been growing over the past few years. In the 2002-2003 Academic Year, there were 36,761 degrees awarded. By the 2019-2020 Academic Year, this has increased by over 40% to a total of 51,701. Not only has the overall total increased, but there has been an increase across all of the different award categories. These categories include degrees or certificates of less than 1 year, degrees or certificates of one to two years, Associate's degrees, degrees or certificates of more than two but less than four years, Bachelor's degree and postbaccalaureate certificates, Master's degree and post-Master's certificates, Doctorate, and Professional Degrees. Figures 20 thru 23 show the total degrees and the breakdown by degree type. Even though the number of Associate's degrees has decreased slightly in the past few years and the number of Master's degrees has leveled off, overall, there is still a clear and steady rise in the number of degrees awarded among these degrees. Perhaps the largest growth though has been with postbaccalaureate certificates. These have increased seven-fold since the 2002-2003 Academic Year. It should be noted that although the number of degrees awarded that are more than two academic years but less than four is also growing, it is an extremely small percentage of the total. In the 2002-2003 Academic Year, they were 0.2% of all degrees awarded and slightly less than 1% for the most recent year. Due to their relatively small impact, they are not graphed.

Figure 20. Total Degrees and Certificates Awarded in Connecticut



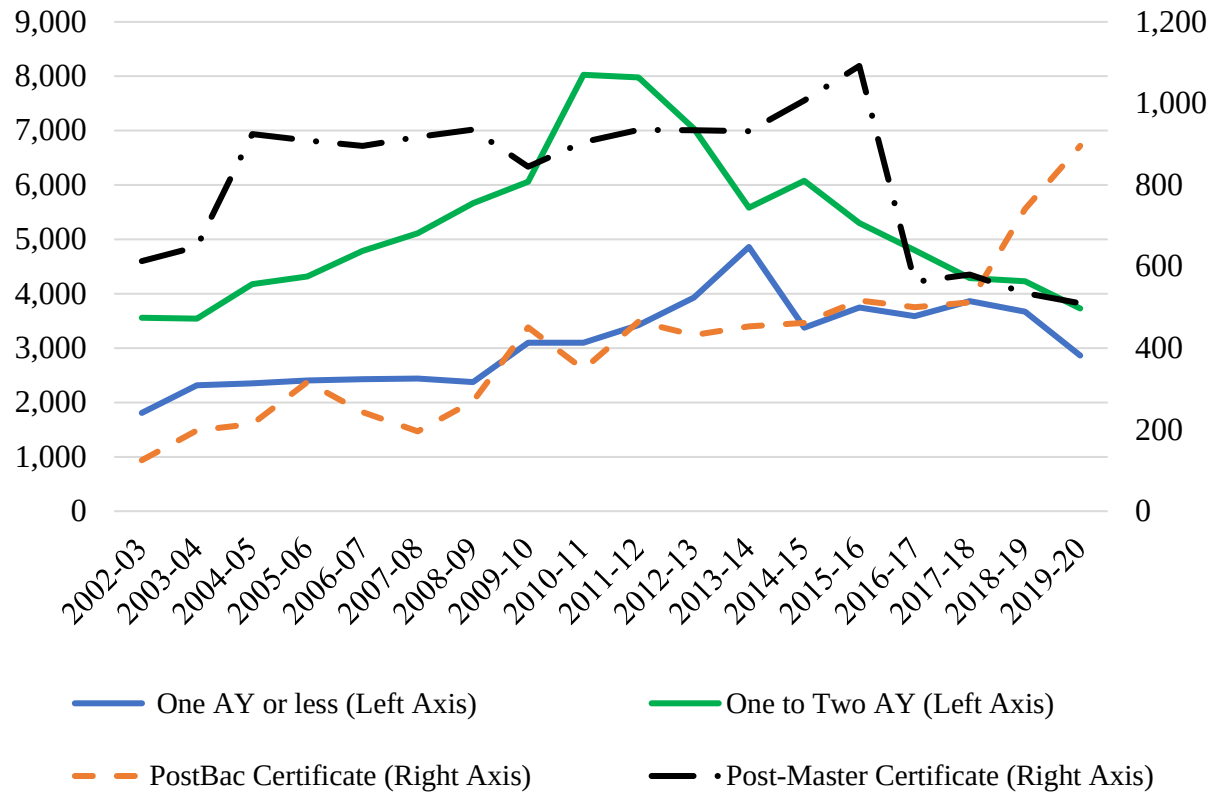
Source: Integrated Postsecondary Education Data System (IPEDS), 2021

Figure 21. Breakout of College Degrees Awarded in Connecticut



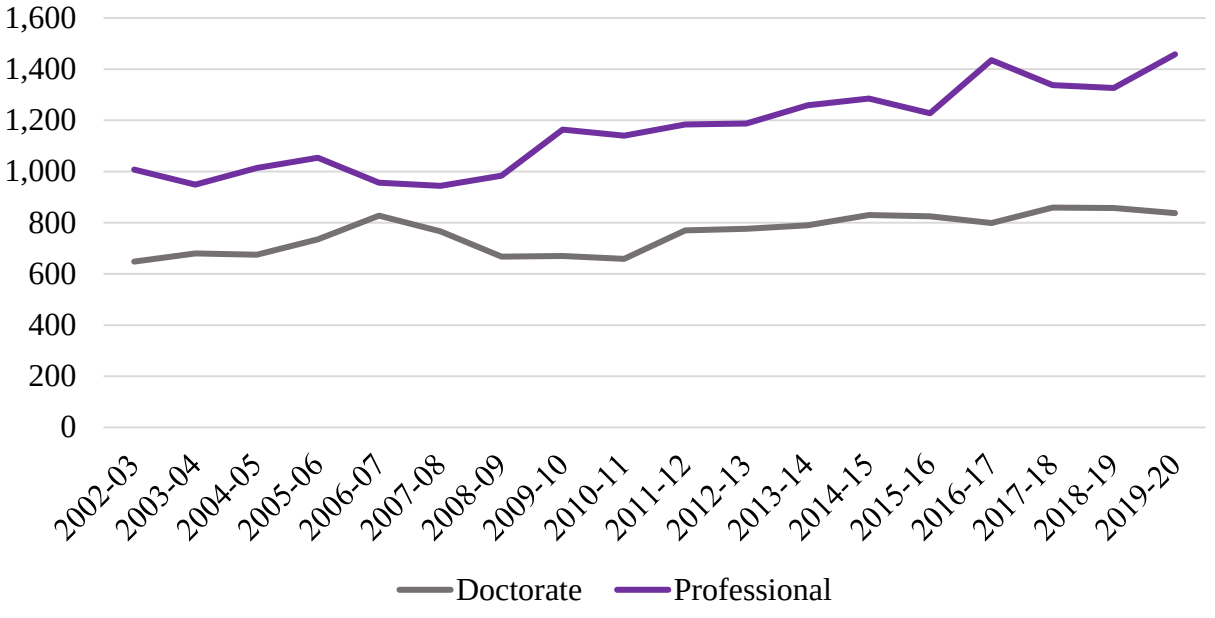
Source: Integrated Postsecondary Education Data System (IPEDS), 2021

Figure 22. Breakout of Certificates and Less than 2 Academic Year (AY) Degrees Awarded



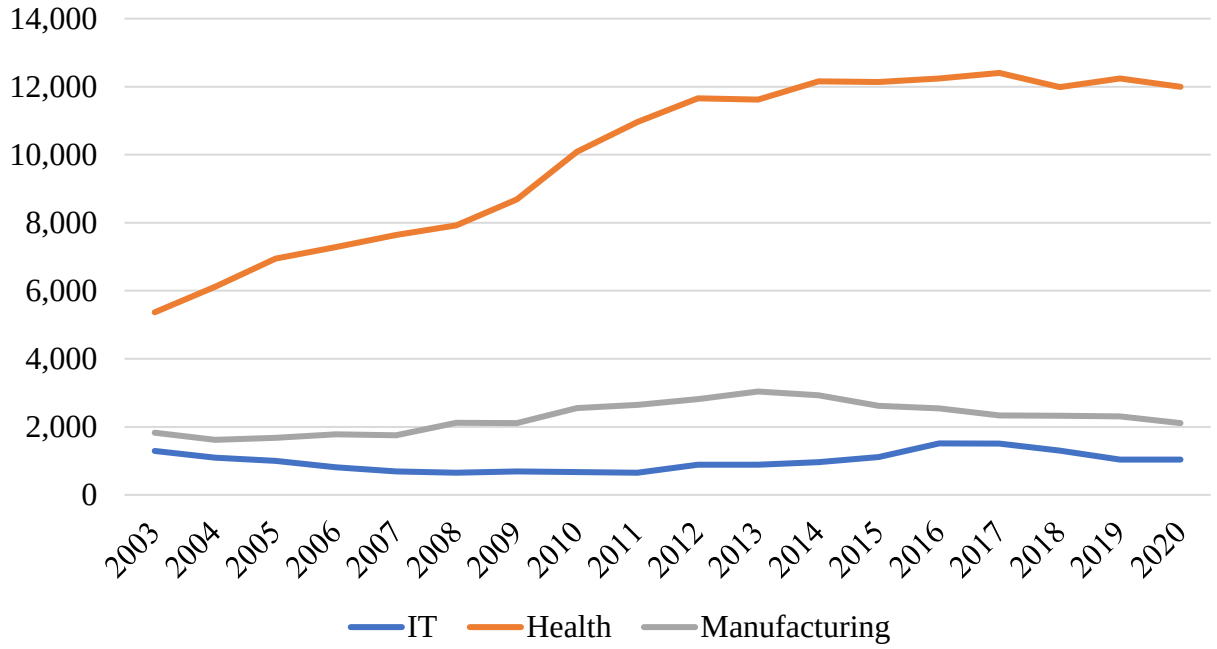
Source: Integrated Postsecondary Education Data System (IPEDS), 2021

Figure 23. Breakout of Terminal College Degrees Awarded in Connecticut



Source: Integrated Postsecondary Education Data System (IPEDS), 2021

Figure 24. Number of Degrees and Certificates Awarded in Connecticut for In-Demand Fields of Study



Source: Integrated Postsecondary Education Data System (IPEDS), 2021

Not only is the number of degrees and certificates important to the economy, but so are the fields of study. Three fields of study have been identified as having an important impact on the current and future state of the economy and the number of degrees or certificates awarded within them is in Figure 24. These fields are IT, Healthcare, and Manufacturing and their importance to economic development should be self-evident. For instance, both the country, and the world for that matter, is now facing the issue of a population that is growing older and will require more healthcare in the future. Changes in technology are revolutionizing the way people shop, live, work, play, and interact with each other. Meanwhile, manufacturing has been experiencing a trend of 'upskilling' as changes in how products are made is requiring that employees have higher levels of education. In 1970, 79% of manufacturing employees had only a high school diploma or less. Currently, 56% of manufacturing employees have at least some college or a Bachelor's degree. These industries have even been combined to create new products that were unimaginable just a few years ago. An example is using IT and manufacturing technologies for 3D printing of medical devices that are now on the cutting edge of science and technology but will hopefully become commonplace in the future.

V. Connecticut School Loan and Scholarship Data

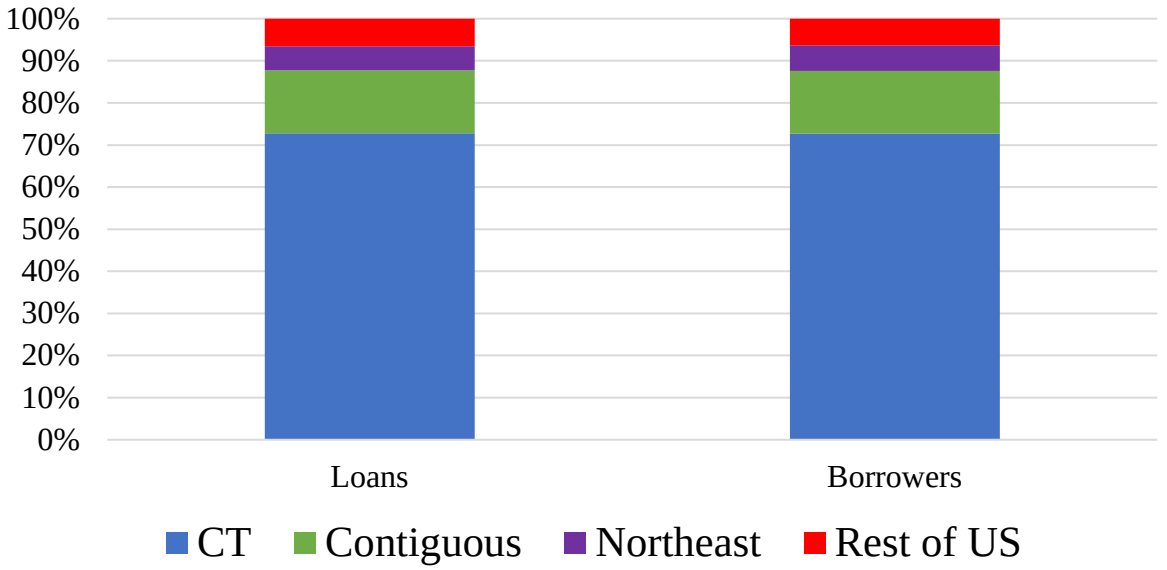
Data on school loans and scholarships was obtained from CHESLA. There are some caveats with the data. CHESLA's scholarship program began in 2015/2016. Initially, the program was administered through Connecticut colleges and universities with CHESLA providing the funds and the schools identifying scholarship recipients. In 2019/2020, CHESLA added a new format with applicants also applying directly to CHESLA. From the 2020/2021 year until present, scholarships are only awarded by applicants applying directly to CHESLA. Scholarship data in this report covers the period from the program's inception in 2015/2016 to the present. Loan data was from 2013 to year-to-date 2022. There was an average of 2.14 loans per person.

Regarding loan program data, CHESLA converted its loan program to a new loan servicer in November 2019. The loans that converted were active loans, loans paid-in-full in the past few years prior to conversion, and loans defaulted in the past few years prior to conversion. Data for this report is derived from loans converted to the new servicer in November 2019 and loans made since then.

For this report, loan data was divided by region and year. CHESLA makes loans to persons living in Connecticut who wish to attend schools either in Connecticut or outside of Connecticut. It will also make loans to persons outside the state who are going to college in

Connecticut. There are no restrictions on the area of study a borrower must undertake for a CHESLA loan. Finally, note that it is possible for people to move once they are done with college or still in college. Therefore, four different regions were created: the state of Connecticut; the contiguous states to Connecticut (New York, Rhode Island, and Massachusetts); the Northeast and Northeast Corridor (Maine, New Jersey, Pennsylvania, New Hampshire, Vermont, Maryland, Delaware, and Washington, DC); and the rest of the United States.[19] Loans and borrowers were divided up geographically by where the person is currently living regardless of where they went to college. For each geographic area, the percentage distribution between the number of loans and the number of borrowers was almost identical. This is illustrated in Figure 25. Tables 11, 12, and 13 break this down further by year while Figure 26 shows the total dollar amount of loans made in each year. Data on loans from 2020, 2021, and 2022 also listed where the person was attending school and is broken out in Tables 12 and 14.[20]

Figure 25. Geographical Distribution of Loans and Borrowers

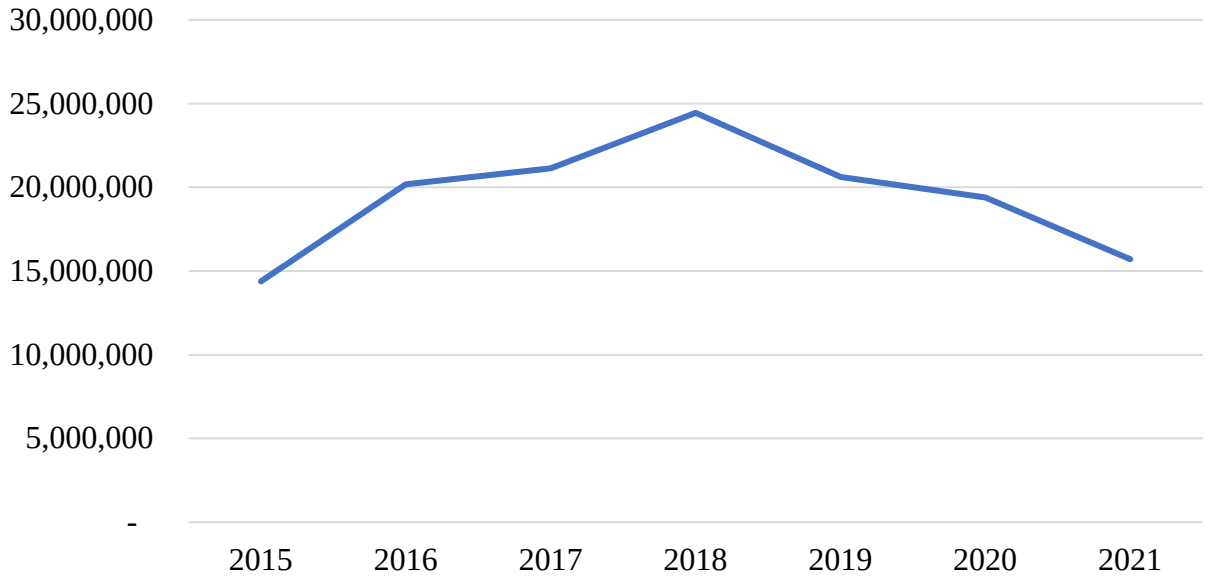


Source: Author's calculations of CHESLA data

[19] Due to a high degree of economic integration between them, the cities from Washington, DC to Boston along the east coast are considered the Northeast megalopolis. Since these cities are also served by an Amtrak link called the Northeast Corridor, this region of cities also has the appellation 'Northeast Corridor'. These cities are Washington, DC, Baltimore, Philadelphia, New York, and Boston. Although the states of Maine, New Hampshire, Vermont, and Delaware don't have any cities in the Northeast Corridor, they are considered the Northeast by most people. The terms Northeast and Northeast Corridor are used interchangeably in this report and are referring to the same set of states.

[20] CHESLA data began in 2013, but only a few data points listed the school a person was attending. As time progressed forward, a larger percentage of the data listed the school the person was attending. For example, in 2013, only 1% of the school loans listed which school the person had attended; by 2018, this was 25% and it was 43% for 2019. Starting in 2020 the data was 98.3% complete, in 2021 it was 99% complete, and in 2022 it was 100% complete. Since there was such a large differential in the data, only 2020,2021, and 2022 were analyzed in this way.

Figure 26. School Loan Amounts by Year



Source: CHESLA Data

Table 11. School Loan Amounts by First Disbursement by Year and Current Geography of Borrower

Year	CT	Contiguous	Northeast	Rest of US	Total
2015	$10,153,401	$2,458,168	$816,578	$954,861	$14,383,008
2016	$15,427,487	$2,844,396	$1,027,630	$878,558	$20,178,071
2017	$15,847,896	$3,153,838	$1,302,971	$838,296	$21,143,001
2018	$19,562,624	$2,774,511	$1,084,010	$1,024,574	$24,445,719
2019	$16,714,564	$2,205,741	$985,436	$709,391	$20,615,131
2020	$16,233,599	$1,898,252	$745,302	$514,769	$19,391,922
2021	$13,415,260	$1,514,590	$540,898	$234,291	$15,705,038
2022 (YTD)	$2,115,202	$121,656	$21,635	$24,336	$2,282,829
SUM	**$109,470,032**	**$16,971,152**	**$6,524,459**	**$5,179,076**	**$138,144,719**

Source: Author's Calculations of CHESLA data

Table 12. School Loan Amounts by Year of Disbursement and Geographic Location of the School the Student is Attending

	2020	2021	2022 (YTD)	**Total**
CT	$8,548,679	$6,695,294	$984,580	**$16,228,553**

Contiguous	$6,233,779	$5,147,514	$820,486	**$12,201,779**
Northeast	$2,602,873	$2,316,551	$265,601	**$5,185,025**
Rest of US	$1,816,512	$1,479,459	$212,162	**$3,508,133**
Unknown	$190,078	$66,219	$0	**$256,297**
Total	**$19,391,921**	**$15,705,037**	**$2,282,829**	**$37,379,787**

Source: Author's Calculations of CHESLA data

Table 13. School Borrowers by First Disbursement by Year and Current Geography of Borrower

Year	CT	Contiguous	Northeast	Rest of US	Total
2015	630	113	43	58	844
2016	898	132	56	55	1,141
2017	973	150	56	52	1,231
2018	1,118	125	50	53	1,346
2019	1,146	99	42	34	1,321
2020	983	83	37	25	1,128
2021	787	67	29	12	895
2022 (YTD)	179	8	3	2	192
SUM	**6,714**	**777**	**316**	**291**	**8,098**

Source: Author's Calculations of CHESLA data

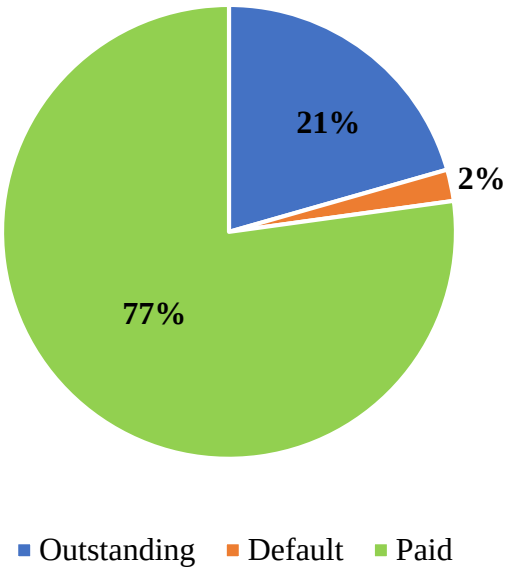
Table 14. School Loan Amounts by Year of Disbursement made in Connecticut by Year and Type of College

Year	2-year	4-year Public	Private
2020	$281,081	$2,354,293	$5,913,305
2021	$153,399	$1,920,109	$4,621,786
2022 (YTD)	$30,064	$361,335	$593,181

Source: Author's Calculations of CHESLA data

The current status of CHESLA loans since the 1990 bond issue is exhibited in Figure 27. Since 1990, CHESLA has originated $545,244,541 across 55,379 student loans. A very small percentage of these loans, less than .006% have been cancelled due to the death of the borrower. Currently $112 million in loans is outstanding. The net default rate for the $545 million in loans since 1990 is around 2%.

Figure 27. Breakdown of CHESLA Loan Status

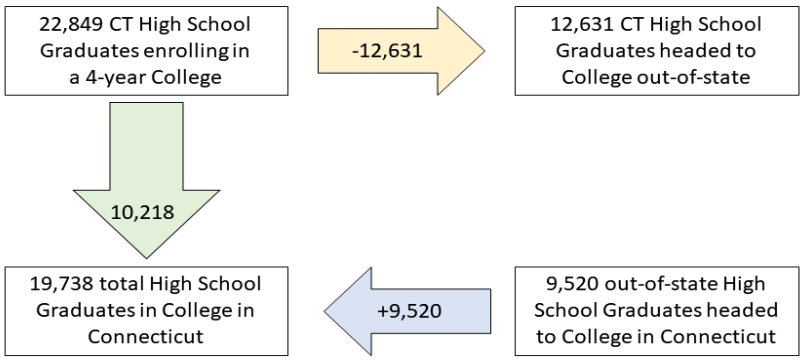


Source: Author's Calculations of CHESLA data

For many years, the state of Connecticut has experienced negative net migration for its first-time college students due to its geographic size and proximity to so many other states. For example, in the fall of 2018 there were 9,807 students from outside of the state who came to Connecticut to go to college but 14,014 Connecticut students who went to another state to go to college for a negative migration of -4,207. In fall of 2020, this pattern was repeated, but at a lower level. There were 12,631 Connecticut students who went out of state but only 9,520 out-of-state students who came to Connecticut for a negative net migration of -3,111. An alternative way to examine this is the in-state retention rate which was roughly equal to 45%—i.e., 45% of Connecticut high school graduates who were going to go to a 4-year college, decided to stay and attend a 4-year college in their home state. This can be problematic because data indicates that nationally this in-state retention rate is closer to 72% on average.[21] However, it should be noted that the in-state retention rates in 2018 and 2020 are an improvement over the 42% rate that was observed in 2012, 2014, and 2016. Figure 28 illustrates this for the year 2020 and CHESLA data in Table 12 confirms this result with 43.4% of recent loans being made to students who are not studying in Connecticut.

Figure 28. Migration of College Students in Connecticut in the Fall of 2020

[21] These migration rates are not a reflection of academic quality per se. Generally speaking, the migration rates are inversely related to a state's geographic size and location relative to other states. Since the Northeast has a large number of geographically small states, it is easier for students from Northeast states to attend school in another Northeast state. The total area of Washington DC and the other eleven states that are the 'Northeast' in this report is 196,000 square miles. For perspective, the state of Montana is 147,000 square miles in size while the state of Texas has 267,000 square miles. The migration rates also differ slightly when one includes first-time college students who graduated more than 12 months ago and students attending institutions other than a 4-year college such as a junior college or trade school.



Source: Author's calculations of Integrated Postsecondary Education Data System (IPEDS) data, 2021

Additionally, it's possible that once a Connecticut resident leaves to go to college in another state that they will remain in that state upon graduation. In fact, approximately 40% of college graduates have moved to a different part of the country within 5 years of graduating from college—or another way of looking at the issue is to realize that within 5 years 60% of Connecticut citizens who attended and graduated from an out-of-state college are likely to stay in that other state.[22] This has the effect of the other state, rather than Connecticut, becoming the beneficiary of the student's economic output

In addition to loans, CHESLA has an extensive scholarship program. Unlike loans, these scholarships do not have to be paid back. This program provides need-based scholarships to Connecticut students who are attending not-for-profit colleges to get a degree or certificate. If a scholarship student is getting a certificate, the area of study must be manufacturing or health care. If they are earning a degree, there are no restrictions on the area of study. CHESLA has data on the field of study chosen by students who are getting a certificate and has some data on chosen fields of study for degree seeking students which was provided by the college or university. This data consisted of the amount of each scholarship, the school the student attended, and their intended course of study and ranged from Academic Year 2015-2016 through Academic Year 2019-2020.[23] It also included scholarship information from Fiscal Years 2020 through 2022. From the beginning of the 2015/2016 Academic year to the spring semester of 2022, almost $10,400,000 has been giving out in scholarships to over 5,500 students. These scholarships are broken out by the type of school and in total dollars and scholarships in Table 14. For example, in 2015, there were 501 scholarships totaling $556,000 given to students who attended 2-year colleges while there were 400 scholarships totaling $863,000 given to students who attended private Connecticut colleges.

Furthermore, CHESLA scholarships also help to educate and train students to work in the in-demand fields of IT, health care, and manufacturing. Table 15 exhibits CHESLA provided

[22] Whether a student will migrate out permanently depends upon many factors including environmental amenities, wage differentials between states, demographic characteristics, and the like. For more information see, Kodrzycki, Yolanda, "Migration of Recent College Graduates: Evidence from the National Longitudinal Survey of Youth" *New England Economic Review*, Jan/Feb, 2001, pgs. 13-34.

[23] Some of the scholarship data was incomplete or missing different component breakouts for different years. Some minor scaling adjustments have been made.

scholarship data by total dollar amount and number of scholarships based upon these critical fields of IT, manufacturing, and health care. Using 2015 as an example year again, there were 35 scholarships for IT related fields to Connecticut college and these 35 scholarships totaled $51,000. In the same year, there was 149 health related field scholarships which totaled slightly more than $245,000. As one can see by the data, health care fields of study in 2015 received the most funding and the largest number of scholarships. This was true in every year. Of the total $2.4 million in scholarships for these three in-demand fields from 2015 to 2021, 73% went to health care related fields while 12% was for manufacturing related areas of study, and the remaining 15% was for IT. These in-demand field scholarship percentages are roughly equal to each other in each of these years.

Table 14. Number and Amount of CHESLA Degree and Certificate Scholarships by Year and School Type

Year	Dollars				Scholarships			
	2-year College	4-year College	Private College	Sum	2-year College	4-year College	Private College	Sum
2015	556,000	467,500	863,000	1,886,500	501	234	400	1,135
2016	601,000	500,000	900,000	2,001,000	479	258	386	1,123
2017	595,000	500,000	897,900	1,992,900	493	261	402	1,156
2018	550,000	500,000	936,573	1,986,573	404	202	412	1,018
2019	353,000	421,600	722,993	1,497,593	237	182	363	782
2020	27,800	208,500	250,200	486,500	10	75	90	175
2021	65,600	218,000	265,400	549,000	25	83	101	209

Source: Author's calculations using CHESLA data

Table 15. Number and Amount of CHESLA Degree and Certificate Scholarships by In-Demand Field

Year	Dollars				Scholarships			
	IT	Health	Man	sum	IT	Health	Man	sum
2015	51,000	245,037	28,500	324,537	35	149	22	206
2016	62,877	363,324	55,618	481,819	37	220	30	294
2017	59,230	331,170	55,300	445,700	42	206	37	285
2018	68,276	387,124	64,500	519,900	33	232	30	295
2019	67,841	273,806	57,100	398,747	36	144	25	205
2020	15,900	82,900	13,700	112,500	9	49	7	65
2021	17,900	93,700	22,500	134,100	11	55	18	84

Source: Author's calculations using CHESLA data

VI. Economic Impact Results

Section III of this report outlined the methodology of economic impact analysis while sections IV and V discussed the underlying independent variables of interest needed to conduct the study. The data previously discussed in this report was used to create the economic impact analysis results. These data included how much money has been lent or given out in any given year by CHESLA as student loans and scholarships, what is the probability that a student will actually graduate, how likely is it that students will work in the state of Connecticut, what are the expected wages in any given year based upon a person's education level, how much do CHESLA loans and scholarships help to retain students within Connecticut, etc. The short run and long run economic impact is then extrapolated and derived using this data.

There are limitations to the extrapolated results that the reader should keep in mind. For example, a person's individual income might vary greatly based upon their particular work ethic or based upon what field of study they actually choose to undertake. Furthermore, there are lots of examples of persons with a high school education earning more than a college graduate.

Nevertheless, the data presented here tells us how the average person behaves, studies, works, earns, and lives. This limitation of the results should be kept in mind.

To refresh the reader, the short run economic impact derives mostly from student spending via loans and scholarships on acquiring an education. These dollars are paid by the student to the college. The college then uses these dollars to hire faculty and staff, purchase supplies, build and maintain the physical structures of the campus, etc. Their economic impact is short lived only in the sense that once these dollars are spent, the economic impact ceases. For the purposes of this report, scholarship and loan dollars actually used within the state of Connecticut were calculated as well as the impact student non-education spending had on the state economy. This total spending was then entered into the Input-Output model to determine and compile the indirect and induced effects. Table 16 shows the short run economic impact for the years 2015 thru 2021 using the Input-Output methodology developed in section III with the Connecticut specific economic data presented in section IV. For simplicity, all reported numbers are in 2021 inflation adjusted dollars.

Table 16. Short Run Economic Impact from CHESLA Loan and Scholarship Program between 2015 and 2021

	Direct	Indirect	Induced	Total
Output	$72,691,672	$22,515,651	$33,410,321	$128,557,104
Labor Income	$45,791,876	$9,616,294	$16,942,994	$72,351,164
Value Added	$45,924,062	$11,481,016	$16,991,903	$74,396,981
Employment	371	82	145	597

Source: Author's calculations

Over the course of 2015 through 2021, there has been direct spending by college and universities from the loans and scholarships that Connecticut students have received from CHESLA. In addition, consumer spending by these loans and scholarship students for things such as gas, restaurant meals, clothes, entertainment, etc. also helps to spur the state economy. When these dollars are spent by the colleges and the students, they multiply throughout the state economy via the indirect and induced effect to create the total effect as discussed in section III. Output within the state of Connecticut has increased by over $128.6 million while almost $72 million in new wages and $74 million in Gross State Product have been created. Finally, an additional 597 jobs can be attributed to this program. These economic effects have the added benefit of increasing state and local taxes by $8,157,500.

The long run effect is the improved productivity of the students who received the post-secondary education versus the base case model of no post-secondary education. This enhanced productivity effect can last for many decades. As noted in earlier sections, it is best to think of this long run economic impact from an education as the difference in wages earned over the course of one's lifetime relative to the base case of graduating from high school. Of course, one must also account for the lost wages while one is in college and not working, the cost of actually attending college, as well as any interest that is paid back from borrowing to attend college. This long-term analysis was done using the average yearly wages for each of the different education

cohorts from section II for students who received either a scholarship or a student loan from CHESLA. A weighted average of college costs was determined as well as the drop-out and graduation rates based upon what type of school, e.g., private, public, etc., the student was attending. Finally, the probability of attaining a graduate or professional degree was calculated along with the subsequent higher earnings and the average cost of graduate school. These net higher earnings for all of these students are then converted to their net present value as is required when costs and benefits from a policy or program occur at different times.[24]

Data on migration patterns for Connecticut residents overall shows that even though Connecticut has a net negative migration, this negative net migration has been shrinking recently. In 2015 almost 77,000 people moved to Connecticut while 103,000 left for a net migration amount of -26,346. However, by 2019 this had changed to 90,000 people moving in to the state while 105,000 left for a net migration of only -15,199. Even this however is a very small portion of the state's population—around 0.4%. Furthermore, evidence indicates that the people most likely to leave the state are persons in the 18-21 age bracket and persons without a college degree. In general, Connecticut has a positive migration rate for higher income persons, persons with a college degree, and people aged 30 to 64.

There was a total of 13,696 students who received a loan or scholarship in the years 2015 thru 2021 from CHESLA. Applying the data already discussed in previous sections to this cohort we can estimate that 951 of them completed a 2- year degree, 9,441 completed a 4-year degree, and 3,304 did not finish.[25] Of these 13,696 students, it is estimated that 8,212 will reside in Connecticut after accounting for post-graduation and lifetime migration patterns. Some of these 8,212 students who are in Connecticut residents and who completed their 4-year degree will go on to earn a graduate or professional degree. Statistically speaking, of the 8,212 4-year degree completers, there will be 1,642 persons with a Master's degree, 397 Professional Degree graduates, and 218 Doctorate graduates.

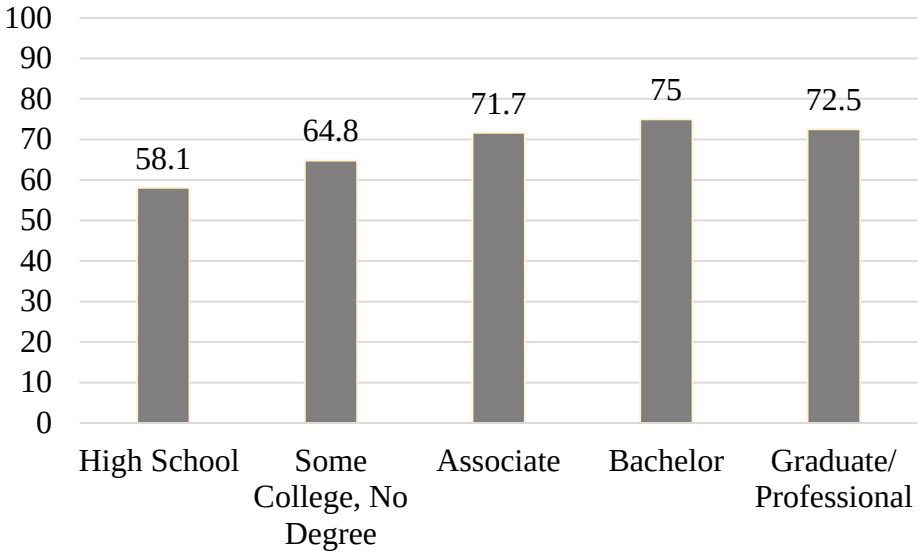
Finally, it should be noted that simply because someone has an education does not mean that they will actually work and earn income. Persons may not work for any number of reasons including the inability to find employment, raising children, caring for parents or siblings, becoming disabled, etc. It is possible for someone to go to college and/or graduate school and then not 'work enough' over the course of their life for their 'investment' in their own education to pay off. However, generally speaking, this is the exception rather than the rule. Still, it is necessary to adjust the incomes of our cohort based upon their expected employment. As is

[24] A dollar today is worth more than a dollar ten years in the future due to the fact that the dollar today can be invested and grow over time. Consider that currently interest rates are 3%. A hundred dollars invested today will grow to $134.39 in ten years. Consequently, $74.41 invested today at 3% will grow to $100 in ten years. Therefore, the net present value of $100 ten years in the future at a discount rate of 3% is $74.41. In short, net present value conversions allows one to understand the true costs and benefits of a program when these costs and benefits occur at different times. The astute reader will notice that the net present value will be different based upon the length of time and the discount (interest) rate. For this analysis the discount rate used is the historical average interest rate of the 10-year US Treasury bond.

[25] The reader will recall that completion rates differ based upon the type of school, 2-year, 4-year, or private, that students attend.

noted in Figure 29, the historical average employment-population ratio for educated workers is much higher than it is for high school only graduates. The employment-population ratio for high school graduates is 58.1% meaning that for every 100 high school graduates in the country only 58.1 are working at any given time while persons with a Bachelor's degree have a ratio of 75%—three-out-of-every-four persons with a Bachelors are currently employed. Therefore, not only do educated persons tend to have higher incomes when they do work, but they also tend to work more. These two factors together tend to greatly increase a college educated person's lifetime income.

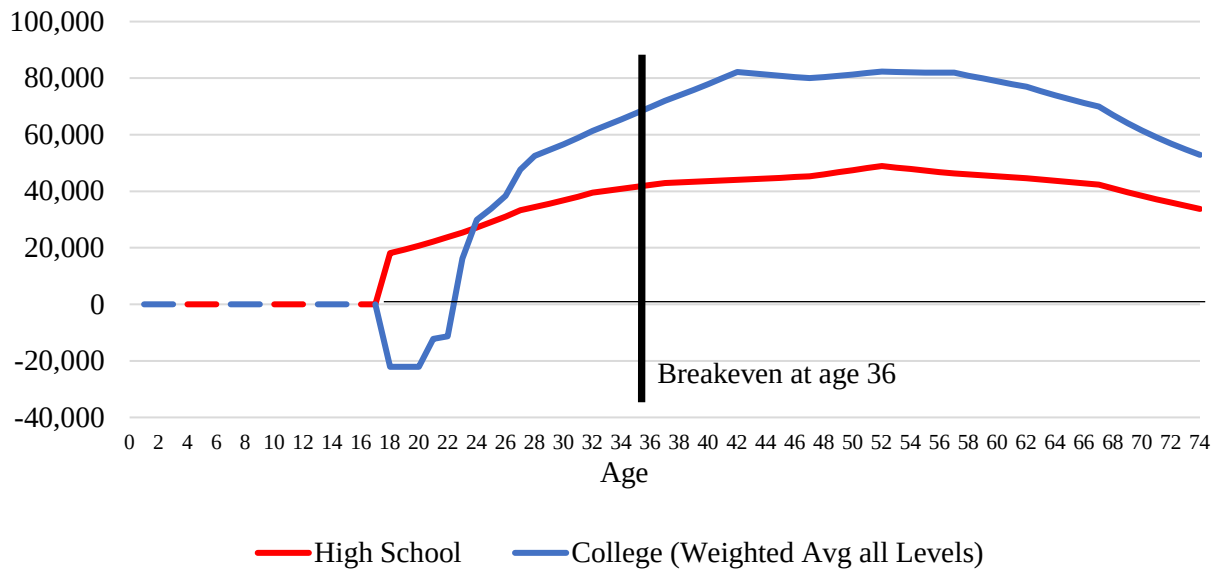
Figure 29. Employment-Population Ratios by Education Level



Source: Bureau of Labor Statistics, 2022

Figure 30 uses the actual Connecticut employment and wage data discussed in this report to make a comparison between the high school only person's expected yearly income to the college educated person's expected yearly income for our cohort of 13,696 students who graduated from high school between 2015 and 2021. The reader should note that the college educated person's income line is a weighted average of the different wages one can expect to earn with the different education levels that this cohort is expected to achieve over their lifetimes (i.e., some college, Associates, Bachelors, Masters, Professional, and Doctorate). All of the income is in inflation-adjusted dollars and the costs of college as well as interest payments on school loans is included. As one can see, there is a substantial difference in yearly and lifetime income between these two persons and it mirrors closely the theoretical differences between these two persons outlined in Figure 17. Our college educated person will have to pay for college, pay interest on school loans, and will miss out on income that could have been earned while they are in school, but the gains to their income from a college education are so large, that cumulative costs and benefits will breakeven with the high school graduate at age 36.

Figure 30. Annual Income for High School and College Educated Persons



Source: Author's calculations using Connecticut specific income and education data

To determine the total economic impact from this 2015-2021 cohort, one need only determine the net annual difference in educational costs and incomes between those who received a CHESLA loan or scholarship and those who did not attend college. This net total economic impact is reflected in Table 17 and is broken out by totals and per person based upon the different education levels. Once again, recall that adjustments have been made to account for the different employment-population ratios for the different cohorts and that the non-high school population size is students who have remained in Connecticut. To make comparisons meaningful, these 8,212 students who live in Connecticut and completed or at least went to college is compared to 8,212 persons who live in Connecticut but only completed high school. The first row details the cohort size for each educational attainment category. The second and third rows are the total income earned by this cohort size in thousands of dollars.

To understand how these numbers are generated, consider persons who earn a doctorate. Of the 13,696 students who initially received a CHESLA loan or scholarship, we can expect that 218 of them will earn a Doctorate and live within the state of Connecticut. On average each of these students who earned a doctorate will earn a net income (income after the cost of college, foregone earnings while in college, and interest paid on student loans) of $3.63 million which exceeds the $1.1 million someone with a high school diploma is expected to earn. In the aggregate, these 218 students will earn a net income of $790,819,000 from age 18 to age 65. The net present value of this $791 million is $329 million.

On the other side of the table, there are 2,373 students who received a scholarship or loan but did not complete college. These students will go on to earn a total net income of $3,191,299,000 over the course of their working life. The net present value of this $3.2 billion is $1.493 billion. The total for this cohort is larger than the Doctorate cohort not because they earn

more on a per-person basis, but because there are over 14 non-college completers for every 1 Doctorate.

The difference in aggregate income between the 8,212 students who received a CHESLA scholarship or loan and stayed in Connecticut and the 8,212 persons who just completed high school is the net gain to the state of Connecticut. Over the working life of these students, their total net income will exceed that of high school only cohort by over $8.562 billion. In net present value terms, this is $3.288 billion and represents the actual long run economic impact.

Taxes paid by these different cohorts was also calculated. It was assumed that these students will file jointly and that the current tax rates for both income and Social Security remain the same as well as the deduction levels in the federal system. This assumption was also used at the state level. It was also assumed that tax rates and deductions with the Connecticut state income tax remain the same as well as the state's sales tax rate, alcohol tax rate, etc. As before, these values are calculated as both a total and as the net present value for each of the education cohorts and in terms of the net gain from college education cohorts relative to the high school only cohort. For example, over the working careers from age 18 to 65, the high school only cohort can be expected to pay $1.072 billion in federal taxes while the much smaller sized cohort of Bachelors degrees will pay $1.061 billion. When the total net gain in federal taxes from all of the students who attended or graduated from college is determined, the reader will see that it is $1.798 billion which has a net present value of $786.602 million. Similarly, the state of Connecticut can expect to collect $45.653 million in taxes from persons with an Associates while they will get $68.028 million from those with a Doctorate degree. The total net gain to the state is $861.299 million with a net present value of $381.092 million.[26]

These total values can be examined on a per person basis as well which is done in the bottom half of Table 17. Here we see that a high school graduate only can expect to earn $1.112 million from age 18 to age 65 while the student with a professional degree will earn just under $4 million net of costs in the same time frame. The net present value of this income stream is $555,242 for the high school graduate and $1.666 million for the professional graduate. Over time, those who completed college, or at least went to college, will pay significantly more in taxes than the high school only graduates. Our high school graduate can expect to pay $130,576 in federal taxes and just over $29,000 in state taxes over the course of their life while the student with the professional degree can expect to pay almost $847,000 and $350,000 in taxes respectively. When one examines the net present value to the government of this future tax revenue, the student with the professional degree will pay a total of $515,673 in state and federal taxes while the high school graduate pays $75,674 in total taxes. Clearly, the economic impact, to both the person themselves and to the state, from education is large.

[26] The astute reader will notice that there seems to be more variation in the totals for the Connecticut tax amounts than for the federal tax amounts. This is due to the presence of the Social Security Tax which is proportional up to a certain income level and then becomes regressive in nature. The Connecticut income tax has no regressivity in it and also tops out at a lower rate than the federal income tax.

Finally, we can determine how many of these graduates will earn their degree in the In-Demand fields of IT, healthcare, and manufacturing. Using the existing ratios for already outlined in this report, the state of Connecticut can expect 125 persons to graduate with a degree related to IT, 1,439 persons with a degree related to health care, and 253 with a degree or certificate related to manufacturing.

Table 17. Long Run Economic Gains from CHESLA Loans and Scholarships (Cohort Total and Per Person with Cohort Totals in Thousands of Dollars)

	High School	Some College	Associates	Bachelors	Masters	Professional	Doctorate	Net Gain
Cohort Size	8,212	2,373	753	2,829	1,642	397	218	
TOTALS (Values for Totals are in Thousands of dollars)								
Income Earned	$9,132,526	$3,191,299	$1,185,360	$6,556,265	$4,386,483	$1,585,225	$790,819	$8,562,926
NPV of Income Earned	$4,559,651	$1,493,638	$563,921	$2,892,203	$1,907,117	$661,658	$328,957	$3,287,845
Federal Taxes Paid	$1,072,290	$410,546	$155,368	$1,061,745	$743,426	$336,207	$163,080	$1,798,084
NPV of Federal Taxes Paid	$514,998	$186,698	$72,017	$489,371	$337,689	$144,865	$70,957	$786,602
CT Taxes Paid	$240,711	$115,804	$45,653	$419,097	$314,776	$138,650	$68,028	$861,299
NPV of CT Taxes Paid	$106,439	$49,144	$19,912	$188,468	$140,448	$59,856	$29,702	$381,092
PER PERSON								
Income	$1,112,095	$1,344,838	$1,574,183	$2,317,520	$2,671,427	$3,993,012	$3,627,611	
NPV of Income	$555,242	$629,431	$748,899	$1,022,341	$1,161,460	$1,666,646	$1,508,978	
Federal Taxes Paid	$130,576	$173,007	$206,333	$375,308	$452,757	$846,870	$748,074	
NPV of Federal Taxes Paid	$62,713	$78,676	$95,640	$172,984	$205,657	$364,901	$325,495	
CT Taxes Paid	$29,312	$48,801	$60,629	$148,143	$191,703	$349,246	$312,057	
NPV of CT Taxes Paid	$12,961	$20,710	$26,444	$66,620	$85,535	$150,772	$136,252	

Source: Author's calculations

VII. Conclusion

The increasing cost of college, as well as people beginning to wonder if college is even 'worth the cost', has started to become an impediment to college in recent years for many people. Although there is anecdotal evidence of people earning a college degree and subsequently earning very little in income, in general the data indicates that for the vast majority of persons college is indeed 'worth the cost'. This just leaves the issue of how to pay for college. CHESLA is able to offer assistance in this regard through loans and scholarships. Students on a scholarship must attend a Connecticut school, but those with a loan can attend any school in the US. Once these students graduate from college, they will typically earn higher wages for the remainder of their life. In this sense, there is both a short run and a long run economic impact occurring thanks to CHESLA loans and scholarships. Evidence in this report indicates that the impact is large and long lasting.

In the short run, today's CHESLA loans to students are used by students to fill-the-gap in paying for today's education. In this sense they are used by colleges and universities to fund current expenditures for faculty, staff, supplies and equipment, and other educational needs by schools. By building an Input-Output model of the Connecticut economy, one can determine the size of this short run effect. The CHESLA program has helped to create 597 jobs, increased wage income in the state by more than $72 million, and increased output by almost $129 million while increasing state Gross Domestic Product by $74 million between 2015 and 2021.

In the long run, this economic impact is even larger. By going to college, students are increasing their human capital and lifetime earnings potential—even if they never actually complete college. These students who finish college will earn $1.2 million more than the average high school graduate. People obtaining advanced degrees will have an even larger earnings differential. These increased earnings mean higher tax revenues for federal, state, and local governments.

In 2015-2021, these CHESLA loans and scholarships were approximately $148 million in size which helped to create a combined short and long run net present value income effect of more than $3.3 billion for Connecticut. This translates into a return of more than $22 for every $1 that was lent or given out via loans and scholarships. There are very few investments where individuals, or society, can make a return of this size.

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