The Alliance
Oregon Alliance of Independent Colleges & Universities
Think Independent

Main Report
APRIL 2023

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# The Economic Value of The Oregon Alliance of Independent Colleges and Universities

Lightcast

# Contents

Cover : Reed College

# Acknowledgments

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We are incredibly grateful to the M.J. Murdock Charitable Trust for their generous support of this economic impact report. Their commitment to advancing education and promoting economic development in our region is truly remarkable, and we are honored to be a recipient of their investment. The report has provided us with valuable insights into the economic contributions of our private, nonprofit member institutions and the ways in which we can continue to foster growth and innovation in our community. We deeply appreciate the Murdock Trust's ongoing support and look forward to working together to create a brighter future for our students and our region. Thank you to the M.J. Murdock Charitable Trust for their unwavering dedication to advancing higher education in Oregon!

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**The Alliance member institutions**

Bushnell University · Corban University · George Fox University · Lewis & Clark · Linfield University · Multnomah University · Pacific University Oregon · Reed College · University of Portland · Warner Pacific University · Western Seminary · Willamette University

# Executive summary

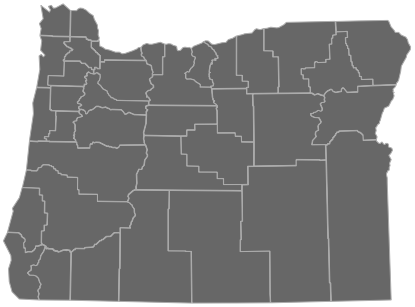
*This report assesses the impact of the Oregon Alliance of Independent Colleges and Universities[1] (The Alliance) member institutions on the state economy and the benefits generated by the member institutions for students, taxpayers, and society. The results of this study show that the member institutions create a positive net impact on the state economy and generate significant returns on investment for students and society and benefits for taxpayers.*

1 See Appendix 1 for a list of the institutions included within The Alliance.


Bushnell University

# Economic impact analysis

During the analysis year, The Alliance member institutions spent $485.8 million on payroll and benefits for 6,766 full-time and part-time employees, and spent another $233.5 million on goods and services to carry out the member institutions' day-to-day operations. This initial round of spending creates more spending across other businesses throughout the state economy, resulting in the commonly referred to multiplier effects. This analysis estimates the net economic impact of The Alliance member institutions that directly accounts for the fact that state and local dollars spent on the institutions could have been spent elsewhere in the state if not directed towards the institutions. This spending would have created impacts regardless. We account for this by estimating the impacts that would have been created from the alternative spending and subtracting the alternative impacts from the spending impacts of The Alliance member institutions.



Oregon

This analysis shows that in fiscal year (FY) 2020-21, operations, visitor, and student spending of the institutions, together with the enhanced productivity of their alumni, generated **$3.5 billion** in added income for the Oregon economy. The additional income of $3.5 billion created by The Alliance member institutions is equal to approximately **1.3%** of the total gross state product (GSP) of Oregon. For perspective, this impact from the institutions is larger than the entire Utilities industry in the state. The impact of $3.5 billion is equivalent to supporting **43,396 jobs**. For further perspective, this means that **one out of every 59 jobs** in Oregon is supported by the activities of The Alliance member institutions and their students. These economic impacts break down as follows:

> The additional income of **$3.5 billion** created by The Alliance member institutions is equal to approximately **1.3%** of the total gross state product of Oregon.

## Operations spending impact

Payroll and benefits to support the institutions' day-to-day operations amounted to $485.8 million. The institutions' non-pay expenditures amounted to $233.5 million. The net impact of operations spending by the institutions in Oregon

during the analysis year was approximately **$491.2 million** in added income, which is equivalent to supporting **7,132 jobs**.

## Visitor spending impact

Tens of thousands of out-of-state visitors attracted to Oregon for activities at The Alliance member institutions brought new dollars to the economy through their spending at hotels, restaurants, gas stations, and other state businesses. The spending from these visitors added approximately **$26 million** in income for the Oregon economy, which is equivalent to supporting **393 jobs**.[2]

## Student spending impact

Approximately 49% of students attending The Alliance member institutions originated from outside the state. Most of these students relocated to Oregon to attend the institutions. In addition, some students, referred to as retained students, are residents of Oregon who would have left the state if not for the existence of The Alliance member institutions. The money that these students spent toward living expenses in Oregon is attributable to the institutions.

The expenditures of relocated and retained students in the state during the analysis year added approximately **$114.1 million** in income for the Oregon economy, which is equivalent to supporting **1,802 jobs**.

## Alumni impact

Over the years, students gained new skills, making them more productive workers, by studying at The Alliance member institutions. Today, tens of thousands of these former students are employed in Oregon. According to Lightcast's Alumni Outcomes data, many of The Alliance member institutions' alumni are employed in the state workforce in industry sectors such as Government, Education; Health Care & Social Assistance; Professional & Technical Services; Manufacturing; Educational Services; Finance & Insurance; and Administrative & Waste Services, with their top occupations being registered nurses; lawyers; chief executives; tutors, teachers, & instructors; personal service managers & entertainment & recreation managers; postsecondary teachers; and general & operations managers.

The accumulated impact of former students currently employed in the Oregon workforce amounted to **$2.9 billion** in added income for the Oregon economy, which is equivalent to supporting **34,070 jobs**.

### Important note

When reviewing the impacts estimated in this study, it is important to note that the study reports impacts in the form of added income rather than sales. Sales includes all the intermediary costs associated with producing goods and services, as well as money that leaks out of the state as it is spent at out-of-state businesses. Income, on the other hand, is a net measure that excludes these intermediary costs and leakages, and is synonymous with gross state product (GSP) and value added. For this reason, it is a more meaningful measure of new economic activity than sales.

2 Note that many institution events were canceled in FY 2020-21 due to COVID-19, substantially decreasing the visitor spending impact. In addition, only seven out of twelve member institutions were able to provide visitor data, which considerably reduces the total measured visitor spending impact.

# Investment analysis


Investment analysis is the practice of comparing the costs and benefits of an investment to determine whether or not it is profitable. This study evaluates the benefits received by taxpayers from The Alliance member institutions, as well as the return on investment to their primary stakeholders—students and Oregon society.

## Student perspective

Students invest their own money and time in their education to pay for tuition, books, and supplies. Many take out student loans to attend the institutions, which they will pay back over time. While some students were employed while attending the institutions, students overall forewent earnings that they would have generated had they been in full employment instead of learning. Summing these direct outlays, opportunity costs, and future student loan costs yields a total of **$894.5 million** in present value student costs.

In return, students will receive a present value of **$3.1 billion** in increased earnings over their working lives. This translates to a return of **$3.50** in higher future earnings for every dollar that students invest in their education at the institutions. The corresponding annual rate of return is **12.5%**.

## Taxpayer perspective

The Alliance and its member colleges and universities are private, nonprofit organizations, yet Oregon taxpayers still receive a significant amount of benefits from its member institutions. Because there is so little state and local taxpayer

funding, we simply look at the benefits received by Oregon taxpayers. Taxpayers will receive an estimated present value of **$773 million** in added tax revenue stemming from the students' higher lifetime earnings and the increased output of businesses. Savings to the public sector add another estimated **$156.4 million** in benefits due to a reduced demand for government-funded social services in Oregon. Over the course of the students' working lives, Oregon taxpayers will receive a total of **$929.4 million** in benefits, the present value sum of the added tax revenues and public sector savings.

Oregon taxpayers will receive a cumulative value of **$929.4 million** in benefits over the course of the students' working lives.

## Social perspective

People in Oregon invested **$1.1 billion** in The Alliance member institutions in FY 2020-21. This includes the institutions' expenditures, student expenses, and student opportunity costs. In return, the state of Oregon will receive an estimated present value of **$7.3 billion** in added state revenue over the course of the students' working lives. Oregon will also benefit from an estimated **$483 million** in present value social savings related to reduced crime, lower welfare and unemployment assistance, and increased health and well-being across the state. For every dollar society invests in The Alliance member institutions, an average of **$6.90** in benefits will accrue to Oregon over the course of the students' careers.


Reed College

# Introduction


Pacific University

The Oregon Alliance of Independent Colleges and Universities (The Alliance) is led by President Brent Wilder, who has been with the organization for 18 years. The Alliance's first member institution was established in 1842, and since then has grown to serve 26,626 credit and 1,142 non-credit students. While The Alliance member institutions affect the state in a variety of ways, many of them difficult to quantify, this study considers the institutions' economic benefits. The institutions naturally help students achieve their individual potential and develop the knowledge, skills, and abilities they need to have fulfilling and prosperous careers. However, The Alliance member institutions impact Oregon beyond influencing the individual lives of students. The institutions' program offerings supply employers with workers to make their businesses more productive. The institutions, their day-to-day operations, and the expenditures of their visitors and students support the state economy through the output and employment generated by state vendors. The benefits created by the institutions extend as far as the state treasury in terms of the increased tax receipts and decreased public sector costs generated by students across the state.

> The Alliance member institutions impact Oregon beyond influencing the lives of students.

This report assesses the impact of The Alliance member institutions on the state economy and the benefits generated by the institutions for students, taxpayers, and society. The approach is twofold. We begin with an economic impact analysis of the institutions on the Oregon economy. To derive results, we rely on a specialized Multi-Regional Social Accounting Matrix (MR-SAM) model to calculate the added income created in the Oregon economy as a result of increased consumer spending and the added knowledge, skills, and abilities of students. Results of the economic impact analysis are broken out according to the following impacts: 1) impact of the institutions' day-to-day operations, 2) impact of visitor spending, 3) impact of student spending, and 4) impact of alumni who are still employed in the Oregon workforce.

The second component of the study measures the benefits generated by The Alliance member institutions for the following stakeholder groups: students, taxpayers, and society. For students, we perform an investment analysis to determine how the money spent by students on their education performs as an investment over time. The students'

investment in this case consists of their out-of-pocket expenses, the cost of interest incurred on student loans, and the opportunity cost of attending the institutions as opposed to working. In return for these investments, students receive a lifetime of higher earnings. For taxpayers, the study measures the benefits to state taxpayers in the form of increased tax revenues and public sector savings stemming from a reduced demand for social services. Finally, for society, the study assesses how the students' higher earnings and improved quality of life create benefits throughout Oregon as a whole.

The study uses a wide array of data that are based on several sources, including the FY 2020-21 academic and financial reports from The Alliance member institutions; alumni records matched to Lightcast's Alumni Outcomes database; industry and employment data from the Bureau of Labor Statistics and Census Bureau; outputs of Lightcast's impact model and MR-SAM model; and a variety of published materials relating education to social behavior.

Chapter 1:

# Profile of The Alliance and the Oregon economy

: Lewis & Clark College


**THE OREGON ALLIANCE** of Independent Colleges and Universities (The Alliance), founded in 1950, is the collective voice of Oregon's regionally accredited, private, nonprofit higher education sector. The Alliance is comprised of 12 member colleges and universities, all located in the Willamette Valley, which was recognized by *TIME Magazine* as one of the world's 50 greatest places of 2023 and known for its first-in-class spectacular vineyards and magnificent surrounding communities.[3]

The Alliance member institutions are bound by a commitment to high-quality education, contributing graduates with advanced talent and a passion for Oregon communities that is vital to the state's economy. The Alliance's activities foster collaboration and find the intersection between the needs and expertise of member institutions, industry, philanthropy, government, and the public good to create real solutions that build an educated and skilled workforce for Oregon.

The Alliance's activities foster collaboration and find the intersection between the needs and expertise of member institutions, industry, philanthropy, government, and the public good.

In total, these institutions enrolled over 27,000 students statewide across all education degree levels—from certificate to bachelor's to graduate and professional degrees. Private, nonprofit colleges and universities are an important and integral part of higher education in the state of Oregon and contribute substantially to Oregon's human capital by awarding a significant percentage of the state's high-demand baccalaureate and advanced degrees.

3 See https://time.com/collection/worlds-greatest-places-2023/.

# The Alliance member institutions' employee and finance data

The study uses two general types of information: 1) data collected from the institutions and 2) state economic data obtained from various public sources and Lightcast's proprietary data modeling tools.[4] This chapter presents the basic underlying information from The Alliance member institutions used in this analysis and provides an overview of the Oregon economy.

## Employee data

Data provided by The Alliance member institutions[5] include information on faculty and staff by place of work and by place of residence. This data appears in Table 1.1. As shown, The Alliance member institutions employed 4,385 full-time and 2,381 part-time faculty and staff in FY 2020-21 (including student workers). Of these, 99% worked in the state and 92% lived in the state. These data are used to isolate the portion of the employees' payroll and household expenses that remains in the state economy.

## Revenues

Figure 1.1 shows The Alliance member institutions' annual revenues by funding source—a total of $1.3 billion in FY 2020-21. As indicated, tuition and fees comprised 40% of total revenue, and revenues from local, state, and federal government sources comprised another 3%. All other revenue (i.e., auxiliary revenue, sales and services, interest, and donations) comprised the remaining 57%. These data are critical in identifying the annual costs of educating the student body from the perspectives of students, taxpayers, and society.

## Expenditures

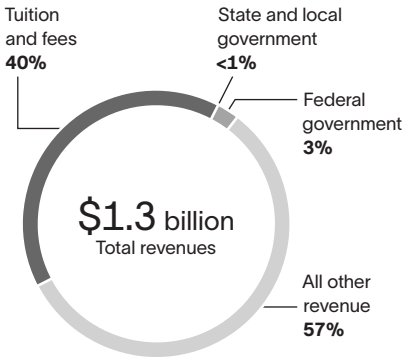
Figure 1.2 displays The Alliance member institutions' expense data. The combined payroll at The Alliance member institutions, including student salaries and wages, amounted to $485.8 million. This was equal to 61% of the institutions' total expenses for FY 2020-21. Other expenditures, including operation and maintenance of plant, depreciation and interest, and purchases of supplies and services, made up $307.4 million. When we calculate the impact of these expenditures in Chapter 2, we exclude expenses for depreciation and interest, as they represent a devaluing of the institutions' assets rather than an outflow of expenditures.

**Table 1.1: Employee data, FY 2020-21**

| | |
|---|---|
| Full-time faculty and staff | 4,385 |
| Part-time faculty and staff | 2,381 |
| **Total faculty and staff** | **6,766** |
| % of employees who work in the state | 99% |
| % of employees who live in the state | 92% |

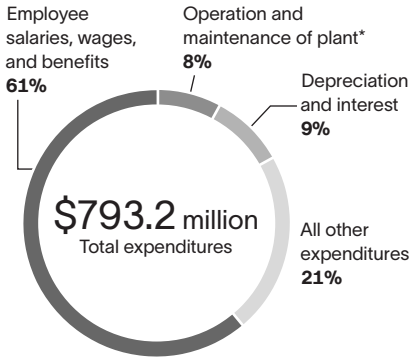
Source: Data provided by The Alliance member institutions.

**Figure 1.1:**
**The Alliance member institutions' revenues by source, FY 2020-21**




Source: Data provided by The Alliance member institutions.
Percentages may not sum to 100% due to rounding.

**Figure 1.2:**
**The Alliance member institutions' expenses by function, FY 2020-21**




*Includes expenditures for capital projects in progress during the analysis year.
Source: Data provided by The Alliance member institutions.
Percentages do not sum to 100% due to rounding.

4 See Appendix 6 for a detailed description of the data sources used in the Lightcast modeling tools.

5 The Alliance consists of Bushnell University, Corban University, George Fox University, Lewis & Clark College, Linfield University, Multnomah University, Pacific University, Reed College, University of Portland, Warner Pacific University, Western Seminary, and Willamette University.

## Multnomah University helps students navigate challenging times

College can be a challenging time in life. Changing relationship dynamics, the journey of self-discovery, and the push to graduate and find a job in your field can be a heavy weight to carry. But as the saying goes, without pressure, there would be no diamonds!

Ryan Nolan came to Multnomah University after the institution he was attending closed. Left with two more years to finish his bible degree, he moved back to his home state of Oregon to finish college. Raised in a church-going family, Ryan chose to pursue a degree in Bible to grow his understanding of the Word. Though, it quickly became clear Ryan had a passion for ministry.

Combining his interest in biblical studies and ministry, Ryan pursued a major in Bible and Theology with a minor in Church Leadership. During his first term, a difficult series of personal events derailed his academic trajectory. That's when being at a small school made all the difference—Multnomah's counseling team stepped in to support Ryan through the adversities he was facing in his life. In his words, "The biggest thing, looking back, was I did feel seen... they cared more about who I was as a person than my grades or my money. They cared about me, and were able to create individual game plans."

The counseling center connected Ryan with Student Success, who walked with him in the process of getting his grades back on track. Ryan's professors were also willing to have honest conversations with him about the steps he needed to take to graduate. Feeling seen, supported, and cared for on an individual level made the difference necessary for Ryan to find his footing and ultimately graduate in 2021.

During his final term, Ryan began the interview process for youth pastor positions around the Portland area. It took tenacity and consistency, but Ryan ultimately got his start in his passion career as a youth pastor for Mountain Park Church, located in the suburbs of Portland. Reflecting on his time at Multnomah, Ryan shared, "It taught me how to really appreciate things, and made it so I have a much more optimistic view of life... Instead of just throwing in the towel, I'm gonna keep digging, because of this optimistic mindset."

## Dr. Doyle Srader, Bushnell University's first Fulbright Scholar

"The first time I taught interpersonal communication was in September 1994. Back then, when I told my family and friends what I taught, they would try to hide their smirks and say, a little mystified, "There are actual college classes about that? Don't you learn how to do that just by being alive?" I don't really hear that anymore. Today, people get it.

Interpersonal communication is the social scientific study of how we talk to one another in gatherings too small to be called public speaking. The most basic unit of all is what we call a dyad, just two people in conversation. But interpersonal communication only makes sense against the backdrop of the kind of relationship the communicators have: friends, co-workers, family members, spouses, teacher and student, detective and suspect, the possibilities are endless.

As the worst of the anti-Covid measures were lifted on campus and we could meet again in person, I was so very thankful for what I think we're often guilty of taking for granted: being together is a glorious blessing that we only appraise rightly after we've been kept apart. Togetherness is magic. In Genesis, before the fall, before sin entered the world, the very first thing God said was not good was that Adam was alone. We were not created to be alone. God engineered us to thrive when we are together.

Interpersonal communication done well, then, is one of the best ways to foster togetherness, and I love that part of my job."

## Multnomah University's supportive faculty and staff

The community you choose during college can have as big of an impact on your life as what you study. 2021 graduate, Brooklyn McFadden, largely attributes her acceptance into law school to the personalized support of the faculty and staff at Multnomah University.

When Brooklyn was a freshman in high school she was inspired by Atticus Finch from *To Kill a Mockingbird* to become a lawyer. Her father shared a similar childhood dream and was eager to support Brooklyn's career in any way he could. However, after starting at her first university, Brooklyn got the feeling that her professors and college community weren't as willing to help her achieve her dreams. It was time for a change and, in her own words, "Multnomah was a Godsend opportunity." There were several appeals to Multnomah for Brooklyn. For starters, Brooklyn was able to be a part of the soccer team and run track at Multnomah while still having time to participate in school activities and clubs. She also wanted to be in a Christian community that valued loving everybody. Brooklyn found all this and more after transferring to Multnomah.

After arriving, several factors stood out to Brooklyn about the unique community at Multnomah. She could have deep conversations with her classmates that pushed her understanding of what it means to be a Christian. Her professors not only cared about Brooklyn but were willing to give her instruction and guidance to help her get into law school. Even the staff went above and beyond to help Brooklyn graduate early so she would stand out on her law school applications!

Since graduating, Brooklyn has moved to New York and is pursuing her dreams at Maurice A. Deane School of Law at Hofstra University. Looking back on her days at Multnomah, Brooklyn explained, "I don't think I would've been in the position I am today if I stayed at my old school or went to a different school, honestly. I pay it all to Multnomah for getting me here." Brooklyn's story goes to show that being in a tight-knit and supportive community can make a big impact on achieving your career goals.

## For Enrique Casas Cofradia, Pacific University means opportunity

Enrique is passionate about renewable energy, entrepreneurship, and finance—which led him to double-major in physics and business administration at Pacific University.

With the help of professors and the College of Business Placement Services Office, he landed a remote summer internship studying the economic side of electric vehicles, and he stayed near campus where he conducted research alongside physics faculty. The experiences, coupled with his academic track, are putting him on the path he needs to pursue his dream career in the renewable energy sector.

"I made a great choice coming to a school where I can meet the professors and develop these close relationships."

## Reed College professors win national awards

Reed College Professor of Chemistry Kelly Chacón was recently named a Henry Dreyfus Teacher-Scholar, an award honoring young faculty for their scholarship as well as commitment to teaching undergraduates. Chacón, who arrived at Reed in 2015, has been a fast-rising figure in the chemical sciences. In 2020, they won a $650,000 CAREER Award from the National Science Foundation, the institution's most prestigious award for pre-tenure faculty. That grant, given to early-career scientists with a special talent for research and education, helped fund Chacón's ongoing research on tellurium, a heavy metal that's seeing increased use in technological infrastructure but whose toxicity causes environmental contamination and risks to the miners who extract it. Chacón works in bioinorganic spectroscopy, studying enzymes that can break down these toxic tellurium ions, potentially leading to the bioremediation of contaminated soils and safer methods of mining. As a queer Latinx first-gen scientist, Chacón has become an outspoken advocate for students from historically marginalized groups. They're also known for working closely with undergraduates in their lab. The American Chemical Society recently included them in a special magazine feature on LGBTQ+ trailblazers, noting that Chacón spent five years working alongside undergraduates to collect the data that laid the foundation for their NSF grant.

Professor of Music Mark Burford has been awarded the Royal Musical Association's Dent Medal for 2022. Burford, who's been at Reed since 2007, began his career with a focus on Brahms and Austro-German concert music of the late eighteenth and early nineteenth centuries. In the last 10 years, though, he's turned his attention to Black popular music studies. His 2012 article, "Sam Cooke as Pop Album Artist—A Reinvention in Three Songs," won the Irving Lowens Article Award from the Society for American Music. His 2019 monograph Mahalia Jackson and the Black Gospel Field earned numerous prizes, including the American Musicological Society's Otto Kinkeldey Award, considered the top honor in the field. Burford also edited The Mahalia Jackson Reader, published in 2020. The Dent Medal committee noted that Burford "has opened up a new field, offering Black objects of study as a legitimate and productive focus for musicological enquiry." They went on: "His wider contribution to musicology is a compassionate demonstration of how we might productively rethink the racializations of the discipline's past."

# The Alliance member institutions' students

The data on The Alliance member institutions' students stemmed from two different data sources: Lightcast's Alumni Outcomes data and The Alliance member institutions' current student data. The Alumni Outcomes data are used to inform the earnings that member institutions' students are expected to make, as well as the industries in which they are expected to be employed.


Reed College

## The Alliance member institutions' Alumni Outcomes findings

Lightcast's Alumni Outcomes database has more than 140 million professional profiles filterable by education level, job title, employer, occupation, location, as well as other demographic parameters. The database contains an aggregate set of profiles from the open web, namely from all the major professional profile sites. Using the 193,651 unique records provided by 10 member institutions[6] of individuals who have graduated from member institutions, Lightcast identified the current occupations of past alumni, combined with their programs of study while at The Alliance member institutions, graduation year, and more. Through this process, Alumni Outcomes matched a total of 77,922, or 40%, profiles of former students from as early as the class of 1952.

This data was used to supplement the earnings data in the alumni impact and investment analysis, as well as to determine which industries alumni are employed in when calculating the alumni impact and associated multiplier effects. Alumni records used to inform Lightcast's earnings data are limited to those listing date of birth, gender, ethnicity, degree level, and place of residence. After filtering out profiles of alumni still residing in Oregon and with required demographic data fields, a sample of 31,061 alumni was used to inform member institutions' alumni earnings. Another sample of 27,639 records, reporting occupation and industry subsector for the last place of employment, was used to inform the industries in which alumni are employed throughout Oregon.

Of the total 31,061 selected matched alumni, 40.2% are male and 59.8% are female. Approximately 87.5% identify as white and 12.5% as a student of color (minority). The matched alumni are, on average, 40 years old. Approximately 58.8% of member institution matched graduates hold a bachelor's degree from member institutions, 26.5% hold a master's degree, 13.7% possess a doctoral degree, while the remaining 1% of alumni hold a certificate and associate degrees.

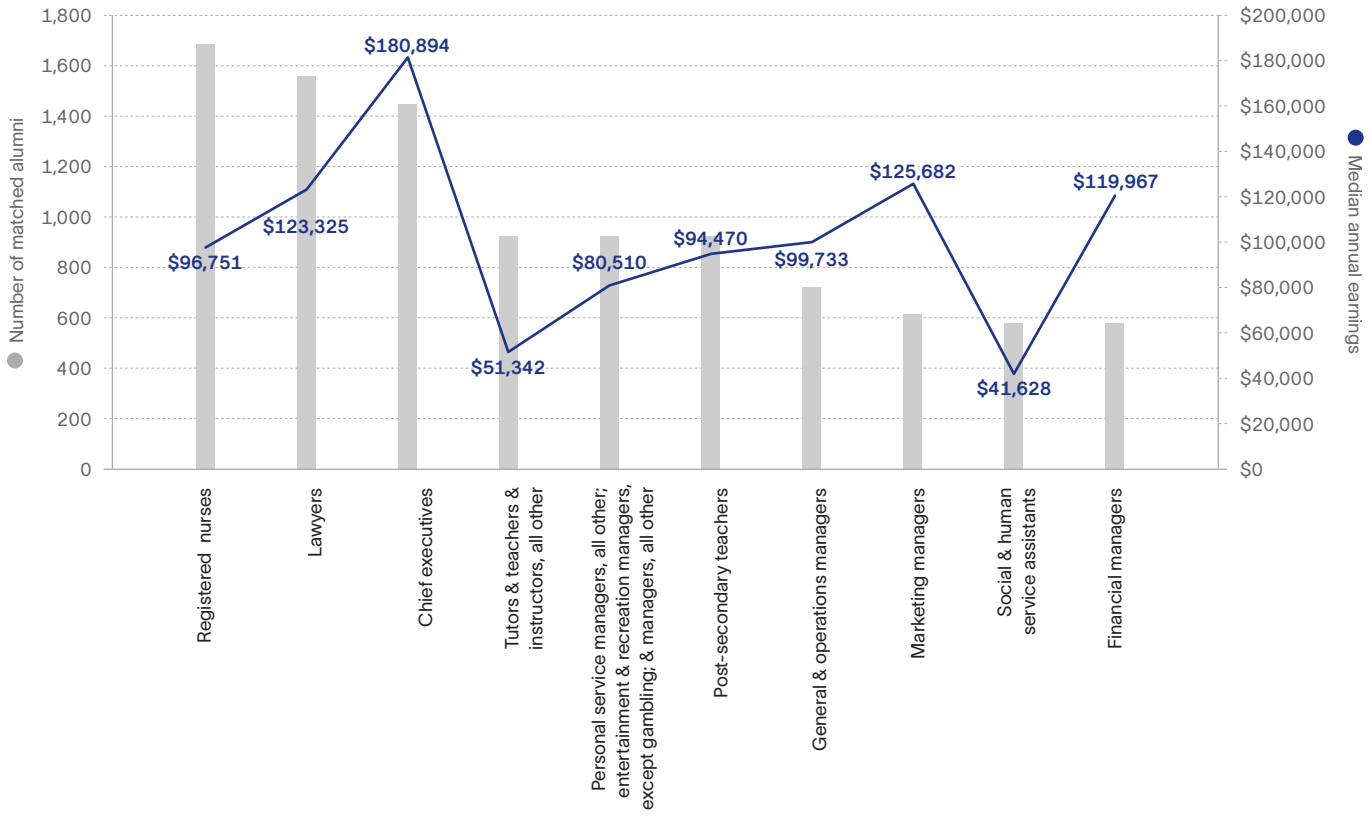
When using the Alumni Outcomes data to determine in which occupations and industries The Alliance member institutions' alumni are employed, a tagging process of self-reported job titles to five-digit Standard Occupational Classification (SOC)

6 Multnomah University and Reed College opted out of the Alumni Outcomes project.

codes is used to map each SOC code listed within each industry sector. A sample of 27,639 records was used for determining the occupations and industries of alumni in Oregon. Of the matched alumni identified as residing in the state, about 17.3% are employed in the Government, Education industry sector; 16.5% are employed in Health Care & Social Assistance; 13.3% are in the Professional & Technical Services industry sector; 10.8% are in Manufacturing; 6.3% are employed in Educational Services; 5.7% work in Finance & Insurance; and 4.5% are in Administrative & Waste Services. These are the top seven industry sectors employing alumni in Oregon. When considering occupations at the five-digit SOC code, the top 10 occupations represent 32% of the total sample (Figure 1.3).

Using these alumni occupation data and Lightcast's earnings data as gathered from the Occupational Employment Statistics along with the American Community Survey and weighting them by alumni match rates by degree level, we can estimate the average earnings of workers in the state and inform the alumni earnings as outlined at the end of this chapter.

**Figure 1.3: Top 10 occupations of The Alliance member institutions' matched alumni with their associated median annual earnings**




Source: Data provided by The Alliance member institutions and Lightcast Alumni Outcomes.

## The Alliance member institutions' FY 2020-21 student data

The Alliance member institutions served 26,626 students taking courses for credit and 1,142 non-credit students in FY 2020-21. These numbers represent unduplicated student headcounts. The breakdown of the student body by gender was 38% male and 62% female. The breakdown by ethnicity was 59% white, 34% students of color, and 7% unknown. The students' overall average age was 26 years old.[7] An estimated 66% of students remain in Oregon after finishing their time at The Alliance member institutions and the remaining 34% settle outside the state.[8]

Table 1.2 summarizes the breakdown of the student population and their corresponding awards and credits by education level. In FY 2020-21, the institutions served 771 PhD graduates, 1,628 master's degree graduates, 4,145 bachelor's degree graduates, 19 associate degree graduates, and 36 certificate graduates. Another 19,944 students enrolled in courses for credit but did not complete a degree during the reporting year. The institutions offered dual credit courses to high schools, serving a total of 78 students over the course of the year. The institutions also served 146 personal enrichment students enrolled in non-credit courses. Non-degree seeking students enrolled in workforce or professional development programs accounted for 432 students. Students not allocated to the other categories comprised the remaining 479 students.

**Table 1.2: Breakdown of student headcount and CHE production by education level, FY 2020-21**

| Category | Headcount | Total CHEs | Average CHEs |
|---|---|---|---|
| PhD or professional graduates | 771 | 22,682 | 29.4 |
| Master's degree graduates | 1,628 | 32,338 | 19.9 |
| Bachelor's degree graduates | 4,145 | 112,250 | 27.1 |
| Associate degree graduates | 19 | 334 | 17.6 |
| Certificate graduates | 36 | 581 | 16.1 |
| Continuing students | 19,944 | 505,083 | 25.3 |
| Dual credit students | 78 | 358 | 4.6 |
| Personal enrichment students | 146 | 584 | 4.0 |
| Workforce/professional development students | 432 | 2,966 | 6.9 |
| All other students | 479 | 4,250 | 8.9 |
| **Total, all students** | **27,768** | **682,877** | **24.6** |
| **Total, less personal enrichment students** | **27,622** | **682,293** | **24.7** |

Source: Data provided by The Alliance member institutions.

We use credit hour equivalents (CHEs) to track the educational workload of the students. One CHE is equal to 15 contact hours of classroom instruction per semester. In the analysis, we exclude the CHE production of personal enrichment students under the

7 Unduplicated headcount, gender, ethnicity, and age data provided by The Alliance member institutions.

8 Settlement data provided by The Alliance member institutions and Lightcast Alumni Outcomes.

assumption that they do not attain knowledge, skills, and abilities that will increase their earnings. The average number of CHEs per student (excluding personal enrichment students) was 24.7.

## University of Portland provides leadership and growth opportunities

Despite the upheaval of the pandemic, senior nursing student Will Weber managed to take full advantage of the opportunities for leadership and growth that University of Portland provides. His classes and clinicals through the School of Nursing and Health Innovations have given him hands-on experience in treating patients holistically. He's built lasting friendships through his many intramural sports teams, and the Army ROTC program has taught him valuable leadership skills that will serve him well in his next stage of life.

## Psychology major Violet Herrick becomes George Fox University's 30,000th degree recipient

Violet Herrick isn't big on being the center of attention, but it isn't every day you get singled out to celebrate a milestone 130 years in the making. Days before graduating, Herrick learned she would be the 30,000th degree recipient in the history of the university, putting her in the spotlight for a surprise bash that included an appearance from President Robin Baker, Pennington the bear mascot, her psychology professors, and a handful of George Fox University employees and friends. Going into this spring, George Fox was 403 graduates shy of 30,000; Herrick was, alphabetically, the 403rd student to receive a degree or certificate in 2022.

Herrick smiled as she was presented a gift basket full of sweets and George Fox swag, as well as a custom-made framed piece of artwork based on a campus mural designed by alumna McKenzie Young. I don't normally like to draw attention to myself, but this was nice—I feel celebrated," she said moments after the big announcement. "I'd say this was on the higher end of all-time surprises in my life."

She was recognized again during her commencement ceremony on April 30 in front of the Stoffer Family Stadium crowd. The big event signified the start of a new chapter for Herrick, who plans to pursue a master's degree in marriage and family therapy. I've really enjoyed my George Fox experience, so this is a bittersweet time for sure," says Herrick, a psychology major from Sacramento, California. "In a community like this, you get to meet so many amazing people. I loved hanging out in the quad and coming across five to 10 people I knew on any given day. I'll miss my amazing psychology professors—Kelly Chang and Jordan Fastenau were especially supportive and really helped me grow while challenging me. Be Known really struck a chord and was real for me. t the same time, I'm excited for the future. I have a two-year online master's program, then plan to be a marriage and family therapist, with the hope of working with adolescents."

In the meantime, Herrick and her husband Joshua will celebrate their graduation—he


earned a degree in engineering from George Fox this spring—by going to Italy. They also have snacks to consume, thanks to her milestone gift-basket prize. "I might share some of it with him," she laughs.

## Lewis & Clark College named a top producer of Fulbrights

The numbers are in, and for the sixth time in 10 years, Lewis & Clark College has been named one of the top producers of Fulbright Award winners in the country, according to the U.S. Department of State's Bureau of Educational and Cultural Affairs. With four grants and 16 applications in FY 2022-23, Lewis & Clark is in the Top 40 baccalaureate producers of Fulbrights in the nation and the only top producer in Oregon.

"I see my best students supported by Fulbright to work in countries around the globe," says Bruce Suttmeier, dean of the College of Arts and Sciences and associate professor of Japanese. "These students have gone to work at the Gates Foundation in vaccine research, at leading nonprofits, and at schools from Vietnam to South America. I'm deeply grateful to Fulbright for providing the opportunities for these students to become the kind of globally informed leaders who can tackle the challenges that confront our world."

## Ethan Myers made the decision to transfer to Linfield University—one he did not regret

Finding the place you will call your alma mater can be a difficult decision. From the academic majors offered to the feeling you get when you first step onto campus, finding the right school is essential for individual success. It can even take multiple tries! However, many transfer students at Linfield University, like Ethan Myers, graduate wishing they would've had more time here.

Born and raised in the Pacific Northwest, Ethan was unsure of his direction after high school. Without a career plan, he spent two years attending local community college classes. However, it wasn't until Ethan's sophomore year when he realized his passion for writing and journalism. Ready to take the next step in his education, Ethan decided to transfer into a more extensive journalism program. "I found Linfield through playing tennis at Spokane Community College," said Ethan. "I was split between a couple schools in the conference because I knew I wanted to go to a smaller school. But once I toured Linfield's campus, it was a pretty easy decision."

Right away, Ethan found a home in Linfield's journalism and media studies program. Ethan was the managing editor for Linfield's student newspaper, The Linfield Review, by his senior year. As a member, he wrote stories covering pop culture, sports, and life on the McMinnville campus. "I've always kind of thought that being a part of The Linfield Review in a way is like an internship," Ethan said. "Being completely student-driven, you are forced to challenge yourself and push yourself to write a lot of stuff to learn what it takes to be a journalist."

Shortly after he graduated from Linfield in the spring of 2021, he accepted a position as a reporter for The Daily Astorian, writing stories on sports, local businesses, and events happening in the neighboring town of Warrington, Ore. "I grew so much in those three years at Linfield and I cannot thank my professors enough," said Ethan. "Being in a small classroom environment with six or eight people, you can't hide. The professors challenge you and want you to succeed."

Looking back at his time at Linfield, Ethan wishes that he would've got one more year. "My time at Linfield was just so great," he said. "This school has so many opportunities and all of the professors are so willing to help you grow not only as a student but also at the next level. Honestly, if I would have stayed at community college or gone to another school, I don't think I would be half of the writer that I am today, and that's all thanks to the students and faculty members at Linfield."

# The Oregon economy

Since The Alliance member institutions were first established, they have been serving Oregon by enhancing the workforce, providing state residents with accessible higher education opportunities, and preparing students for highly skilled, technical professions. Table 1.3 summarizes the breakdown of the state economy by major industrial sector, with details on labor and non-labor income. Labor income refers to wages, salaries, and proprietors' income. Non-labor income refers to profits, rents, and other forms of investment income. Together, labor and non-labor income comprise the state's total income, which can also be considered as the state's gross state product (GSP).

**Table 1.3: Labor and non-labor income by major industry sector in Oregon, 2021***

| Industry sector | Labor income (millions) | Non-labor income (millions) | Total income (millions)** | % of total income | Sales (millions) |
|---|---|---|---|---|---|
| Manufacturing | $18,561 | $15,787 | $34,348 | 13% | $73,011 |
| Other Services (except Public Administration) | $4,724 | $24,067 | $28,790 | 11% | $41,101 |
| Health Care & Social Assistance | $21,049 | $2,498 | $23,547 | 9% | $38,452 |
| Government, Non-Education | $17,284 | $4,242 | $21,526 | 8% | $135,973 |
| Professional & Technical Services | $14,648 | $3,032 | $17,680 | 7% | $27,435 |
| Retail Trade | $11,016 | $6,393 | $17,408 | 6% | $29,964 |
| Wholesale Trade | $8,071 | $8,996 | $17,067 | 6% | $28,694 |
| Finance & Insurance | $9,132 | $7,169 | $16,302 | 6% | $28,165 |
| Construction | $11,735 | $1,867 | $13,603 | 5% | $28,569 |
| Information | $5,214 | $6,468 | $11,683 | 4% | $18,459 |
| Government, Education | $11,020 | $0 | $11,020 | 4% | $12,732 |
| Real Estate & Rental & Leasing | $6,715 | $3,305 | $10,021 | 4% | $24,157 |
| Management of Companies & Enterprises | $9,273 | $667 | $9,940 | 4% | $16,211 |
| Administrative & Waste Services | $6,582 | $1,530 | $8,111 | 3% | $14,774 |
| Accommodation & Food Services | $5,221 | $2,558 | $7,780 | 3% | $16,358 |
| Transportation & Warehousing | $5,837 | $1,214 | $7,051 | 3% | $15,290 |
| Agriculture, Forestry, Fishing & Hunting | $4,220 | $1,594 | $5,814 | 2% | $13,721 |
| Utilities | $816 | $2,278 | $3,093 | 1% | $5,250 |
| Educational Services | $1,905 | $119 | $2,024 | 1% | $2,936 |
| Arts, Entertainment, & Recreation | $1,559 | $408 | $1,967 | 1% | $3,094 |
| Mining, Quarrying, & Oil and Gas Extraction | $215 | $263 | $477 | <1% | $879 |
| **Total** | **$174,797** | **$94,456** | **$269,252** | **100%** | **$575,225** |

* Data reflect the most recent year for which data are available. Lightcast data are updated quarterly.

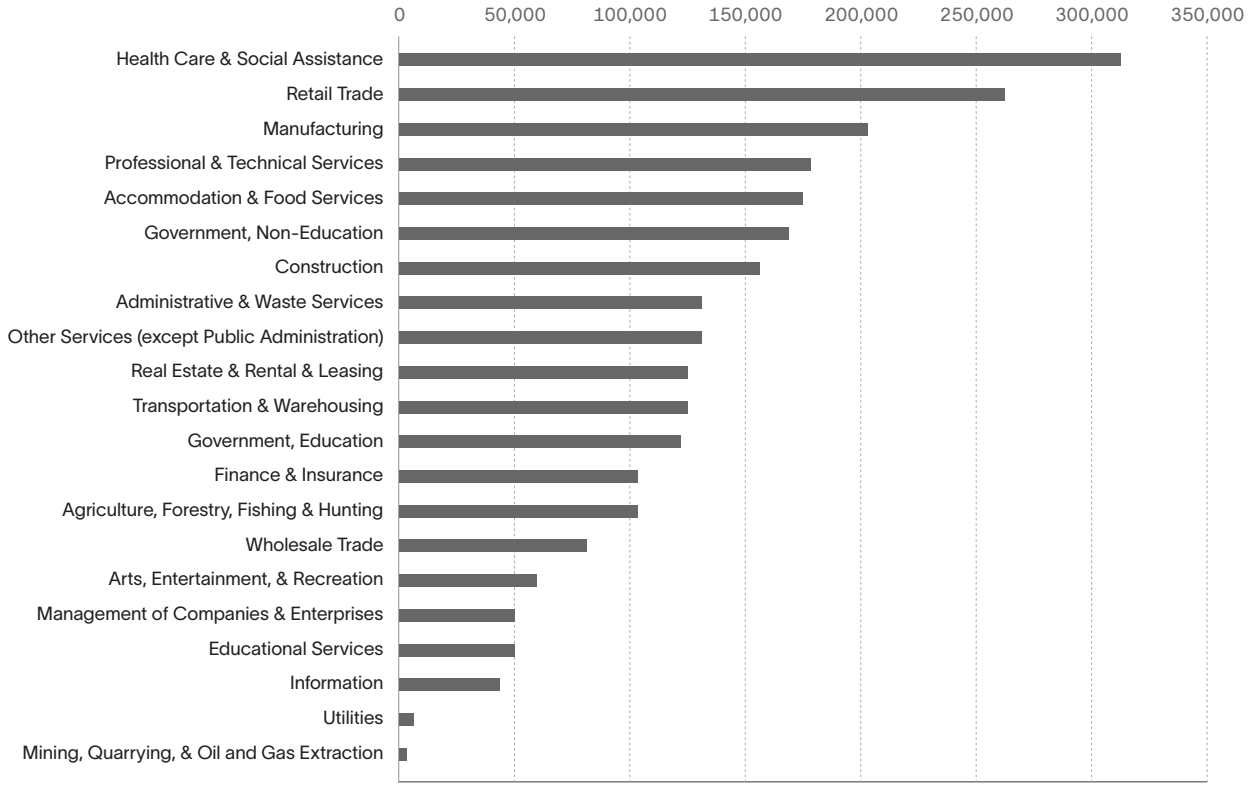
** Numbers may not add due to rounding.

Source: Lightcast industry data.

As shown in Table 1.3, the total income, or GSP, of Oregon is approximately $269.3 billion, equal to the sum of labor income ($174.8 billion) and non-labor income ($94.5 billion). In Chapter 2, we use the total added income as the measure of the relative impacts of the institutions on the state economy.

Figure 1.4 provides the breakdown of jobs by industry in Oregon. The Health Care & Social Assistance sector is the largest employer, supporting 311,487 jobs or 12.1% of total employment in the state. The second largest employer is the Retail Trade sector, supporting 260,783 jobs or 10.1% of the state's total employment. Altogether, the state supports 2.6 million jobs.[9]

**Figure 1.4: Jobs by major industry sector in Oregon, 2021***




* Data reflect the most recent year for which data are available. Lightcast data are updated quarterly.

Source: Lightcast employment data.

9 Job numbers reflect Lightcast's complete employment data, which includes the following four job classes: 1) employees who are counted in the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW), 2) employees who are not covered by the federal or state unemployment insurance (UI) system and are thus excluded from QCEW, 3) self-employed workers, and 4) extended proprietors.

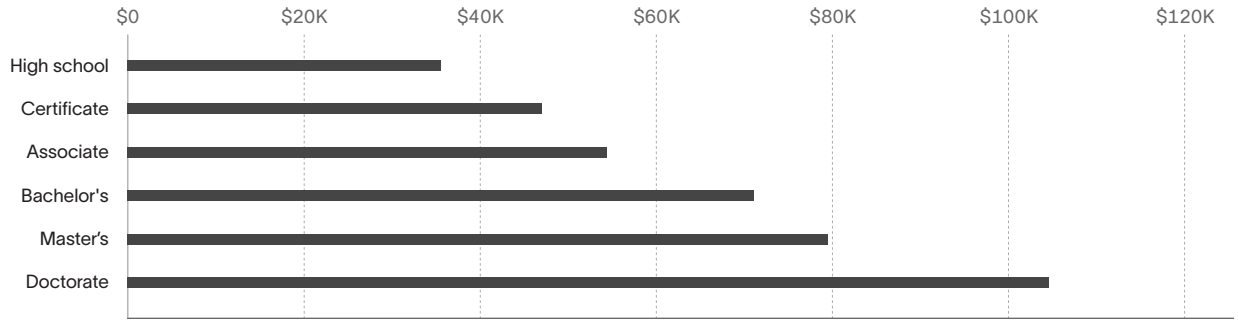
Table 1.4 and Figure 1.5 present the mean earnings by education level in Oregon at the midpoint of the average-aged worker's career. These numbers are derived from Lightcast's complete employment data on average earnings per worker in the state,[10] as well as from the earnings calculated by using the occupations in the Alumni Outcomes data. The numbers are then weighted by the institutions' demographic profiles. As shown, students have the potential to earn more as they achieve higher levels of education compared to maintaining a high school diploma. Students who earn a bachelor's degree from the institutions can expect approximate wages of $71,200 per year within Oregon, approximately $35,700 more than someone with a high school diploma.

**Table 1.4: Average earnings by education level at The Alliance member institutions' student career midpoint**

| Education level | State earnings | Difference from next lowest degree |
|---|---|---|
| High school or equivalent | $35,500 | n/a |
| Certificate | $46,900 | $11,400 |
| Associate degree | $54,100 | $7,200 |
| Bachelor's degree | $71,200 | $17,100 |
| Master's degree | $79,400 | $8,200 |
| Doctoral degree | $104,300 | $24,900 |

Source: Lightcast employment data and The Alliance member institutions' Alumni Outcomes data.

**Figure 1.5: Average earnings by education level at The Alliance member institutions' student career midpoint**




Source: Lightcast employment data and The Alliance Alumni Outcomes data.

10 Wage rates in the Lightcast MR-SAM model combine state and federal sources to provide earnings that reflect complete employment in the state, including proprietors, self-employed workers, and others not typically included in state data, as well as benefits and all forms of employer contributions. As such, Lightcast industry earnings-per-worker numbers are generally higher than those reported by other sources.

Chapter 2:

# Economic impacts on the Oregon economy

*The Alliance member institutions impact the Oregon economy in a variety of ways. The institutions are employers and buyers of goods and services. They attract monies that otherwise would not have entered the state economy through their day-to-day operations and the expenditures of their visitors and students. Further, they provide students with the knowledge, skills, and abilities they need to become productive citizens and add to the overall output of the state.*


: Pacific University

**IN THIS CHAPTER,** we estimate the following economic impacts of The Alliance member institutions: 1) the operations spending impact, 2) the visitor spending impact, 3) the student spending impact, and 4) the alumni impact, measuring the income added in the state as former students expand the state economy's stock of human capital.

When exploring each of these economic impacts, we consider the following hypothetical question:

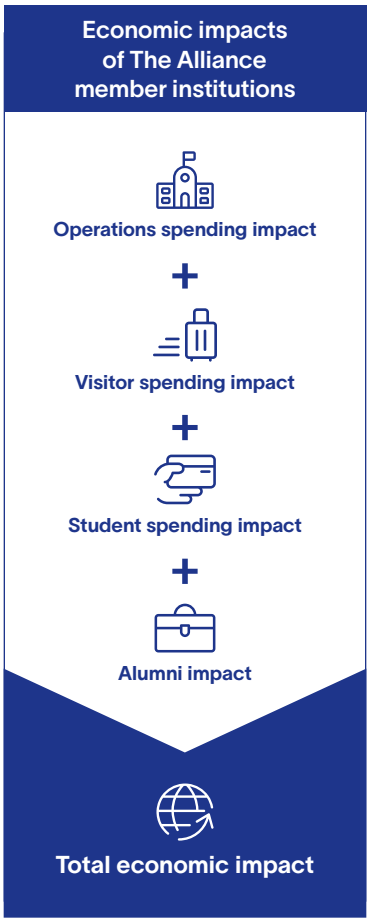
**How would economic activity change in Oregon if The Alliance member institutions and their alumni did not exist in FY 2020-21?**

Each of the economic impacts should be interpreted according to this hypothetical question. Another way to think about the question is to realize that we measure net impacts, not gross impacts. Gross impacts represent an upper-bound estimate in terms of capturing all activity stemming from the institutions; however, net impacts reflect a truer measure of economic impact since they demonstrate what would not have existed in the state economy if not for the institutions.

Economic impact analyses use different types of impacts to estimate the results. The impact focused on in this study assesses the change in income. This measure is similar to the commonly used gross state product (GSP). Income may be further broken out into the **labor income impact**, also known as earnings, which assesses the change in employee compensation; and the **non-labor income impact**, which assesses the change in business profits. Together, labor income and non-labor income sum to total income.

Another way to state the impact is in terms of **jobs**, a measure of the number of full- and part-time jobs that would be required to support the change in income. Finally, a frequently used measure is the **sales impact**, which comprises the change in business sales revenue in the economy as a result of increased economic activity. It is important to bear in mind, however, that much of this sales revenue leaves the state economy through intermediary transactions and costs.[11] All of these measures—added labor and non-labor income, total income, jobs, and sales—are used to estimate the economic impact results presented in this chapter. The analysis breaks out the impact measures into different components, each based on the economic effect that caused the impact. The following is a list of each type of effect presented in this analysis:

- The **initial effect** is the exogenous shock to the economy caused by the initial spending of money, whether to pay for salaries and wages, purchase goods or services, or cover operating expenses.




11 See Appendix 5 for an example of the intermediary costs included in the sales impact but not in the income impact.

- The initial round of spending creates more spending in the economy, resulting in what is commonly known as the **multiplier effect**. The multiplier effect comprises the additional activity that occurs across all industries in the economy and may be further decomposed into the following three types of effects:
    - The **direct effect** refers to the additional economic activity that occurs as the industries affected by the initial effect spend money to purchase goods and services from their supply chain industries.
    - The **indirect effect** occurs as the supply chain of the initial industries creates even more activity in the economy through their own inter-industry spending.
    - The **induced effect** refers to the economic activity created by the household sector as the businesses affected by the initial, direct, and indirect effects raise salaries or hire more people.

The terminology used to describe the economic effects listed above differs slightly from that of other commonly used input-output models, such as IMPLAN. For example, the initial effect in this study is called the "direct effect" by IMPLAN, as shown in the table below. Further, the term "indirect effect" as used by IMPLAN refers to the combined direct and indirect effects defined in this study. To avoid confusion, readers are encouraged to interpret the results presented in this chapter in the context of the terms and definitions listed above. Note that, regardless of the effects used to decompose the results, the total impact measures are analogous.

| **Lightcast** | Initial | Direct | Indirect | Induced |
|---|---|---|---|---|
| **IMPLAN** | Direct | Indirect | | Induced |

Multiplier effects in this analysis are derived using Lightcast's Multi-Regional Social Accounting Matrix (MR-SAM) input-output model that captures the interconnection of industries, government, and households in the state. The Lightcast MR-SAM contains approximately 1,000 industry sectors at the highest level of detail available in the North American Industry Classification System (NAICS) and supplies the industry-specific multipliers required to determine the impacts associated with increased activity within a given economy. For more information on the Lightcast MR-SAM model and its data sources, see Appendix 6.

**Net impacts** reflect a truer measure of economic impact since they demonstrate what would not have existed in the state economy if not for the institutions.

# Operations spending impact

: Multnomah University

Faculty and staff payroll is part of the state's total earnings, and the spending of employees for groceries, apparel, and other household expenditures helps support state businesses. The institutions themselves purchase supplies and services, and many of their vendors are in Oregon. These expenditures create a ripple effect that generates still more jobs and higher wages throughout the economy.

Table 2.1 presents the institutions' expenditures for the following three categories: 1) salaries, wages, and benefits, 2) operation and maintenance of plant,[12] and 3) all other expenditures, including purchases for supplies and services. In this analysis, we exclude expenses for depreciation and interest due to the way those measures are

**Table 2.1: The Alliance member institutions' expenses by function (excluding depreciation & interest), FY 2020-21**

| Expense category | In-state expenditures (thousands) | Out-of-state expenditures (thousands) | Total expenditures (thousands) |
|---|---|---|---|
| Employee salaries, wages, and benefits | $482,078 | $3,713 | $485,791 |
| Operation and maintenance of plant | $39,877 | $23,284 | $63,161 |
| All other expenditures | $122,500 | $47,859 | $170,360 |
| **Total** | **$644,456** | **$74,856** | **$719,312** |

Source: Data provided by The Alliance member institutions and the Lightcast impact model.

12 Capital construction expenses are included under operation and maintenance of plant.

calculated in the national input-output accounts, and because depreciation represents the devaluing of the institutions' assets rather than an outflow of expenditures.[13]

The first step in estimating the multiplier effects of the institutions' operational expenditures is to map these categories of expenditures to the approximately 1,000 industries of the Lightcast MR-SAM model. Assuming that the spending patterns of the institutions' personnel approximately match those of the average U.S. consumer, we map salaries, wages, and benefits to spending on industry outputs using national household expenditure coefficients provided by Lightcast's national SAM. Approximately 99% of The Alliance member institutions' employees work in Oregon (see Table 1.1), and therefore we consider 99% of the salaries, wages, and benefits. For the other two expenditure categories (i.e., operation and maintenance of plant and all other expenditures), we assume the institutions' spending patterns approximately match national averages and apply the national spending coefficients for NAICS 611310 (Colleges, Universities, and Professional Schools).[14] Operation and maintenance of plant expenditures are mapped to the industries that relate to capital construction, maintenance, and support, while the institutions' remaining expenditures are mapped to the remaining industries.

We now have three vectors of expenditures for The Alliance member institutions: one for salaries, wages, and benefits; another for operation and maintenance of plant; and a third for the institutions' purchases of supplies and services. The next step is to estimate the portion of these expenditures that occur inside the state. The expenditures occurring outside the state are known as leakages. We estimate in-state expenditures using regional purchase coefficients (RPCs), a measure of the overall demand for the commodities produced by each sector that is satisfied by state suppliers, for each of the approximately 1,000 industries in the MR-SAM model.[15] For example, if 40% of the demand for NAICS 541211 (Offices of Certified Public Accountants) is satisfied by state suppliers, the RPC for that industry is 40%. The remaining 60% of the demand for NAICS 541211 is provided by suppliers located outside the state. The three vectors of expenditures are multiplied, industry by industry, by the corresponding RPC to arrive at the in-state expenditures associated with the institutions. See Table 2.1 for a break-out of the expenditures that occur in-state. Finally, in-state spending is entered, industry by industry, into the MR-SAM model's multiplier matrix, which in turn provides an estimate of the associated multiplier effects on state labor income, non-labor income, total income, sales, and jobs.

Table 2.2 presents the economic impact of the institutions' operations spending. The people employed by the institutions and their salaries, wages, and benefits comprise the initial effect, shown in the top row of the table in terms of labor income, non-labor income, total added income, sales, and jobs. The additional impacts created by the initial effect appear in the next four rows under the section labeled *multiplier effect*.

13 This aligns with the economic impact guidelines set by the Association of Public and Land-Grant Universities. Ultimately, excluding these measures results in more conservative and defensible estimates.

14 See Appendix 3 for a definition of NAICS.

15 See Appendix 6 for a description of Lightcast's MR-SAM model.

Summing the initial and multiplier effects, the gross impacts are $717.2 million in labor income and $163.4 million in non-labor income. This sums to a total impact of $880.6 million in total added income associated with the spending of the institutions and their employees in the state. This is equivalent to supporting 10,874 jobs.

**Table 2.2: Operations spending impact, FY 2020-21**

| | Labor income (thousands) | Non-labor income (thousands) | Total income (thousands) | Sales (thousands) | Jobs supported |
|---|---|---|---|---|---|
| **Initial effect** | **$482,078** | **$0** | **$482,078** | **$719,312** | **6,700** |
| **Multiplier effect** | | | | | |
| Direct effect | $55,368 | $24,886 | $80,254 | $162,378 | 920 |
| Indirect effect | $24,114 | $8,364 | $32,479 | $71,384 | 417 |
| Induced effect | $155,644 | $130,186 | $285,830 | $490,510 | 2,837 |
| **Total multiplier effect** | **$235,127** | **$163,436** | **$398,563** | **$724,272** | **4,174** |
| **Gross impact (initial + multiplier)** | **$717,205** | **$163,436** | **$880,641** | **$1,443,584** | **10,874** |
| Less alternative uses of funds | -$199,607 | -$189,876 | -$389,483 | -$598,818 | -3,742 |
| **Net impact** | **$517,598** | **-$26,439** | **$491,158** | **$844,766** | **7,132** |

Source: Lightcast impact model.

The $880.6 million in gross impact is often reported by researchers as the total impact. We go a step further to arrive at a net impact by applying a counterfactual scenario, i.e., what would have happened if a given event—in this case, the expenditure of in-state funds on The Alliance member institutions—had not occurred. The Alliance member institutions received an estimated 60% of their funding from sources within Oregon. This portion of the institutions' funding came from the tuition and fees paid by resident students, from the auxiliary revenue and donations from private sources located within the state, from state and local taxes, and from the financial aid issued to students by state and local government. We must account for the opportunity cost of this in-state funding. Had other industries received these monies rather than the institutions, income impacts would have still been created in the economy. In economic analysis, impacts that occur under counterfactual conditions are used to offset the impacts that actually occur in order to derive the true impact of the event under analysis.

The total net impact of the institutions' operations is **$491.2 million** in total added income, which is equivalent to supporting **7,132 jobs**.

We estimate this counterfactual by simulating a scenario where in-state monies spent on the institutions are instead spent on consumer goods and savings. This simulates the in-state monies being returned to the taxpayers and being spent by the household sector. Our approach is to establish the total amount spent by in-state students and taxpayers on The Alliance member institutions, map this to the detailed industries of the MR-SAM model using national household expenditure coefficients, use the industry RPCs to estimate in-state spending, and run the in-state spending through the MR-SAM model's multiplier matrix to derive multiplier effects. The results of this

exercise are shown as negative values in the row labelled "less alternative uses of funds" in Table 2.2.

The total net impact of the institutions' operations is equal to the gross impact less the impact of the alternative use of funds—the opportunity cost of the regional money. As shown in the last row of Table 2.2, the institutions' operations are labor-intensive, resulting in a net impact of $517.6 million in labor income. However, in the case of non-labor income, the adjustment for alternative uses of funds has a greater value than the generated initial and multiplier gross impact, making the net non-labor impact of operations spending negative. Nevertheless, the overall net impact is positive and significant. The labor and non-labor impacts sum to $491.2 million in total added income, equivalent to supporting 7,132 jobs. These impacts represent new economic activity created in the local economy solely attributable to the operations of The Alliance member institutions.

### Western Seminary launches new PhD program

Western Seminary is pleased to announce the launch of the PhD in Intercultural Education. This is now Western's highest academic degree designed to equip students as experts in the field of intercultural education. "With the launch of the PhD program, Western Seminary crosses a new milestone in its pursuit to serve with and for the church as a catalyst and resource for spiritual transformation," says President Chuck Conniry, PhD.

The PhD program is directed by Enoch Wan, PhD, who has been teaching at Western for 22 years and has served as the director of Western's Intercultural Studies Program since 2013. Before coming to Western, Dr. Wan served on the faculty of Reformed Theological Seminary where he launched the PhD program in Intercultural Studies. He sees this new program as an exciting opportunity for those seeking greater expertise in intercultural education. "This is a terminal degree which enables graduates to teach at the highest academic level," says Wan.

The PhD program is not only open to new students. Current students may apply to switch to the PhD from the Doctor of Intercultural Studies (DIS) or the Doctor of Education in Intercultural Education (EdD). EdD and DIS alumni who graduated within the past 10 years are also invited to re-apply to Western and transfer credit from their DIS and EdD degrees. "This program fills a unique niche," states Conniry. "It is not simply another option in missiology or intercultural studies. It will provide graduates with a skill set that empowers them to excel as expert leaders in a variety of fields for which cultural competency is a primary criterion."


## Research is like a puzzle at Pacific University

"I like trying to figure out what's going on and being the first to figure it out," said Rachel Araiza, a Pacific University biology major from southern Oregon.

Rachel came to Pacific University with the help of a scholarship. In her freshman year, she earned a research grant that allowed her to start investigating the eating habits and ecological impact of invasive bullfrogs in local wetlands. "There's a lot of opportunities for research, even if you're just starting out," she said. "It's really nice to be able to get in early."

Aside from her research, Rachel also plays lacrosse and is a member of the Boxers' women's rowing team. She is considering joining the Peace Corps after graduation and hopes to continue her education to pursue a career in wildlife biology.

## Bushnell University grant and match breathes new life into 1908 historic building

Bushnell University proudly announced in February 2023 that it has received a grant in the amount of $800,000 from the M.J. Murdock Charitable Trust for the construction of the Goodrich Hall Tower. The Tower will be a four-story building providing key improvements to the historic Goodrich Hall in order to serve the university's growing student population. The grant was matched by a generous alumni donor family. With the addition of this $1.6 million to the capital campaign, Venture Forward surged past the $16 million mark. The campaign, with a goal of $18 million, includes two other building projects on campus, as well as the new baseball stadium at Hamlin Middle School in Springfield. It also funds three programmatic expansions, including the Accelerated Bachelor of Science in Nursing, which graduated its first cohort of nurses in December.

The Goodrich Hall Tower will provide an elevator and bathrooms on each level, as well as other modern improvements for the stone structure originally constructed in 1908. The interior of Goodrich Hall will be reconfigured to meet modern classroom demands and to provide offices for administration.

The M.J. Murdock Charitable Trust is a philanthropic organization supporting community-focused organizations in the Pacific Northwest and beyond for over 45 years. The Trust has been a long-time supporter of Bushnell University, with a growing number of grants awarded in recent years.

"The construction of the Goodrich Hall Tower is a great example of capacity-building projects the Trust loves to support," says Dana Miller, senior program director for grants, Murdock Trust. "By creating an accessible and updated facility, students, faculty, and administration will be able to move more safely into Bushnell University's future as it grows its student body. The Trust is honored to support institutions like Bushnell that create an inclusive learning environment so all students have an opportunity to flourish and thrive."

"Bushnell University is grateful for the Murdock Trust's pivotal partnership. We look forward to the construction of the Goodrich Hall Tower in 2023," says Bushnell President Dr. Joseph D. Womack. "The Tower will transform the space where Bushnell students have studied for over 117 years to make it usable and accessible for generations to come."

# Visitor spending impact

Tens of thousands of out-of-state visitors came to The Alliance member institutions in FY 2020-21 to participate in various academic and entertainment related activities, as well as business and sports events. *Seven out of twelve* member institutions estimated that 45,461 out-of-state visitors attended events hosted by them in FY 2020-21. It is important to note that many regular university events that would have been hosted in a typical year were canceled in FY 2020-21 due to COVID-19, which heavily reduced the visitor spending impact.


Table 2.3 presents the average expenditures per person-trip for accommodation, food, transportation, and other personal expenses (including shopping and entertainment). Based on these figures, the gross spending of out-of-state visitors totaled $30.5 million in FY 2020-21. However, some of this spending includes monies paid to the institutions through non-textbook items (e.g., event tickets, food, etc.). These have already been accounted for in the operations impact and should thus be removed to avoid double-counting. We estimate that on-campus sales generated by out-of-state visitors totaled $2.4 million. The net sales from out-of-state visitors in FY 2020-21 thus come to $28.2 million.

**Table 2.3: Average per-trip visitor costs and sales generated by out-of-state visitors in Oregon, FY 2020-21***

| | |
|---|---|
| Accommodation | $421 |
| Food | $153 |
| Entertainment and shopping | $41 |
| Transportation | $52 |
| **Total expenses per visitor** | **$666** |
| *Number of out-of-state visitors* | *45,461* |
| Gross sales | $30,548,718 |
| On-campus sales (excluding textbooks) | -$2,363,200 |
| **Net off-campus sales** | **$28,185,518** |

* Costs have been adjusted to account for the length of stay of out-of-state visitors. Accommodation and transportation have been adjusted downward to recognize that, on average, two visitors share these costs.

Source: Sales calculations estimated by Lightcast based on data provided by The Alliance member institutions.

Calculating the increase in income as a result of visitor spending again requires use of the MR-SAM model. The analysis begins by discounting the off-campus sales generated by out-of-state visitors to account for leakage in the trade sector, and then bridging the net figures to the detailed sectors of the MR-SAM model. The model runs the net sales figures through the multiplier matrix to arrive at the multiplier effects. As shown in Table 2.4, the net impact of visitor spending in FY 2020-21 is $13.7 million in labor income and $12.4 million in non-labor income. This totals to $26 million in value added to the state economy and is equivalent to supporting 393 jobs. Again, given that FY 2020-21 was an abnormal year because of the pandemic seriously affecting visitor activities and that only seven out of twelve institutions provided visitor data to measure the impact, $26 million in added income or 393 supported state jobs is a conservative measure understating the potential total visitor spending impact of The Alliance member institutions.

**Tens of thousands of out-of-state visitors** came to The Alliance member institutions in FY 2020-21 to participate in various academic and entertainment related activities, as well as business and sports events.

**Table 2.4: Visitor spending impact, FY 2020-21**

| | Labor income (thousands) | Non-labor income (thousands) | Total income (thousands) | Sales (thousands) | Jobs supported |
|---|---|---|---|---|---|
| **Initial effect** | **$0** | **$0** | **$0** | **$28,186** | **0** |
| **Multiplier effect** | | | | | |
| Direct effect | $6,873 | $6,236 | $13,108 | $22,040 | 197 |
| Indirect effect | $2,175 | $1,937 | $4,112 | $7,047 | 63 |
| Induced effect | $4,614 | $4,191 | $8,805 | $14,739 | 132 |
| **Total multiplier effect** | **$13,663** | **$12,363** | **$26,026** | **$43,826** | **393** |
| **Total impact (initial + multiplier)** | **$13,663** | **$12,363** | **$26,026** | **$72,011** | **393** |

Source: Lightcast impact model.

## Leiana Petlewski did a little of everything at Pacific University

She was a dancer and choreographer, an actor and theatre tech, and a musician. She studied abroad, completed internships locally and internationally, and served as an ambassador to other students. "I was always told I would have to choose in college, and that's the reason I love Pacific University: You get to do so many different things, and the professors are supportive of that instead of trying to encourage you to choose one thing."

A dance and applied theatre double major from Vasalia, Calif., Leiana played cello in the Pacific Philharmonic Orchestra, performed with the Pacific Dance Ensemble, acted and managed tech for the Theatre Department, and worked as an Undergraduate Admissions tour guide and Residence Life community assistant. She also studied abroad at York St. John University in England, where she interned with an arts program serving the mental health community and helped start the program's first U.S. branch.

Following her May 2021 graduation—as valedictorian—her plan was to move closer to Portland and continue pursuing a career in theatre and dance.

## Bushnell University's partnership for a new baseball stadium

Bushnell University, in partnership with the Springfield Baseball Project and Springfield Public Schools, announced in April 2021 the signing of a partnership to renovate a baseball field at the Hamlin Sports Complex located at Hamlin Middle School, to be used as the new home for Bushnell Baseball.

The Hamlin Sports Complex will continue to serve as home to the Springfield High School Millers along with the Bushnell Beacons, and a soon to be announced summer college wood bat team. After a 50-year absence, Bushnell announced in January the relaunch of its baseball program.

"The Hamlin Sports Complex is the perfect place for our new baseball team to play and train," said Corey Anderson, Bushnell's Athletic Director. "We are excited to continue our relationship with Springfield Public Schools. We are currently in our first year with our softball team playing and practicing on Rich Schwab Field at Maple Elementary and now to add another fantastic facility for both players and fans to enjoy is truly a gift."

Bushnell Head Baseball Coach Tommy Richards said, "The vision of this new park gives us some outstanding momentum as we are talking to recruits and their families and preparing our inaugural roster for this fall. This will quickly become a destination baseball complex with a turf and natural field side-by-side and we believe it will be an excellent facility for Beacons to call home for years to come."

Strong partnerships provide strong foundations for our students in Springfield," said Todd Hamilton, Superintendent for Springfield Schools. "Springfield schools continue to be humbled by the community support for our students, programs, and facilities."

## George Fox University Bruins claim first Northwest Conference All-Sports Trophy

George Fox University athletics has earned its share of team and individual titles, but FY 2021-22 marked a first for the university—the capturing of the Northwest Conference's McIlroy-Lewis All-Sports Trophy, awarded to the school that accumulates the most points based on league finishes across all sports. George Fox earned 262 total points between its 19 conference teams and led all NWC members in championships with seven. Points for the all-sports trophy are awarded in descending order for first through ninth place. The Bruins were league champs in men's tennis, women's golf, women's lacrosse, and men's and women's track and field in the spring, after winning conference titles in men's and women's cross country in the fall.

"Winning the conference's all-sports trophy is a tremendous accomplishment," says George Fox Athletic Director Adam Puckett. "It doesn't just represent the success of one or two sports, but rather the overall accomplishments of our entire athletics program. All credit goes to our incredible coaching staff and student-athletes who have put in the work to elevate our programs to where they are today."

George Fox was the only conference school to qualify all of its spring teams for NWC postseason play, and none of them finished lower than fourth in their respective final standings. In addition to their champions, the Bruins notched a runner-up finish in softball, third-place finishes in men's golf and baseball, and a fourth-place showing in women's tennis. Collectively, 130 George Fox athletes earned All-Northwest Conference honors in FY 2021-22. The Bruins also sported three NWC Players of the Year, three Freshman of the Year, and six Coach of the Year honorees.

"This award recognizes more than the success of our talented student-athletes and coaches," says University President Robin Baker. "It also reflects the great support we receive from our faculty, staff, and community. As a university, we can enjoy this honor together."

# Student spending impact


Both in-state and out-of-state students contribute to the student spending impact of The Alliance member institutions; however, not all of these students can be counted towards the impact. Of the in-state students, only those students who were retained, or who would have left the state to seek education elsewhere had they not attended the institutions, are measured. Students who would have stayed in the state anyway are not counted towards the impact since their monies would have been added to the Oregon economy regardless of the institutions. In addition, only the out-of-state students who relocated to Oregon to attend the institutions are measured. Students who commute from outside the state or take courses online are not counted towards the student spending impact because they are not adding money from living expenses to the state.

While there were 14,030 students attending the institutions who originated from Oregon (excluding personal enrichment students and dual credit high school students),[16] not all of them would have remained in the state if not for the existence of The Alliance member institutions. We apply a conservative assumption that 10% of these students would have left Oregon for other education opportunities if the institutions did not exist.[17] Therefore, we recognize that the in-state spending of 1,403 students retained in the state is attributable to the institutions. These students, called retained students, spent money at businesses in the state for everyday needs such as groceries,

16 For institutions unable to provide origin data for their non-credit students, we assume all non-credit students originated from within the state.

17 See Appendix 2 for a sensitivity analysis of the retained student variable.

accommodation, and transportation. Of the retained students, we estimate 250 lived on campus while attending the institutions. While these students spend money while attending the institutions, we exclude most of their spending for room and board since these expenditures are already reflected in the impact of the institutions' operations.

Relocated students are also accounted for in student spending impact. An estimated 7,143 students came from outside the state and lived off campus while attending the institutions in FY 2020-21. Another estimated 5,126 out-of-state students lived on campus while attending the institutions. We apply the same adjustment as described above to the students who relocated and lived on campus during their time at the institutions. Collectively, the off-campus expenditures of out-of-state students supported jobs and created new income in the state economy.[18]

The average costs for students appear in the first section of Table 2.5, equal to $13,672 per student. Note that this table excludes expenses for books and supplies, since many of these costs are already reflected in the operations impact discussed in the previous section. We multiply the $13,672 in annual costs by the 8,296 students who either were retained or relocated to the state because of the member institutions and lived in-state but off campus. This provides us with an estimate of their total spending. For students living on campus, we multiply the per-student cost of off-campus food purchases (assumed to be equal to 25% of room and board), personal expenses, and transportation by the number of students who lived in the state but on campus while attending (5,376 students). Altogether, off-campus spending of relocated and retained students generated gross sales of $136 million. This figure, once net of the monies

**Table 2.5: Average student costs and total sales generated by relocated and retained students in Oregon, FY 2020-21**

| | |
|---|---|
| Room and board | $11,448 |
| Personal expenses | $1,419 |
| Transportation | $804 |
| **Total expenses per student** | **$13,672** |
| *Number of students retained* | *1,403* |
| *Number of students relocated* | *12,269* |
| Gross retained student sales | $17,192,684 |
| Gross relocated student sales | $118,815,959 |
| **Total gross off-campus sales** | **$136,008,643** |
| Wages and salaries paid to student workers* | $8,596,808 |
| **Net off-campus sales** | **$127,411,835** |

* This figure reflects only the portion of payroll that was used to cover the living expenses of relocated and retained student workers who lived in the state.

Source: Student costs and wages provided by The Alliance member institutions. Lightcast provided estimates of the monies paid to student workers for institutions unable to provide data. The number of relocated and retained students who lived in the state off campus or on campus while attending is derived by Lightcast from the student origin data and in-term residence data provided by The Alliance member institutions. The data are based on all students.

18 Online students and students who commuted to Oregon from outside the state are not considered in this calculation because it is assumed their living expenses predominantly occurred in the state where they resided during the analysis year. We recognize that not all online students live outside the state, but keep the assumption given data limitations.

paid to student workers, yields net off-campus sales of $127.4 million, as shown in the bottom row of Table 2.5.

Estimating the impacts generated by the $127.4 million in student spending follows a procedure similar to that of the operations impact described above. We distribute the $127.4 million in sales to the industry sectors of the MR-SAM model, apply RPCs to reflect in-state spending, and run the net sales figures through the MR-SAM model to derive multiplier effects.

Table 2.6 presents the results. The initial effect is purely sales-oriented and there is no change in labor or non-labor income. The impact of relocated and retained student spending thus falls entirely under the multiplier effect. The total impact of student spending is $68.2 million in labor income and $45.9 million in non-labor income. This sums together to $114.1 million in total added income and is equivalent to supporting 1,802 jobs. These values represent the direct effects created at the businesses patronized by the students, the indirect effects created by the supply chain of those businesses, and the effects of the increased spending of the household sector throughout the state economy as a result of the direct and indirect effects.

The total impact of student spending is **$114.1 million** in total added income and is equivalent to supporting **1,802 jobs**.

**Table 2.6: Student spending impact, FY 2020-21**

| | Labor income (thousands) | Non-labor income (thousands) | Total income (thousands) | Sales (thousands) | Jobs supported |
|---|---|---|---|---|---|
| **Initial effect** | **$0** | **$0** | **$0** | **$127,412** | **0** |
| **Multiplier effect** | | | | | |
| Direct effect | $33,816 | $22,863 | $56,679 | $102,720 | 887 |
| Indirect effect | $12,173 | $8,302 | $20,475 | $38,322 | 337 |
| Induced effect | $22,242 | $14,753 | $36,995 | $66,477 | 578 |
| **Total multiplier effect** | **$68,231** | **$45,918** | **$114,150** | **$207,519** | **1,802** |
| **Total impact (initial + multiplier)** | **$68,231** | **$45,918** | **$114,150** | **$334,931** | **1,802** |

Source: Lightcast impact model.

## Pacific University attracts community of Hawaiian students

Chascity-Mae Sarmiento chose Pacific University for its long-time connection to Hawai'i. Originally from Oahu, Hawai'i, Chascity-Mae wanted a college experience where she could stay connected with Hawaiian and Polynesian culture while also preparing for a career of service. "I knew Pacific University had a huge Hawai'i club and a huge support system," she said.

As a social work major, she developed an animal-assisted group therapy program for children. After graduation, she went on to earn a master of social work, and now she's a mental health counselor. "I knew I really wanted to help people," she said.

## Bushnell University's students return with record undergraduate enrollment

As FY 2022-23 gets underway at Bushnell University, undergraduate enrollment has reached record numbers and graduate student enrollment has nearly rebounded from pre-pandemic levels.

With an overall enrollment of more than 700 students and a traditional undergraduate student body of nearly 400 students, Bushnell is reaching numbers not achieved before. Of the 700 students, 261 are new to the undergraduate, online-undergraduate, and graduate programs. Of the new undergraduates, 44% of students are from out-of-state and 33% are from the Eugene area. Major factors attributing to overall enrollment growth include the Clinical Mental Health Counseling program which now has an enrollment of nearly 100 students, the continued growth of the athletic program, and facility development and growth on campus. We are very excited about what is going on at Bushnell. Throughout these past years, we have made a conscious decision to continue to move forward strategically and we are seeing the results of that." said Michael Fuller, Vice President for Enrollment & Special Assistant to the President for Strategic Planning. "New program development, our current capital campaign, increased reputation, and strategic partnerships are all major attributing factors to our enrollment growth."

# Alumni impact


In this section, we estimate the economic impacts stemming from the added labor income of alumni in combination with their employers' added non-labor income. This impact is based on the number of students who have attended the institutions *throughout their history*, not just those matched in the Alumni Outcomes data. We then use this total number to consider the impact of those students in the single FY 2020-21. Former students who earned a degree as well as those who may not have finished their degree or did not take courses for credit are considered alumni. Note that Lightcast's Alumni Outcomes data that are used to inform the earnings and industries of alumni represent member institutions' graduates only.

> The greatest economic impact of The Alliance member institutions stems from the added human capital—the knowledge, creativity, imagination, and entrepreneurship—found in their alumni.

While The Alliance member institutions create an economic impact through their operations, visitor, and student spending, the greatest economic impact of The Alliance stems from the added human capital—the knowledge, creativity, imagination, and entrepreneurship—found in the institutions' alumni. While attending the institutions, students gain experience, education, and the knowledge, skills, and abilities that increase their productivity and allow them to command a higher wage once they enter the workforce. But the reward of increased productivity does not stop there. Talented professionals make capital more productive too (e.g., buildings, production

facilities, equipment). The employers of the institutions' alumni enjoy the fruits of this increased productivity in the form of additional non-labor income (i.e., higher profits).

The methodology here differs from the previous impacts in one fundamental way. Whereas the previous spending impacts depend on an annually renewed injection of new sales into the state economy, the alumni impact is the result of years of past instruction and the associated accumulation of human capital. The initial effect of alumni is comprised of two main components. The first and largest of these is the added labor income of the institutions' former students. The second component of the initial effect is comprised of the added non-labor income of the businesses that employ former students of The Alliance member institutions.

We begin by estimating the portion of alumni who are employed in the workforce. To estimate the historical employment patterns of alumni in the state, we use the following sets of data or assumptions: 1) settling-in factors to determine how long it takes the average student to settle into a career;[19] 2) death, retirement, and unemployment rates from the National Center for Health Statistics, the Social Security Administration, and the Bureau of Labor Statistics; and 3) state migration data from the Internal Revenue Service.[20] The result is the estimated portion of alumni from each previous year who were still actively employed in the state as of FY 2020-21.

The next step is to quantify the skills and human capital that alumni acquired from the institutions. We use the students' production of CHEs as a proxy for accumulated human capital. The average number of CHEs completed per student in FY 2020-21 was 24.7. To estimate the number of CHEs present in the workforce during the analysis year, we use the institutions' historical student headcount over the past 46 years, from FY 1975-76 to FY 2020-21. We apply a 46-year time horizon to include all alumni active in the state workforce who have not reached the average retirement age of 67. The time horizon, or number of years in the workforce, is calculated by subtracting The Alliance students' average age from the retirement age of 67. However, because the alumni impact is based on credits achieved and not headcount, we calculate and use an average age per credit rather than per student.

We multiply the 24.7 average CHEs per student by the headcounts that we estimate are still actively employed from each of the previous years.[21] Students who enroll at the institutions more than one year are counted at least twice in the historical enrollment data. However, CHEs remain distinct regardless of when and by whom they were earned, so there is no duplication in the CHE counts. We estimate there are approximately 9.1 million CHEs from alumni active in the workforce.

19 Settling-in factors are used to delay the onset of the benefits to students in order to allow time for them to find employment and settle into their careers. In the absence of hard data, we assume a range between one and three years for students who graduate with a certificate or a degree, and between one and five years for returning students.

20 According to a study performed by Pew Research Center, people who have already moved are more likely to move again than people who do not move. Therefore, migration rates are dampened to account for the idea that if they do not move in the first two years after leaving the institutions, then they are less likely to migrate out compared to the average person.

21 This assumes the average credit load and level of study from past years is equal to the credit load and level of study of students today.

Next, we estimate the value of the CHEs, or the skills and human capital acquired by the institutions' alumni. This is done using the *incremental* added labor income stemming from the students' higher wages. The incremental added labor income is the difference between the wage earned by the institutions' alumni and the alternative wage they would have earned had they not attended the institutions. Using the state incremental earnings, The Alliance member institutions Alumni Outcomes data, credits required, and distribution of credits at each level of study, we estimate the average value per CHE to equal $266. This value represents the state average incremental increase in wages that the institutions' alumni received during the analysis year for every CHE they completed.

Because workforce experience leads to increased productivity and higher wages, the value per CHE varies depending on the students' workforce experience, with the highest value applied to the CHEs of students who had been employed the longest by FY 2020-21, and the lowest value per CHE applied to students who were just entering the workforce. More information on the theory and calculations behind the value per CHE appears in Appendix 7. In determining the amount of added labor income attributable to alumni, we multiply the CHEs of former students in each year of the historical time horizon by the corresponding average value per CHE for that year, and then sum the products together. This calculation yields approximately $2.4 billion in gross labor income from increased wages received by former students in FY 2020-21 (as shown in Table 2.7).

**Table 2.7: Number of CHEs in workforce and initial labor income created in Oregon, FY 2020-21**

| | |
|---|---|
| Number of CHEs in workforce | 9,087,608 |
| Average value per CHE | $266 |
| **Initial labor income, gross** | **$2,417,220,177** |
| **Adjustments for counterfactual scenarios** | |
| Percent reduction for alternative education opportunities | 10% |
| Percent reduction for adjustment for labor import effects | 50% |
| **Initial labor income, net** | **$1,087,749,080** |

Source: Lightcast impact model.

The next two rows in Table 2.7 show two adjustments used to account for counterfactual outcomes. As discussed above, counterfactual outcomes in economic analysis represent what would have happened if a given event had not occurred. The event in question is the education and training provided by The Alliance member institutions and subsequent influx of skilled labor into the state economy. The first counterfactual scenario that we address is the adjustment for alternative education opportunities. In the counterfactual scenario where The Alliance member institutions do not exist, we assume a portion of the institutions' alumni would have received a comparable education elsewhere in the state or would have left the state and received a comparable education and then returned to the state. The incremental added labor income that accrues to those students cannot be counted towards the added labor income from

the institutions' alumni. The adjustment for alternative education opportunities amounts to a 10% reduction of the $2.4 billion in added labor income. This means that 10% of the added labor income from the institutions' alumni would have been generated in the state anyway, even if the institutions did not exist. For more information on the alternative education adjustment, see Appendix 8.

The other adjustment in Table 2.7 accounts for the importation of labor. Suppose The Alliance member institutions did not exist and in consequence there were fewer skilled workers in the state. Businesses could still satisfy some of their need for skilled labor by recruiting from outside Oregon. We refer to this as the labor import effect. Lacking information on its possible magnitude, we assume 50% of the jobs that students fill at state businesses could have been filled by workers recruited from outside the state if the institutions did not exist.[22] Consequently, the gross labor income must be adjusted to account for the importation of this labor, since it would have happened regardless of the presence of the institutions. We conduct a sensitivity analysis for this assumption in Appendix 2. With the 50% adjustment, the net added labor income added to the economy comes to $1.1 billion, as shown in Table 2.7.

The $1.1 billion in added labor income appears under the initial effect in the labor income column of Table 2.8. To this we add an estimate for initial non-labor income. As discussed earlier in this section, businesses that employ former students of The Alliance member institutions see higher profits as a result of the increased productivity of their capital assets. To estimate this additional income, we allocate the initial increase in labor income ($1.1 billion) to the six-digit NAICS industry sectors where students are most likely to be employed. These data stem from mapping the occupation data from Alumni Outcomes to six-digit industry sectors. We apply a matrix of wages by industry and by occupation from the MR-SAM model to map the occupational distribution of the $1.1 billion in initial labor income effects to the detailed industry sectors in the MR-SAM model.[23]

Once these allocations are complete, we apply the ratio of non-labor to labor income provided by the MR-SAM model for each sector to our estimate of initial labor income. This computation yields an estimated $378.4 million in added non-labor income attributable to the institutions' alumni. Summing initial labor and non-labor income together provides the total initial effect of alumni productivity in the Oregon economy, equal to approximately $1.5 billion. To estimate multiplier effects, we convert the industry-specific income figures generated through the initial effect to sales using sales-to-income ratios from the MR-SAM model. We then run the values through the MR-SAM's multiplier matrix.

Table 2.8 shows the multiplier effects of alumni. Multiplier effects occur as alumni generate an increased demand for consumer goods and services through the expenditure of their higher wages. Further, as the industries where alumni are employed increase their

22 A similar assumption is used by Walden (2014) in his analysis of the Cooperating Raleigh Colleges.

23 For example, if the MR-SAM model indicates that 20% of wages paid to workers in SOC 51-4121 (Welders) occur in NAICS 332313 (Plate Work Manufacturing), then we allocate 20% of the initial labor income effect under SOC 51-4121 to NAICS 332313.

output, there is a corresponding increase in the demand for input from the industries in the employers' supply chain. Together, the incomes generated by the expansions in business input purchases and household spending constitute the multiplier effect of the increased productivity of the institutions' alumni. The final results are $1.1 billion in added labor income and $366.9 million in added non-labor income, for an overall total of $1.4 billion in multiplier effects. The grand total of the alumni impact is $2.9 billion in total added income, the sum of all initial and multiplier labor and non-labor income effects. This is equivalent to supporting 34,070 jobs.

**Table 2.8:** **Alumni impact, FY 2020-21**

| | Labor income (thousands) | Non-labor income (thousands) | Total income (thousands) | Sales (thousands) | Jobs supported |
|---|---|---|---|---|---|
| **Initial effect** | **$1,087,749** | **$378,354** | **$1,466,104** | **$2,695,719** | **17,163** |
| **Multiplier effect** | | | | | |
| Direct effect | $231,163 | $83,777 | $314,940 | $625,042 | 3,830 |
| Indirect effect | $94,159 | $34,861 | $129,021 | $259,010 | 1,561 |
| Induced effect | $734,898 | $248,304 | $983,202 | $1,683,094 | 11,515 |
| **Total multiplier effect** | **$1,060,221** | **$366,942** | **$1,427,162** | **$2,567,146** | **16,906** |
| **Total impact (initial + multiplier)** | **$2,147,970** | **$745,296** | **$2,893,266** | **$5,262,865** | **34,070** |

Source: Lightcast impact model.

## Western Seminary graduate spotlight: Taylor Burdiss

***Current ministry role:*** I am the Women's Transition Specialist at Portland Rescue Mission. I work as a case manager for seven women in our community program who are struggling with homelessness and addiction.

***Why did you choose Western Seminary?*** I wanted a deeper understanding of the Bible and knew I wanted to work in the church. What sold me about Western was the admissions team. I had so many questions, and they were so kind and really cared about me as a person.

***How has your training at Western helped you in your role?*** The women here are wrestling through significant struggles. I get to come alongside them and pastor them through that. They ask me hard questions like "How do I forgive the person who raped me." Thanks to my seminary degree, I have a theological understanding of who God is, and now I have the tools to answer many of their questions from a biblical perspective.

***What's one class at Western that impacted you?*** I took Hermeneutics with Todd Miles during my first semester, and it opened up a treasure chest that I will never be able to close. I didn't grow up in the church and came to know Jesus at 15. Hermeneutics taught me how to truly read the Bible. Being able to understand Scripture within the context of the entire Bible was transformational for me.

***How has the gospel transformed your life and ministry?*** In my work, I experience brokenness, death, and darkness every day. I couldn't do this without Jesus. Ultimately, the breath in my lungs is because of Jesus, and I have a Father who loves me so deeply that what He thinks about me is all that matters. Despite the death and brokenness, I encounter with the homeless population in Portland, God is still greater and there is hope in that.

## Linfield University School of Nursing students gain first-hand experience with communicating and helping patients

At Linfield University School of Nursing, students spend time learning through simulations. Nursing students work with peers, actors, and faculty in a replicated healthcare setting that provides opportunities for real-life training with standardized patients and state-of-the-art technology and equipment. While in nursing school, access to hands-on activities is imperative to creating a robust learning environment that enriches the nursing practice and offers a platform to practice nursing judgment.

## How Willamette University graphic design major Emma Wiseman became a junior designer at Happylucky

***Why did you choose Happylucky?*** They do value-based design work, like LGBTQ issues and women's rights, so that was one reason why I wanted to apply. I heard about it from Professor Kristin Rogers Brown.

***What was the interview process like?*** It was pretty competitive. You had to go through two or three interviews, and you needed a good online portfolio. I think they were looking for a strong, confident, and empathetic personality that also met their values and interests as a company. Their ethos is "Fear less, love more."

***What did you do?*** I helped host, plan, and design a leadership dinner for women and nonbinary leaders. That was such a fun experience—I got to learn about environmental design, branding, and budget management. We made wooden photography backdrops, designed wooden arches that were produced by another studio, and chose the photographer, DJ, and chef for the event. We wanted everyone who participated to be a woman because it was a women-led event. All of the interns were women and so were the guests. But we also did smaller projects—like logos or printed material for Adidas—and edited or created a lot of presentations.

***What did you learn at PNCA that applies to your new job?*** My typography and most of the graphic design classes I had were really relevant, and I think my production class expanded my print knowledge. My thesis project also helped me grasp a bit of the agency lifestyle compared to an in-school learning environment. I spent about a year planning and designing a clothing line and poster series about the environment. There was a pop-up shop with posters on the walls, and I made tops with screen prints and a 30-page lookbook.

***Did you have any other internships?*** In 2020, I was an unpaid intern at an online magazine called Grain of Salt, where I did layouts. It was student-led and really cool—I met a lot of people my age who all want to achieve the same goals. I also took PNCA's Center for Design program, where I worked on projects for Mercy Corps, Art Zero, and the Portland Institute for Contemporary Art.

***What led to the job at Happylucky and what will you be doing?*** After Happylucky saw the success of the dinner, they asked all of the interns to become junior employees. My first day was Nov. 1. So far, I've worked on a logo design for a grassroots organization called Vote In Jail that helps promote access to voting rights to people who are incarcerated. I also helped plan an in-store VIP member shopping event for the brand Savage X Fenty. Right now I'm working on projects for Adidas and planning a second women's dinner event. I'm not sure what else I'll be doing, but hopefully, it will be related to branding and environmental retail design.


## Alumna uses skills gained at Corban University to lead global organization

After years working with pro-life organizations, Bethany Janzen began to see the need for pro-life education and support to extend to underserved, developing nations. She built a team and launched Pro-Life Global in 2019. "We forget it's a global issue," says Janzen. "The challenges are very different in each region, but there is an incredible need." Her organization seeks to empower grassroots advocacy movements to support and protect mothers in crisis and their babies in developing nations across South and Central America, Africa, and Asia. "Corban University provided me with so many opportunities for internships, mentorships, and extracurriculars that gave me the skills to enter the workforce and make a difference in the world," Janzen says. "From studying political entrepreneurship to Bible to accounting, my education was critical in knowing how to start up and run a new organization."

## Multnomah University helps students achieve career aspirations and explore passions

Success can be defined in many ways, like achieving a goal or reaching a milestone. But often, the most significant part of your story is the people who helped you get there and how you grew along the way. When we asked Josh Gulliford if Physical Therapy is his calling, he responded, "I would say it feels like one of my callings. It's a way I can still present my faith in Christ and love people where they're at." Josh's Multnomah University story is one of achieving his career aspirations while having the freedom to explore how he could use all of his passions to serve God.

Josh knew from an early age he wanted to help people by practicing Physical Therapy like his father. But that's only part of his story. During college, Josh was a student-athlete, helped in Young Life, was a youth group leader, and worked a part-time job. Josh came to Multnomah after hearing from a friend at Young Life about the opportunity to pursue his education while continuing to play soccer. Balancing his career aspirations, sports, personal life, and school took a lot of time management and support from his community, but being at a school where Josh could live out all parts of his story is what made Multnomah special.

Along the way, Josh learned from his professors and classmates who helped him grow as a student and a follower of God. Josh shared, "I grew up my entire life in a Christian household but never really dove deep into my faith, and I think Multnomah provided that opportunity and that safe space to do so." Living 20 minutes from his hometown also allowed Josh to make connections in the Physical Therapy world and get the observation hours he needed. When the time came to apply for PT School, Josh was admitted to Southwest Baptist University in Missouri. And today, Josh still integrates his education from Multnomah in his clinical rotations. "People at times, often put up walls to prevent themselves from being reached. And sometimes for those walls to break down, you just need to have a caring and kind person who's willing to listen and sit with them and be with them... I think Multnomah has shown me ways to do it, and on top of that, shown me how to do it maturely and find those people who can help me continue to grow and perform."

Josh hopes to return to the Northwest area after he finishes his rotations. His biggest recommendation to future students is to make friends and connections in their college and local community. We can't wait to see Josh return to the area one day and be a part of that extended Multnomah community.

## Bushnell University, four generations deep

The Wilhite family enjoys a long legacy as Beacons, carrying the torch through many churches, serving as leaders equipped to answer God's call on their lives. Extending through four generations, six alumni, and now one undergraduate student, the Wilhite family continues their heritage at Bushnell University. Matthew Wilhite is a freshman this year at Bushnell. While Matthew's decision to be a Beacon was of his own accord, it was significantly impacted by the long-standing positive reputation that Bushnell holds as a tight-knit, Christ-centered community. He decided to attend after hearing Corynn Gilbert, Director of Development, talk about the integration of Christian faith and learning on campus. "Even though I had heard numerous stories from my parents and grandparents about how amazing their time was there, it was at that moment I knew Bushnell was where I could learn and grow in my faith," Matthew recalls.

Matthew knew that his grandparents, parents, and uncle had attended the university. But he only recently learned that his great-grandfather, Lee Maxell, also attended in the late 1920s. "Turns out my dad's grandpa, my great-grandpa, attended for a little while and then influenced my grandpa to attend. It is so cool to see how my family's legacy keeps growing at Bushnell." Matthew's grandparents, Bryan Wilhite '62 and Sharon (Morrison) Wilhite '62, met and got married during their time as undergraduates. Matthew's parents, Steven Wilhite '92 and Kari (Rose) Wilhite '93, also met on campus and got married shortly after completing their bachelor's degrees. Matthew's uncle, Lee Wilhite '91 serves Christian higher education as the Vice President of Enrollment, Marketing, and Communication at Biola University.

# Total impact

The total economic impact of The Alliance member institutions on Oregon can be generalized into two broad types of impacts. First, on an annual basis, The Alliance member institutions generate a flow of spending that has a significant impact on the state economy. The impacts of this spending are captured by the operations, visitor, and student spending impacts. While not insignificant, these impacts do not capture the true purpose of The Alliance member institutions. The basic mission of the institutions is to foster human capital. Every year, a new cohort of the institutions' former students adds to the stock of human capital in the state, and a portion of alumni continues to add to the state economy.

Table 2.9 displays the grand total impacts of The Alliance member institutions on the Oregon economy in FY 2020-21. For context, the percentages of the impact compared to the total labor income, total non-labor income, combined total income, sales, and jobs in Oregon, as presented in Table 1.3 and Figure 1.4, are included. The total added value of The Alliance member institutions is **$3.5 billion**, equivalent to **1.3%** of the GSP of Oregon. By comparison, this contribution that the institutions provide on their own is larger than the entire Utilities industry in the state. The total impact supported **43,396 jobs** in FY 2020-21. For perspective, this means that **one out of every 59 jobs** in Oregon is supported by the activities of the institutions and their students.


: Linfield University

**Table 2.9: Total impact, FY 2020-21**

| | Labor income (thousands) | Non-labor income (thousands) | Total income (thousands) | Sales (thousands) | Jobs supported |
|---|---|---|---|---|---|
| Operations spending | $517,598 | -$26,439 | $491,158 | $844,766 | 7,132 |
| Visitor spending | $13,663 | $12,363 | $26,026 | $72,011 | 393 |
| Student spending | $68,231 | $45,918 | $114,150 | $334,931 | 1,802 |
| Alumni | $2,147,970 | $745,296 | $2,893,266 | $5,262,865 | 34,070 |
| **Total impact** | **$2,747,461** | **$777,138** | **$3,524,600** | **$6,514,573** | **43,396** |
| % of the Oregon economy | 1.6% | 0.8% | 1.3% | 1.1% | 1.7% |

Source: Lightcast impact model.

These impacts from The Alliance member institutions and their students stem from different industry sectors and spread throughout the state economy. Table 2.10 displays the total impact by each industry sector based on their two-digit NAICS code. The table shows the total impact of operations, visitors, students, and alumni, as shown in Table 2.9, broken down by each industry sector's individual impact on the state economy using processes outlined earlier in this chapter. By showing the impact from individual industry sectors, it is possible to see in finer detail the industries that drive the greatest impact on the state economy from the activities of the institutions and from where their alumni are employed. For example, the activities of institutions and their alumni in the Professional & Technical Services industry sector generated an impact of $398.3 million in FY 2020-21.

**Table 2.10: Total impact by industry, FY 2020-21**

| Industry sector | Total income (thousands) | Jobs supported |
|---|---|---|
| Educational Services | $620,117 | 9,975 |
| Professional & Technical Services | $398,330 | 3,527 |
| Health Care & Social Assistance | $371,325 | 4,890 |
| Manufacturing | $365,214 | 2,866 |
| Government, Education | $361,413 | 4,581 |
| Finance & Insurance | $259,136 | 1,385 |
| Retail Trade | $159,314 | 2,774 |
| Information | $158,800 | 733 |
| Administrative & Waste Services | $127,507 | 2,158 |
| Real Estate & Rental & Leasing | $122,169 | 1,856 |
| Wholesale Trade | $119,421 | 629 |
| Accommodation & Food Services | $117,544 | 2,587 |
| Utilities | $105,709 | 197 |
| Other Services (except Public Administration) | $57,277 | 2,474 |
| Construction | $53,550 | 586 |
| Arts, Entertainment, & Recreation | $34,433 | 840 |
| Transportation & Warehousing | $31,501 | 624 |
| Management of Companies & Enterprises | $24,220 | 131 |
| Government, Non-Education | $23,823 | 152 |
| Agriculture, Forestry, Fishing, & Hunting | $11,067 | 291 |
| Mining, Quarrying, & Oil and Gas Extraction | $2,730 | 139 |
| **Total impact** | **$3,524,600** | **43,396** |

Source: Lightcast impact model.


### Student gains real-world experience while at University of Portland

After years of thinking about learning as an exercise in memorization, Kevin Wong came to University of Portland and found that real learning happens when you have the chance to apply what you study. His experiences in the Pamplin School of Business and in his projects with UP's industry partners like Adidas have given him opportunities to gain real-world experience and confidence in his abilities, which will give him solid footing as he embarks on his career.

### Western Seminary's Master of Arts in Counseling degree combines Christian worldview and compassion within the counseling profession

Western Seminary's Master of Arts in Counseling degree in Clinical Mental Health Counseling prepares Christian counselors to bring concern and care for the whole person. It equips students to excel in Christian counseling, as well as in church, private practice, agency, clinical mental health, or school settings. As with most counseling degrees, this program offers skill-based coursework, internship experience, as well as a requirement to complete personal counseling. Since this program is offered at a seminary, it also unites biblical and theological studies in order to connect both Christian worldview and compassion to the counseling profession. While the curriculum satisfies Licensed Professional Counselor (LPC) requirements set forth by the Oregon Board of Licensed Professional Counselors and Therapists, it is also CACREP accredited, allowing students the flexibility to obtain licensure in many other states with minimal additional work.

### Lewis & Clark College equips students with lifelong skills

The most important thing Devin Owen learned at Lewis & Clark College was how to think critically. His neuroscience classes were instrumental in teaching him how to read and interpret scientific writing and statistics, which is only becoming more and more useful today. More broadly though, thinking deeply about fiction, philosophy, or art enriched his life. It's also given him the tools to self-learn: teaching himself how to code, start a business, and so many things that have made his career transitions possible.

Lewis & Clark excels at fostering community in two special ways: supporting student-led clubs and initiatives and offering robust overseas programs. Devin was constantly amazed at how welcoming different student clubs were, from sports like rugby, soccer, and lacrosse, to more academic or special interest groups. He found many of my best friends through these shared interests.

## Alumna uses role as publisher to model principles instilled at Corban University

As President of Illuminate Literary Agency, Jenni Burke sees her responsibility as helping Christian creatives and communicators expand their ministries by creating best-selling writing careers. "I get excited about the Christian authors that we are supporting and getting behind them, giving them the microphone, and trying to amplify the work they do through their books," Burke says. Burke sees her agency as fulfilling a unique role in the publishing space of supporting authors beyond just the success of their books. "We care just as much about the ministry side of our organization and making sure that the authors themselves are being supported in a way that stewards their own souls, helping them stay connected and thriving in Christ so that they can have not just a profitable publishing career, but a life-giving publishing career. These are principles and priorities that were modeled and instilled in me during my time at Corban University."

Chapter 3:

# Investment analysis

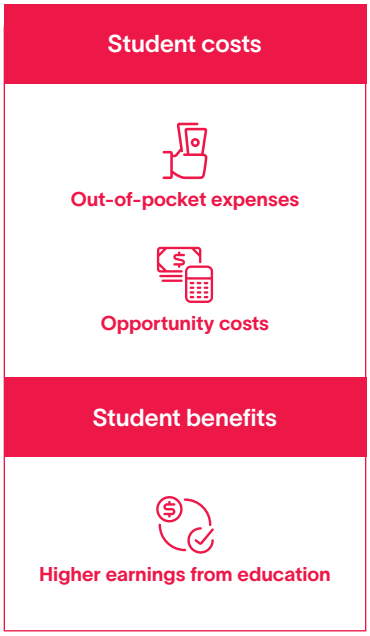
*The benefits generated by The Alliance member institutions affect the lives of many people. The most obvious beneficiaries are the institutions' students; they give up time and money to go to the institutions in return for a lifetime of higher wages and improved quality of life. But the benefits do not stop there. As students earn more, communities and citizens throughout Oregon benefit from an enlarged economy and a reduced demand for social services. In the form of increased tax revenues and public sector savings, the benefits of education extend as far as the state government.*

*Investment analysis is the process of evaluating total costs and measuring these against total benefits to determine whether or not a proposed venture will be profitable. If benefits outweigh costs, then the investment is worthwhile. If costs outweigh benefits, then the investment will lose money and is thus considered infeasible. In this chapter, we evaluate the return on investment for member institutions' students and Oregon society, as well as the benefits for state taxpayers.*

Lewis & Clark College

# Student perspective

To enroll in postsecondary education, students pay for tuition and forego monies that otherwise they would have earned had they chosen to work instead of attend college. From the perspective of students, education is the same as an investment; i.e., they incur a cost, or put up a certain amount of money, with the expectation of receiving benefits in return. The total costs consist of the tuition and fees that students pay and the opportunity cost of foregone time and money. The benefits are the higher earnings that students receive as a result of their education.




## Calculating student costs

Student costs consist of three main items: direct outlays, opportunity costs, and future principal and interest costs incurred from student loans. Direct outlays include tuition and fees, equal to $528.4 million from Figure 1.1. Direct outlays also include the cost of books and supplies. On average, full-time students spent $962 each on books and supplies during the reporting year.[24] Multiplying this figure by the number of full-time equivalents (FTEs) produced by The Alliance member institutions in FY 2020-21[25] generates a total cost of $22.6 million for books and supplies.

In order to pay the cost of tuition, many students had to take out loans. These students not only incur the cost of tuition from the institutions but also incur the interest cost of taking out loans. In FY 2020-21, students received a total of $70.7 million in federal loans to attend the institutions.[26] Students pay back these loans along with interest over the span of several years in the future. Since students pay off these loans over time, they accrue no initial cost during the analysis year. Hence, to avoid double counting, the $70.7 million in federal loans is subtracted from the costs incurred by students in FY 2020-21.

In addition to the cost of tuition, books, and supplies, students also experienced an opportunity cost of attending college during the analysis year. Opportunity cost is the

24 Based on the data provided by The Alliance member institutions.

25 A single FTE is equal to 30 CHEs for undergraduate students and 24 CHEs for graduate students, so there were 23,214 FTEs produced by students in FY 2020-21, equal to 682,877 CHEs divided by 30 (excluding personal enrichment students).

26 Due to data limitations, only federal loans are considered in this analysis.

most difficult component of student costs to estimate. It measures the value of time and earnings foregone by students who go to the institutions rather than work. To calculate it, we need to know the difference between the students' full earning potential and what they actually earn while attending the institutions.

We derive the students' full earning potential by weighting the average annual earnings levels in Table 1.4 according to the education level breakdown of the student population at the start of the analysis year.[27] However, the earnings levels in Table 1.4 reflect what average workers earn at the midpoint of their careers, not while attending the institutions. Because of this, we adjust the earnings levels to the average age of the student population (26) to better reflect their wages at their current age.[28] This calculation yields an average full earning potential of $29,628 per student.

In determining how much students earn while enrolled in postsecondary education, an important factor to consider is the time that they actually spend on postsecondary education, since this is the only time that they are required to give up a portion of their earnings. We use the students' CHE production as a proxy for time, under the assumption that the more CHEs students earn, the less time they have to work, and, consequently, the greater their foregone earnings. Overall, students attending member institutions in FY 2020-21 earned an average of 24.8 CHEs per student (excluding personal enrichment students and dual credit high school students), which is approximately equal to 89% of a full academic year.[29] We thus include no more than $26,403 (or 89%) of the students' full earning potential in the opportunity cost calculations.

Another factor to consider is the students' employment status while enrolled in postsecondary education. It is estimated that 62% of students are employed.[30] For the remainder of students, we assume that they are either seeking work or planning to seek work once they complete their educational goals (with the exception of personal enrichment students, who are not included in this calculation). By choosing to enroll, therefore, non-working students give up everything that they can potentially earn during the academic year (i.e., the $26,403). The total value of their foregone earnings thus comes to $261.2 million.

Working students are able to maintain all or part of their earnings while enrolled. However, many of them hold jobs that pay less than statistical averages, usually because those are the only jobs they can find that accommodate their course schedule. These jobs tend to be at entry level, such as restaurant servers or cashiers. To account for this, we assume that working students hold jobs that pay 83% of what they would have earned had they chosen to work full-time rather than go to college.[31] The remaining


Photo: Multnomah University


Photo: Corban University

27 This is based on students who reported their prior level of education to The Alliance member institutions. The prior level of education data was then adjusted to exclude dual credit high school students.

28 Further discussion on this adjustment appears in Appendix 7.

29 Equal to 24.8 CHEs divided by 30 for the proportion of undergraduate students and 24 for the proportion of graduate students, the assumed number of CHEs in a full-time academic year.

30 Lightcast provided estimates of the percentage of students employed for institutions unable to provide data. This figure excludes dual credit high school students, who are not included in the opportunity cost calculations.

31 The 83% assumption is based on the average hourly wage of jobs commonly held by working students divided by the state average hourly wage. Occupational wage estimates are published by the Bureau of Labor Statistics (see http://www.bls.gov/oes/current/oes_nat.htm).

17% comprises the percentage of their full earning potential that they forego. Obviously, this assumption varies by person; some students forego more and others less. Since we do not know the actual jobs that students hold while attending, the 17% in foregone earnings serves as a reasonable average.

Working students also give up a portion of their leisure time to attend higher education institutions. According to the Bureau of Labor Statistics American Time Use Survey, students forego up to 0.3 hours of leisure time per day.[32] Assuming that an hour of leisure is equal in value to an hour of work, we derive the total cost of leisure by multiplying the number of leisure hours foregone during the academic year by the average hourly pay of the students' full earning potential. For working students, therefore, their total opportunity cost is $83.7 million, equal to the sum of their foregone earnings ($69.2 million) and foregone leisure time ($14.5 million).

Thus far we have discussed student costs during the analysis year. However, recall that students take out student loans to attend college during the year, which they will have to pay back over time. The amount they will be paying in the future must be a part of their decision to attend the institutions today. Students who take out loans are not only required to pay back the principal of the loan but to also pay back a certain amount in interest. The first step in calculating students' loan interest cost is to determine the payback time for the loans. The $70.7 million in loans was awarded to 10,198 students, averaging $6,934 per student in the analysis year. However, this figure represents only one year of loans. Because loan payback time is determined by total indebtedness, we assume that since the institutions are four-year institutions, students will be indebted four times that amount, or $27,737 on average. According to the U.S. Department of Education, this level of indebtedness will take 20 years to pay back under the standard repayment plan.[33]

This indebtedness calculation is used solely to estimate the loan payback period. Students will be paying back the principal amount of $70.7 million over time. After taking into consideration the time value of money, this means that students will pay off a discounted present value of $47.6 million in principal over the 20 years. In order to calculate interest, we only consider interest on the federal loans awarded to students in FY 2020-21. Using the student discount rate of 3.7%[34] as our interest rate, we calculate that students will pay a total discounted present value of $22.3 million in interest on student loans throughout the first 20 years of their working lifetime. The stream of these future interest costs together with the stream of loan payments is included in the costs of Column 5 of Table 3.2.

The steps leading up to the calculation of student costs appear in Table 3.1. Direct outlays amount to $479.7 million, the sum of tuition and fees ($528.4 million) and

32 American Time Use Survey. 2017-2019. Last modified November 30, 2021. Accessed March 2022. https://www.bls.gov/tus/data.htm.

33 Repayment period based on total education loan indebtedness, U.S. Department of Education, 2022. https://studentaid.ed.gov/sa/repay-loans/understand/plans/standard.

34 The student discount rate is derived from the baseline forecasts for the 10-year discount rate published by the Congressional Budget Office. See the Congressional Budget Office, Student Loan and Pell Grant Programs—July 2021 Baseline. https://www.cbo.gov/system/files/2021-07/51310-2021-07-studentloan.pdf.

books and supplies ($22.6 million), less federal loans received ($70.7 million) and $543.9 thousand in direct outlays of personal enrichment students (those students are excluded from the cost calculations). Opportunity costs for working and non-working students amount to $344.8 million. Finally, we have the present value of future student loan costs, amounting to $69.9 million between principal and interest. Summing direct outlays, opportunity costs, and future student loan costs together yields a total of $894.5 million in present value student costs.

**Table 3.1: Present value of student costs, FY 2020-21 (thousands)**

| | |
|---|---|
| **Direct outlays in FY 2020-21** | |
| Tuition and fees | $528,403 |
| Less federal loans received | -$70,715 |
| Books and supplies | $22,588 |
| Less direct outlays of personal enrichment students | -$544 |
| **Total direct outlays** | **$479,732** |
| **Opportunity costs in FY 2020-21** | |
| Earnings foregone by non-working students | $261,154 |
| Earnings foregone by working students | $69,214 |
| Value of leisure time foregone by working students | $14,480 |
| **Total opportunity costs** | **$344,848** |
| **Future student loan costs (present value)** | |
| Student loan principal | $47,584 |
| Student loan interest | $22,324 |
| **Total present value student loan costs** | **$69,907** |
| **Total present value student costs** | **$894,487** |

Source: Based on data provided by The Alliance member institutions and outputs of the Lightcast impact model.

## Linking education to earnings

Having estimated the costs of education to students, we weigh these costs against the benefits that students receive in return. The relationship between education and earnings is well documented and forms the basis for determining student benefits. As shown in Table 1.4, state mean earnings levels at the midpoint of the average-aged worker's career increase as people achieve higher levels of education. The differences between state earnings levels define the incremental benefits of moving from one education level to the next.

A key component in determining the students' return on investment is the value of their future benefits stream; i.e., what they can expect to earn in return for the investment they make in education. We calculate the future benefits stream to the institutions' FY 2020-21 students first by determining their average annual increase in earnings, equal to $169.1 million. This value represents the higher wages that accrue to students at the

midpoint of their careers and is calculated based on the marginal wage increases of the CHEs that students complete while attending the institutions. Using the state of Oregon earnings along with The Alliance member institutions' Alumni Outcomes data, the marginal wage increase per CHE is $248. For a full description of the methodology used to derive the $169.1 million, see Appendix 7.

The second step is to project the $169.1 million annual increase in earnings into the future, for as long as students remain in the workforce. We do this using the Mincer function to predict the change in earnings at each point in an individual's working career.[35] The Mincer function originated from Mincer's seminal work on human capital (1958). The function estimates earnings using an individual's years of education and post-schooling experience. While some have criticized Mincer's earnings function, it is still upheld in recent data and has served as the foundation for a variety of research pertaining to labor economics. Card (1999 and 2001) addresses a number of these criticisms using U.S. based research over the last three decades and concludes that any upward bias in the Mincer parameters is on the order of 10% or less. We use state-specific and education level-specific Mincer coefficients. To account for any upward bias, we incorporate a 10% reduction in our projected earnings, otherwise known as the ability bias. With the $169.1 million representing the students' higher earnings at the midpoint of their careers, we apply scalars from the Mincer function to yield a stream of projected future benefits that gradually increase from the time students enter the workforce, peak shortly after the career midpoint, and then dampen slightly as students approach retirement at age 67. This earnings stream appears in Column 2 of Table 3.2.

As shown in Table 3.2, the $169.1 million in gross higher earnings occurs around Year 13, which is the approximate midpoint of the students' future working careers given the average age of the student population and an assumed retirement age of 67. In accordance with the Mincer function, the gross higher earnings that accrue to students in the years leading up to the midpoint are less than $169.1 million and the gross higher earnings in the years after the midpoint are greater than $169.1 million.

The final step in calculating the students' future benefits stream is to net out the potential benefits generated by students who are either not yet active in the workforce or who leave the workforce over time. This adjustment appears in Column 3 of Table 3.2 and represents the percentage of the FY 2020-21 student population that will be employed in the workforce in a given year. Note that the percentages in the first five years of the time horizon are relatively lower than those in subsequent years. This is because many students delay their entry into the workforce, either because they are still enrolled at the institutions or because they are unable to find a job immediately upon graduation. Accordingly, we apply a set of "settling-in" factors to account for the time needed by students to find employment and settle into their careers. As discussed in Chapter 2, settling-in factors delay the onset of the benefits by one to three years for students who graduate with a certificate or a degree and by one to five years for degree-seeking students who do not complete during the analysis year.



35 Appendix 7 provides more information on the Mincer function and how it is used to predict future earnings growth.

Table 3.2: **Projected benefits and costs, student perspective**

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Year | Gross higher earnings to students (millions) | % active in workforce* | Net higher earnings to students (millions) | Student costs (millions) | Net cash flow (millions) |
| 0 | $71.4 | 13% | $9.5 | $824.6 | -$815.1 |
| 1 | $77.9 | 23% | $17.8 | $5.1 | $12.7 |
| 2 | $84.7 | 33% | $27.7 | $5.1 | $22.5 |
| 3 | $91.7 | 49% | $44.7 | $5.1 | $39.5 |
| 4 | $98.9 | 71% | $69.9 | $5.1 | $64.7 |
| 5 | $106.4 | 97% | $102.7 | $5.1 | $97.5 |
| 6 | $114.0 | 96% | $109.9 | $5.1 | $104.8 |
| 7 | $121.8 | 96% | $117.2 | $5.1 | $112.1 |
| 8 | $129.6 | 96% | $124.7 | $5.1 | $119.5 |
| 9 | $137.5 | 96% | $132.1 | $5.1 | $127.0 |
| 10 | $145.5 | 96% | $139.6 | $5.1 | $134.4 |
| 11 | $153.4 | 96% | $146.9 | $5.1 | $141.8 |
| 12 | $161.3 | 96% | $154.2 | $5.1 | $149.1 |
| 13 | $169.1 | 95% | $161.4 | $5.1 | $156.3 |
| 14 | $176.7 | 95% | $168.4 | $5.1 | $163.2 |
| 15 | $184.1 | 95% | $175.1 | $5.1 | $170.0 |
| 16 | $191.3 | 95% | $181.6 | $4.5 | $177.1 |
| 17 | $198.1 | 95% | $187.7 | $4.5 | $183.2 |
| 18 | $204.6 | 95% | $193.4 | $4.5 | $188.9 |
| 19 | $210.8 | 94% | $198.7 | $4.5 | $194.2 |
| 20 | $216.5 | 94% | $203.6 | $4.5 | $199.1 |
| 21 | $221.8 | 94% | $207.9 | $0.0 | $207.9 |
| 22 | $226.5 | 93% | $211.7 | $0.0 | $211.7 |
| 23 | $230.7 | 93% | $214.9 | $0.0 | $214.9 |
| 24 | $234.4 | 93% | $217.5 | $0.0 | $217.5 |
| 25 | $237.5 | 92% | $219.5 | $0.0 | $219.5 |
| 26 | $239.9 | 92% | $220.7 | $0.0 | $220.7 |
| 27 | $241.8 | 92% | $221.3 | $0.0 | $221.3 |
| 28 | $243.0 | 91% | $221.2 | $0.0 | $221.2 |
| 29 | $243.5 | 91% | $220.4 | $0.0 | $220.4 |
| 30 | $243.4 | 90% | $218.9 | $0.0 | $218.9 |
| 31 | $242.7 | 89% | $216.8 | $0.0 | $216.8 |
| 32 | $241.4 | 89% | $213.9 | $0.0 | $213.9 |
| 33 | $239.4 | 88% | $210.4 | $0.0 | $210.4 |
| 34 | $236.9 | 87% | $206.3 | $0.0 | $206.3 |
| 35 | $233.7 | 86% | $201.6 | $0.0 | $201.6 |
| 36 | $230.0 | 85% | $196.4 | $0.0 | $196.4 |
| 37 | $225.8 | 84% | $190.6 | $0.0 | $190.6 |
| 38 | $221.1 | 83% | $184.5 | $0.0 | $184.5 |
| 39 | $216.0 | 82% | $177.9 | $0.0 | $177.9 |
| 40 | $210.4 | 81% | $171.0 | $0.0 | $171.0 |
| **Present value** | | | **$3,102.3** | **$894.5** | **$2,207.8** |

* Includes the "settling-in" factors and attrition.

Percentages reflect aggregate values for all institutions and are subject to fluctuations due to the institutions' varying time horizons.

Source: Lightcast impact model.

| Benefit-cost ratio | Internal rate of return | Payback period (years) |
|---|---|---|
| 3.5 | 12.5% | 9.9 |

Beyond the first five years of the time horizon, students will leave the workforce for any number of reasons, whether death, retirement, or unemployment. We estimate the rate of attrition using the same data and assumptions applied in the calculation of the attrition rate in the economic impact analysis of Chapter 2.[36] The likelihood of leaving the workforce increases as students age, so the attrition rate is more aggressive near the end of the time horizon than in the beginning. Column 4 of Table 3.2 shows the net higher earnings to students after accounting for both the settling-in patterns and attrition.

## Return on investment for students

Having estimated the students' costs and their future benefits stream, the next step is to discount the results to the present to reflect the time value of money. For the student perspective we assume a discount rate of 3.7% (see below). Because students tend to rely upon debt to pay for education—i.e. they are negative savers—their discount rate is based upon student loan interest rates.[37] In Appendix 2, we conduct a sensitivity analysis of this discount rate. The present value of the benefits is then compared to student costs to derive the investment analysis results, expressed in terms of a benefit-cost ratio, rate of return, and payback period. The investment is feasible if returns match or exceed the minimum threshold values; i.e., a benefit-cost ratio greater than 1.0, a rate of return that exceeds the discount rate, and a reasonably short payback period.

### Discount rate

The discount rate is a rate of interest that converts future costs and benefits to present values. For example, $1,000 in higher earnings realized 30 years in the future is worth much less than $1,000 in the present. All future values must therefore be expressed in present value terms in order to compare them with investments (i.e., costs) made today. The selection of an appropriate discount rate, however, can become an arbitrary and controversial undertaking. As suggested in economic theory, the discount rate should reflect the investor's opportunity cost of capital, i.e., the rate of return one could reasonably expect to obtain from alternative investment schemes. In this study we assume a 3.7% discount rate from the student perspective and a -0.3% discount rate from the perspectives of taxpayers and society.

In Table 3.2, the net higher earnings of students yield a cumulative discounted sum of approximately $3.1 billion, the present value of all the future earnings increments (see the bottom section of Column 4). This may also be interpreted as the gross capital asset value of the students' higher earnings stream. In effect, the aggregate FY 2020-21 student body is rewarded for its investment in The Alliance member institutions with a capital asset valued at $3.1 billion.

36 See the discussion of the alumni impact in Chapter 2. The main sources for deriving the attrition rate are the National Center for Health Statistics, the Social Security Administration, and the Bureau of Labor Statistics. Note that we do not account for migration patterns in the student investment analysis because the higher earnings that students receive as a result of their education will accrue to them regardless of where they find employment.

37 The student discount rate is derived from the baseline forecasts for the 10-year Treasury rate published by the Congressional Budget Office. See the Congressional Budget Office, Student Loan and Pell Grant Programs—July 2021 Baseline. https://www.cbo.gov/system/files/2021-07/51310-2021-07-studentloan.pdf.

The students' cost of attending the institutions is shown in Column 5 of Table 3.2, equal to a present value of $894.5 million. Comparing the cost with the present value of benefits yields a student benefit-cost ratio of 3.5 (equal to $3.1 billion in benefits divided by $894.5 million in costs).

Another way to compare the same benefits stream and associated cost is to compute the rate of return. The rate of return indicates the interest rate that a bank would have to pay a depositor to yield an equally attractive stream of future payments.[38] Table 3.2 shows students of The Alliance member institutions earning average returns of 12.5% on their investment of time and money. This is a favorable return compared, for example, to approximately 1% on a standard bank savings account, or 10.5% on stocks and bonds (30-year average return).

> The Alliance member institutions' students see an average rate of return of **12.5%** for their investment of time and money.

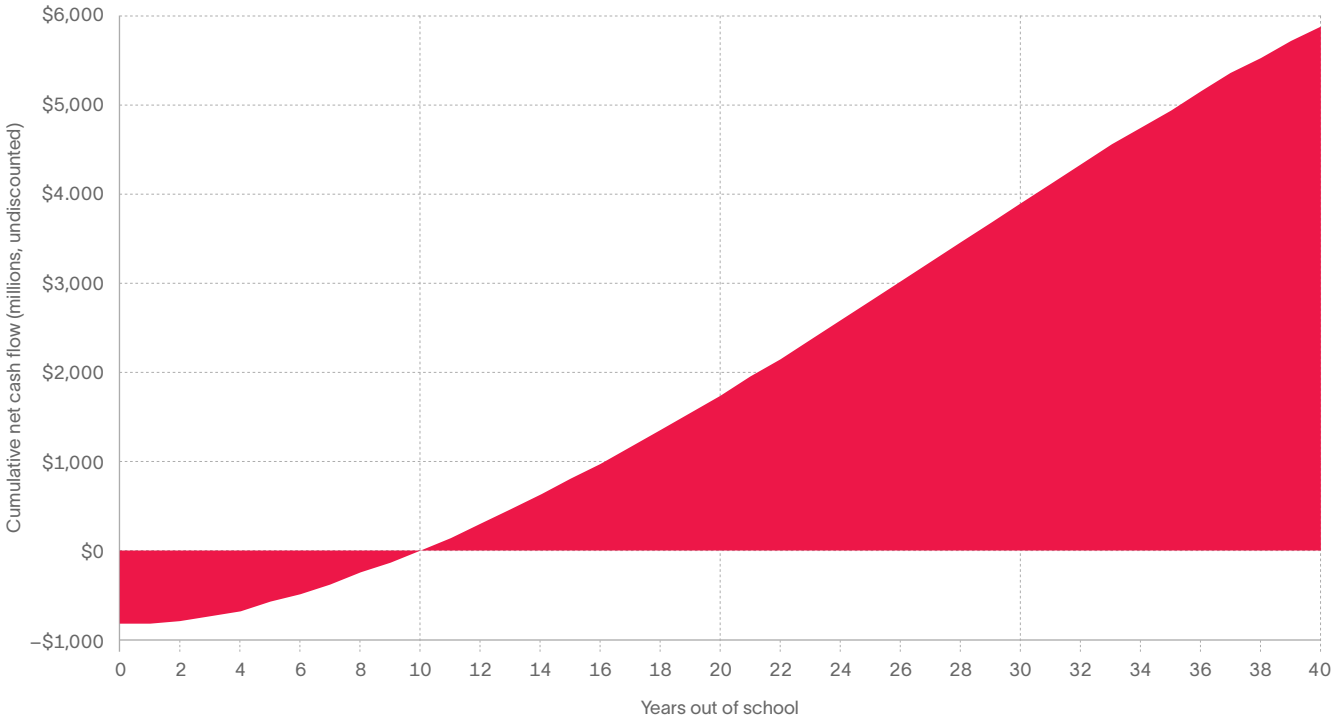
Note that returns reported in this study are real returns, not nominal. When a bank promises to pay a certain rate of interest on a savings account, it employs an implicitly nominal rate. Bonds operate in a similar manner. If it turns out that the inflation rate is higher than the stated rate of return, then money is lost in real terms. In contrast, a real rate of return is on top of inflation. For example, if inflation is running at 3% and a nominal percentage of 5% is paid, then the real rate of return on the investment is only 2%. In Table 3.2, the 12.5% student rate of return is a real rate. With an inflation rate of 2.2% (the average rate reported over the past 20 years as per the U.S. Department of Commerce, Consumer Price Index), the corresponding nominal rate of return is 14.6%, higher than what is reported in Table 3.2.

The payback period is defined as the length of time it takes to entirely recoup the initial investment.[39] Beyond that point, returns are what economists would call pure costless rent. As indicated in Table 3.2, students at The Alliance member institutions see, on average, a payback period of 9.9 years, meaning 9.9 years after their initial investment of foregone earnings and out-of-pocket costs, they will have received enough higher future earnings to fully recover those costs (Figure 3.1).

38 Rates of return are computed using the familiar internal rate-of-return calculation. Note that, with a bank deposit or stock market investment, the depositor puts up a principal, receives in return a stream of periodic payments, and then recovers the principal at the end. Someone who invests in education, on the other hand, receives a stream of periodic payments that include the recovery of the principal as part of the periodic payments, but there is no principal recovery at the end. These differences notwithstanding comparable cash flows for both bank and education investors yield the same internal rate of return.

39 Payback analysis is generally used by the business community to rank alternative investments when safety of investments is an issue. Its greatest drawback is it does not account for the time value of money. The payback period is calculated by dividing the cost of the investment by the net return per period. In this study, the cost of the investment includes tuition and fees plus the opportunity cost of time; it does not account for student living expenses.

**Figure 3.1: Student payback period**




Source: Lightcast impact model.

### Lewis & Clark College Japanese overseas programs changed student's college experience

Nani Welch Keliihoomalu's decision to study abroad in Japan changed her entire college experience. Prior to attending Lewis & Clark College, Nani had never been to the Pacific Northwest, but she had seen that Portland was such an up-and-coming city with a lot of things for young people to do. Nani had taken Japanese in middle school and high school and coming from Hawaii, she grew up around a lot of Japanese influence and culture which really sparked her interest. Studying abroad was by far the best part of her four years. The Japanese overseas programs that Lewis & Clark offers are immersive and she hopes to return to Japan as soon as possible.

## Students in George Fox University's Servant Engineering program design solutions that lead to a better life—one human at a time

Brandon is 19 years old. He likes to play video games, make fried Oreos with his foster care provider, and go to the movies. His favorite character? Iron Man. Brandon also lives with cerebral palsy, which makes it difficult to manipulate objects with the fingers on his right hand. A surgery that fused the bones in his wrist further complicates matters, making daily tasks that require the use of both hands nearly impossible.

That's where the "gauntlet" comes in. A synthetic fiber glove married to a tension-assisting exoskeleton strengthens Brandon's finger movements, allowing for greater extension. As a result, he can use both hands for his favorite activity, video games, and much more. The gauntlet is hand-sewn and 3D printed—the outcome of months of trial, error, research, and observation. It's a one-of-one design, much like Tony Stark's first Iron Man prototype. And when Brandon wears it he feels like a superhero. Or, in his own words, "awesome."

The Servant Engineering team at George Fox University wouldn't have it any other way. Because it's not just about the device—it's about the human wearing it. Established in 2010, Servant Engineering is a required course for all junior engineering and computer science majors. Some projects seek solutions to greater humanitarian needs. But in many cases, such as Brandon's, students are paired with a single "client." One team of student engineers. One faculty advisor. One full academic year.

At any given time more than a dozen projects are in motion. A postural assist device for students at the Oregon School for the Blind. An accessory that allows a client with hemiplegia—a condition that prevents the use of half his body—to use a wheelchair. A series of solutions for a young girl with a rare genetic disease called Bruck syndrome to independently eat, clean her teeth, and use a computer mouse.

In each case, the process begins with a simple but powerful concept: human-centered design. "In the first three to four weeks of the class, I don't want students to think about a single solution," says professor Todd Curtis, faculty advisor to the team that created Brandon's gauntlet. "I only want them to understand the problem, to get to know the client, to empathize with the client."

But the Servant Engineering program benefits more than just the client. One of the student's ability to articulate what he learned over the course of the project helped secure an internship with Intel, with a possible full-time offer forthcoming. Wherever he lands, the lessons he learned from the program will last a lifetime. "Using your engineering skills to help real people, to solve open-ended problems, is something you can only learn by doing," Curtis says. "These experiences are priceless for our students."

## Lewis & Clark College welcomes students with warm environment

Lewis & Clark College was the perfect place for Arista Engineer in terms of the small class sizes, opportunities to interact with professors, and wide range of subjects available to students. But the thing that made her most excited to attend Lewis & Clark was the warm and welcoming attitude of everyone she interacted with.

Studying overseas in London, Arista said "The Humanities program in London was the best for me since it worked well with my English major... The classes in Queen Mary University of London provided me with opportunities to explore English literature in more varied ways, such as through the study of contemporary works and linguistics." Additionally, the international student community is the warmest and welcoming one on campus. Everyone at the International Students and Scholars office went out of their way to help Arista and her fellow study abroad students adjust to the new country and environment and make sure they were as comfortable as possible.

## Pre-nursing, first-generation student now helps others as a peer mentor in Linfield University's award-winning First Scholars program

For sophomore Lucy Kerr, helping others has always been the priority. The pre-nursing major came into Linfield University as a first-generation student. She now lends a helping hand to those in the same position. "I always knew I was going to go to college," Lucy said. "I just didn't have a pathway set for me."

Linfield's first-generation program is open to all first-generation students, mostly geared towards first-year students, which includes monthly meetings to make the college transition a little less daunting. Lucy currently holds the first-scholar coordinator position, where she now has four mentees. "After applying to be a first scholar coordinator, I've really gotten to see the diversity of the program," she said. "It's really taught me a lot."

In addition to Lucy's involvement within the first-generation program, she has been a member of the women's soccer team and Alpha Phi sorority. "I wanted to get involved so I could help people that came in at my position," Lucy said. "I've always cared about helping people."

On top of everything else, Lucy has been able to excel in the classroom and develop strong-rooted relationships with professors. Reflecting on microbiology professor Tim Sullivan, Lucy appreciates the support he's given her over the past two years. "He really cares about me as a person," she said. "I remember talking to him about how soccer was hard for me at times, and he said how he wanted to support me on and off the field. He said even if you don't play, I will come and watch."

While juggling sports, campus jobs, Greek life, and classes, Lucy has made the most of her experience on the McMinnville campus by finding a support system that is best for her. The support she has been given is paid forward by the helping hand Lucy lends out.

## Corban University scholar engages in real-world research

A member of the highly competitive Murdock Research Scholar program, Asia Jackson has the rare opportunity as an undergraduate to engage in hands-on, real-world cancer research at some of the best labs and facilities on the West Coast. Her time as a Corban University biology major set the stage for this experience with opportunities to participate in frontline COVID and cancer research at Corban's new Scope Lab. "Because of the one-on-one time I get with professors, I've been able to do so many things and engage in hands-on research that not a lot of undergraduate students at other bigger universities are able to do, and that's all because of Corban," she says. In her spare time, Jackson also stars for the women's soccer team, even representing her native nation of Guam for the AFC Asia Cup Qualifying in the Kyrgyz Republic in 2021.

## Mia Naccarato, member of Linfield University's Presidential Internship program

"Entering my first year at Linfield University as a first-generation student, I did not have a solid idea of what I wanted to study. I spent time using career cruising websites answering countless questions about myself in hopes of finding a more suitable professional "match." As the semester went on, my interest turned to Linfield's science programs, which led me to exercise science.

Later in the semester, I received an email saying that I had been nominated by faculty for Linfield's Presidential Impact Internship Program. It is a four-year program that guides and mentors five students through career exploration opportunities as well as completing two summer internships. After the application and interview process, I was stoked to be accepted into the program! I felt hopeful that this opportunity would help me combine my two biggest interests—working with children and learning about the human body—into one profession. Through this program, I attended various seminars with my cohort. We learned about professional development skills, non-profit versus for-profit organizations, networking and so much more.

By April, I had established a plan to spend my summer as a volunteer at the Children's Therapy Unit in Puyallup, Washington. I met numerous people from so many areas within CTU, which allowed me to explore a wide variety of therapeutic services for children. I had the chance to sit alongside physical, occupational, and speech therapists while they treated their patients. I got to witness how pediatric therapists are creative and flexible in their sessions from patient to patient. I observed that in order for sessions to be effective, a lot of trust between the therapist and patient needs to be established.

Each of these qualities really sparked my interests further in exploring careers in this field. I started spending one day a week at Good Samaritan Hospital right across the street following therapists into patient rooms and observing their therapeutic sessions. Right away, I could tell a big difference between the inpatient and outpatient environments, as well as how the therapists interacted with their patients. I also noticed similarities in the characteristics of the therapists, such as empathy, passion, and patience, which are all very important to me.


Now, after my amazing experience at both facilities, it feels relieving and exciting to have a better sense of the educational path I want to take. Sitting alongside physical, speech, and occupational therapists, and comparing them solidified my interest in occupational therapy, especially after learning how versatile a degree in it can be. My time at CTU would not have happened without the help of Linfield's Presidential Impact internship program. I am also thrilled to have found a career that involves working with children and working with the human body simultaneously!"

# Taxpayer perspective

From the taxpayer perspective, the pivotal step is to determine the public benefits that specifically accrue to state government, even with little state and local taxpayer support. For example, benefits resulting from earnings growth are limited to increased state tax payments. Similarly, savings related to improved health, reduced crime, and fewer welfare and unemployment claims, discussed below, are limited to those received strictly by state government. In all instances, benefits to private residents, local businesses, or the federal government are excluded. Because The Alliance is a private, nonprofit organization and receives very little taxpayer funding, a benefit-cost ratio and internal rate of return for taxpayers are not measured in this analysis.

**Taxpayer benefits**

**Increased tax revenue**

**Avoided costs to state government**

## Growth in state tax revenues

As a result of their time at The Alliance member institutions, students earn more because of the skills they learned while attending the institutions, and businesses earn more because student skills make capital more productive (buildings, machinery, and everything else). This in turn raises profits and other business property income. Together, increases in labor and non-labor (i.e., capital) income are considered the effect of a skilled workforce. These in turn increase tax revenues since state government is able to apply tax rates to higher earnings.

Estimating the effect of The Alliance member institutions on increased tax revenues begins with the present value of the students' future earnings stream, which is displayed in Column 4 of Table 3.2. To these net higher earnings, we apply a multiplier derived from Lightcast's MR-SAM model to estimate the added labor income created in the state as students and businesses spend their higher earnings.[40] As labor income increases, so does non-labor income, which consists of monies gained through investments. To calculate the growth in non-labor income, we multiply the increase in labor income by a ratio of the Oregon gross state product to total labor income in the state. We also include the spending impacts discussed in Chapter 2 that were created in FY 2020-21 from operations, visitor, and student spending. To each of these, we apply the prevailing tax rates so we capture only the tax revenues attributable to state government from this additional revenue.

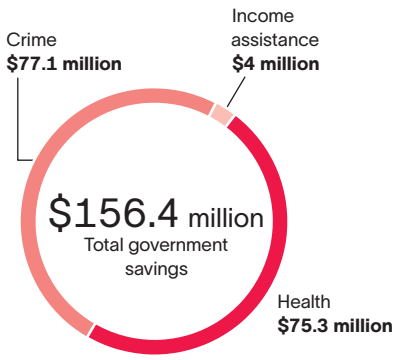
40 For a full description of the Lightcast MR-SAM model, see Appendix 6.

Not all of these tax revenues may be counted as benefits to the state, however. Some students leave the state during the course of their careers, and the higher earnings they receive as a result of their education leaves the state with them. To account for this dynamic, we combine student settlement data from the institutions with data on migration patterns from the Internal Revenue Service to estimate the number of students who will leave the state workforce over time.

We apply another reduction factor to account for the students' alternative education opportunities. This is the same adjustment that we use in the calculation of the alumni impact in Chapter 2 and is designed to account for the counterfactual scenario where the institutions do not exist. The assumption in this case is that any benefits generated by students who could have received an education even without the institutions cannot be counted as new benefits to society. For this analysis, we assume an alternative education variable of 10%, meaning that 10% of the student population at the institutions would have generated benefits anyway even without the institutions. For more information on the alternative education variable, see Appendix 8.

After adjusting for attrition and alternative education opportunities, we calculate the present value of the future added tax revenues that occur in the state, equal to $773 million. Recall from the discussion of the student return on investment that the present value represents the sum of the future benefits that accrue each year over the course of the time horizon, discounted to current year dollars to account for the time value of money. Given that the stakeholder in this case is the public sector, we use the discount rate of -0.3%. This is the real treasury interest rate reported by the Office of Management and Budget (OMB) for 30-year investments, and in Appendix 2, we conduct a sensitivity analysis of this discount rate.[41]

**Figure 3.2: Present value of government savings**




Source: Lightcast impact model.

## Government savings

In addition to the creation of higher tax revenues to the state government, education is statistically associated with a variety of lifestyle changes that generate social savings, also known as external or incidental benefits of education. These represent the avoided costs to the government that otherwise would have been drawn from public resources absent the education provided by The Alliance member institutions. Government savings appear in Figure 3.2 and Table 3.3 and break down into three main categories: 1) health savings, 2) crime savings, and 3) income assistance savings. Health savings include avoided medical costs that would have otherwise been covered by state government. Crime savings consist of avoided costs to the justice system (i.e., police protection, judicial and legal, and corrections). Income assistance benefits comprise avoided costs due to the reduced number of welfare and unemployment insurance claims.

In addition to the creation of **higher tax revenues** to the state government, education is statistically associated with a variety of lifestyle changes that generate **social savings**.

41 Office of Management and Budget. "Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses." *Real Interest Rates on Treasury Notes and Bonds of Specified Maturities (in Percent)*. https://www.whitehouse.gov/wp-content/uploads/2020/12/discount-history.pdf.

The model quantifies government savings by calculating the probability at each education level that individuals will have poor health, commit crimes, or claim welfare and unemployment benefits. Deriving the probabilities involves assembling data from a variety of studies and surveys analyzing the correlation between education and health, crime, and income assistance at the national and state level. We spread the probabilities across the education ladder and multiply the marginal differences by the number of students who achieved CHEs at each step. The sum of these marginal differences counts as the upper bound measure of the number of students who, due to the education they received at the institutions, will not have poor health, commit crimes, or demand income assistance. We dampen these results by the ability bias adjustment discussed earlier in the student perspective section and in Appendix 7 to account for factors (besides education) that influence individual behavior. We then multiply the marginal effects of education times the associated costs of health, crime, and income assistance.[42] Finally, we apply the same adjustments for attrition and alternative education to derive the net savings to the government. Total government savings appear in Figure 3.2 and sum to $156.4 million.

Table 3.3 displays all benefits to taxpayers. The first row shows the added tax revenues created in the state, equal to $773 million, from students' higher earnings, increases in non-labor income, and spending impacts. The sum of the government savings and the added income in the state is $929.4 million, as shown in the bottom row of Table 3.3. These savings continue to accrue in the future as long as the FY 2020-21 student population of the institutions remains in the workforce.

**Table 3.3: Present value of added tax revenue and government savings (thousands)**

| | |
|---|---|
| **Added tax revenue** | **$772,974** |
| **Government savings** | |
| Health-related savings | $75,283 |
| Crime-related savings | $77,069 |
| Income assistance savings | $4,050 |
| **Total government savings** | **$156,401** |
| **Total taxpayer benefits** | **$929,375** |

Source: Lightcast impact model.

## Total benefits to taxpayers

The $929.4 million in taxpayer benefits accrue as long as the FY 2020-21 student population is active in the state workforce. Table 3.4 outlines the stream of benefits taxpayers receive.

**Table 3.4: Projected benefits, taxpayer perspective**

| 1 | 2 |
|---|---|
| **Year** | **Benefits to taxpayers (millions)** |
| 0 | $67.7 |
| 1 | $4.2 |
| 2 | $6.1 |
| 3 | $9.5 |
| 4 | $14.3 |
| 5 | $20.2 |
| 6 | $20.5 |
| 7 | $20.9 |
| 8 | $21.3 |
| 9 | $21.7 |
| 10 | $22.0 |
| 11 | $22.3 |
| 12 | $22.6 |
| 13 | $22.9 |
| 14 | $23.2 |
| 15 | $23.4 |
| 16 | $23.6 |
| 17 | $23.7 |
| 18 | $23.9 |
| 19 | $23.9 |
| 20 | $24.0 |
| 21 | $24.0 |
| 22 | $23.9 |
| 23 | $23.8 |
| 24 | $23.6 |
| 25 | $23.4 |
| 26 | $23.2 |
| 27 | $22.9 |
| 28 | $22.5 |
| 29 | $22.1 |
| 30 | $21.6 |
| 31 | $21.1 |
| 32 | $20.6 |
| 33 | $20.0 |
| 34 | $19.4 |
| 35 | $18.8 |
| 36 | $18.1 |
| 37 | $17.4 |
| 38 | $16.7 |
| 39 | $16.0 |
| 40 | $15.3 |
| **Present value** | **$929.4** |

Numbers reflect aggregate values for all institutions and are subject to fluctuations due to the institutions' varying time horizons.

Source: Lightcast impact model.

42 For a full list of the data sources used to calculate the social externalities, see the Resources and References section. See also Appendix 11 for a more in-depth description of the methodology.

## Reed College alumna solving problems in local community

Alumna Nili Yosha founded an innovative non-profit called Outside the Frame, which is having an impact on houseless youth in Portland. With rigorous workshops and steady mentorship, Nili and her team teach the art and discipline of filmmaking to houseless youth. She and her students have made over 100 films in a wide variety of genres, like documentary, drama, music video, and comedy. Her students find that the process of learning how to tell a story through film helps them process their past and develop tools for writing or finding agency in designing their futures. In 2022, Nili and her students exhibited selected films in Venice as part of an exhibition curated by Professor of Art Gerri Ondrizek called "Transitions and Transformations: The Constant Flux of Our Personal Structures."

## Willamette University connects student with political internship

When Chris Brown traveled to Washington, D.C., for an internship with Sen. Dan Sullivan (R-AK), he was entering what some refer to as "the path to employment." Last summer, the Ketchikan native became involved with the legislative process, working on issues that have become increasingly important to him—energy, the environment, and policy affecting Alaska Natives. For many interns, internships like these lead to junior staff roles in Sullivan's office. Brown hopes he can be among them. "I'm definitely going to look into that and heading back to D.C." after graduation, he said.


He would be returning to familiar territory. Four years ago, he spent a summer in the office of Republican Sen. Lisa Murkowski to participate in the only congressional internship available to high school students—an effort by Murkowski to continue the legacy of Sen. Ted Stevens (R-AK), for whom she was a high school intern. The experience not only gave Brown a taste of political life, it confirmed the direction of his career. After Murkowski's internship, he completed another internship with the Oregon House Republican Caucus then a six-month session with Rep. Mark Owens (R-Crane), who had him work on renewable energy challenges like adjustments to Oregon's renewable portfolio standard and listened to his opinion on emerging bills.

Brown gained more practical experience as Sullivan's intern. He made connections with staff members, sat in on weekly Senate meetings, and got to be a fly on the wall during discussions with Alaska ambassadors and Native American leaders. He even worked on a bill awarding tax credits to non-Alaska Natives who returned Native cultural objects they owned—a meaningful opportunity, as Brown had become interested in these issues after being raised in Ketchikan's rich Native culture. Even small tasks in Sullvan's office gave interns uncommon authority. Answering calls from constituents required Brown to lend a sympathetic ear—sometimes only to hear a lot of yelling—but he learned what issues animate voters the most, especially during big news cycles, he said. In his first week, the Uvalde school shooting occurred and Sullivan's office was flooded with calls.

An economics major and art minor, Brown is preparing for his final semester at Willamette University and plans to pursue a career in environmental law. For students considering political internships, he has some advice. "There are more opportunities on the Hill than it might seem," he said. "Every time I've applied, there's always a voice inside asking, 'Am I going to get this?' But just go for it—it's definitely worth it."

## Pacific University's teaching of problem-solving skills helps transfer students throughout career

When LeMar Anglin came to Pacific University as a transfer student in 2009, his goal was to play basketball and become a physical therapist. But a conversation with a kinesiology professor changed his plans.

LeMar was researching how much footwear could improve a basketball player's performance, when his professor asked, "Have you ever thought about working at Nike?" LeMar hadn't. But after realizing the global athletics powerhouse was headquartered right in Pacific's backyard, he made it his mission.

In the past decade, LeMar has worked his way through the ranks, networking, and building on his connections. Today, he's Nike's global sports apparel product director, and he credits his success to his experiences at Pacific. "My love for problem-solving really grew from there, and now I literally look at everything as a problem to be solved", he said. "I now find joy in not just doing the bare minimum, but in trying to completely obliterate whatever problem; to solve every aspect of every challenge to ensure that we can go on and achieve what we're trying to achieve. That way of thinking I didn't have before."

## Reed College students win national statistics competition

A team of three Reedies, Robin Hart, Maxwell VanLandSchoot, and Sung Bum "Simon" Ahn won first place in a national statistics competition: the intermediate section of the American Statistical Association (ASA) and the Consortium for the Advancement of Undergraduate Statistics Education (CAUSE) sponsored Undergraduate Statistics Project Competition (USPROC).

The team's project had origins in an internship that Robin held with Reed alumna Christine Hedman, executive director of the Washington Defenders Association. When Statistics Professor Jonathan Wells assigned a group project in Math 243 Statistical Learning, Robin recalled some data sets that they encountered during that internship—funding allocations for the Washington State Office of Public Defense. These data would form the basis of Robin, Maxwell, and Simon's project. Statistical analyses performed by the group showed that the Washington State public defense funding model was flawed, and they endeavored to create a new one. When they did so successfully, Professor Wells encouraged them to apply to the national competition. They said they were "blown away" by the win, and that they hope that their win shows that stats can be a tool to fight for equity and justice and that though Reed's Stats department is small, it's mighty.

## Willamette University student and professor team up to draft proposal on streaming royalty for musicians—and *Rolling Stone* takes notice

Willamette Law Jordyn Wickstrom didn't picture herself behind the scenes of a Congressional Resolution featured in a *Rolling Stone* article. But that's where she ended up this summer, after working as a research assistant for Professor Rohan Grey, a primary drafter of a Congressional Resolution introduced by U.S. Reps. Rashida Tlaib (D-MI) and co-sponsor Jamaal Bowman (D-NY) on August 11, 2022. The resolution proposes a new streaming royalty for musicians, offering payment on a per-stream basis. Although streaming services provide the main avenue for listening to music in 2022, performing musicians are paid very little for their work.

Wickstrom became interested in helping draft the resolution and subsequent bill after taking Grey's Contracts class as a 1L and working with him on Oregon public banking legislation. Despite her unfamiliarity with the subject matter, she dove in. "I didn't know anything about how music royalties are paid to artists and had to do a lot of research to familiarize myself with copyright law and the royalties artists get for their work," she said. "I started by drafting a preamble of the resolution and looking into why this was important, comparing with other countries. I also tied in things that have happened that make this a noteworthy issue, such as the COVID pandemic, which caused musicians to earn significantly less."

The pay issue came to the forefront for Tlaib after she partnered with the Union of Musicians and Allied Workers. "When we met [with UMAW], it was really clear how efforts to pay musicians fairly for their work tied into so many different threads of justice we were already working on," Tlaib said in the *Rolling Stone* article. "We've worked with UMAW and artists to develop this resolution as a consciousness-builder and an organizing tool, to raise awareness amongst not only lawmakers but also just everyday streaming users about how when you listen to a song on Spotify and other platforms, the artist is being paid basically nothing." Tlaib says the work "is a step in the direction of" equitably paying musicians for their art. She introduced the resolution to Congress in mid-August, with the full bill forthcoming.

Wickstrom isn't sure of her future career plans as an attorney, but she says the experience was valuable. She learned the differences between a resolution and a bill and says the drafting skills are transferable to her work with the public banking working group. She appreciates that Grey, as a professor, always tries to ensure his students have experiential learning opportunities.

# Social perspective

Oregon benefits from the education that The Alliance member institutions provide through the earnings that students create in the state and through the savings that they generate through their improved lifestyles. To receive these benefits, however, members of society must pay money and forego services that they otherwise would have enjoyed if the member institutions did not exist. Society's investment in the member institutions stretches across several investor groups, from students to employers to taxpayers. We weigh the benefits generated by The Alliance member institutions to these investor groups against the total social costs of generating those benefits. The total social costs include all the member institutions' expenditures, all student expenditures (including interest on student loans) less tuition and fees, and all student opportunity costs, totaling a present value of $1.1 billion.

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

**Social costs**

- The Alliance member institutions' expenditures
- Student out-of-pocket expenses
- Student opportunity costs

**Social benefits**

- Increased economic base
- Avoided social costs

## Growth in state economic base

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

### Beekeeper analogy

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

But from society's standpoint, there is more. Flowers provide the nectar that bees need for honey production, and smart beekeepers locate near flowering sources such as orchards. Nearby orchard owners, in turn, benefit as the bees spread the pollen necessary for orchard growth and fruit production. This is an uncompensated external benefit of beekeeping, and economists have long recognized that society might do well to subsidize activities that produce positive externalities, such as beekeeping.

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

Estimating the effect of The Alliance member institutions on the state's economic base follows a similar process used when calculating increased tax revenues in the taxpayer perspective. However, instead of looking at just the tax revenue portion, we include all of the added earnings and business output. First, we calculate the students' future higher earnings stream. We factor in student attrition and alternative education opportunities to arrive at net higher earnings. We again apply multipliers derived from Lightcast's MR-SAM model to estimate the added labor and non-labor income created in the state as students and businesses spend their higher earnings and as businesses generate additional profits from this increased output (added student and business income in Figure 3.3.). We also include the operations, visitor, and student spending impacts discussed in Chapter 2 that were created in FY 2020-21 (added income from the institutions' activities in Figure 3.3.).

Using this process, we calculate the present value of the future added income that occurs in the state, equal to $7.3 billion. Recall from the discussion of the student and taxpayer return on investment that the present value represents the sum of the future benefits that accrue each year over the course of the time horizon, discounted to current year dollars to account for the time value of money. As stated in the taxpayer perspective, given that the stakeholder in this case is the public sector, we use the discount rate of -0.3%.


Multnomah University

## Social savings

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

addition to avoided costs to the justice system, crime savings also consist of avoided victim costs and benefits stemming from the added productivity of individuals who otherwise would have been incarcerated. Income assistance savings are comprised of the avoided government costs due to the reduced number of welfare and unemployment insurance claims.

Table 3.5 displays the results of the analysis. The first row shows the increased economic base in the state, equal to $7.3 billion, from students' higher earnings and their multiplier effects, increases in non-labor income, and spending impacts. Social savings appear next, beginning with a breakdown of savings related to health. These include savings due to a reduced demand for medical treatment and social services, improved worker productivity and reduced absenteeism, and a reduced number of vehicle crashes and fires induced by alcohol or smoking-related incidents. These savings amount to $391.9 million. Crime savings amount to $87.1 million, including savings associated with a reduced number of crime victims, added worker productivity, and reduced expenditures for police and law enforcement, courts and administration of justice, and corrective services. Finally, the present value of the savings related to income assistance amount to $4 million, stemming from a reduced number of persons in need of welfare or unemployment benefits. All told, social savings amounted to $483 million in benefits to communities and citizens in Oregon.

**Table 3.5: Present value of the future increased economic base and social savings in the state (thousands)**

| | |
|---|---|
| **Increased economic base** | **$7,288,359** |
| **Social savings** | |
| **Health** | |
| Smoking | $54,547 |
| Alcohol dependence | $58,771 |
| Obesity | $87,297 |
| Depression | $168,990 |
| Drug abuse | $22,292 |
| **Total health savings** | **$391,898** |
| **Crime** | |
| Criminal justice system savings | $75,688 |
| Crime victim savings | $1,440 |
| Added productivity | $9,931 |
| **Total crime savings** | **$87,059** |
| **Income assistance** | |
| Welfare savings | $2,204 |
| Unemployment savings | $1,845 |
| **Total income assistance savings** | **$4,050** |
| **Total social savings** | **$483,007** |
| **Total, increased economic base + social savings** | **$7,771,365** |

Source: Lightcast impact model.

The sum of the social savings and the increased state economic base is $7.8 billion, as shown in the bottom row of Table 3.5 and in Figure 3.3. These savings accrue in the future as long as the FY 2020-21 student population of The Alliance member institutions remains in the workforce.

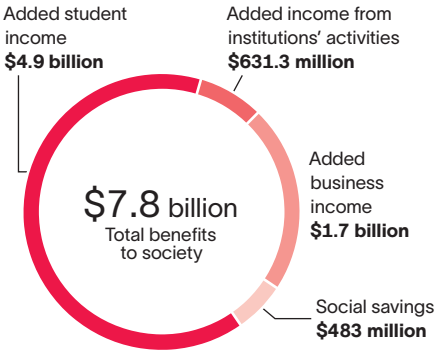
## Return on investment for society

Table 3.6 presents the stream of benefits accruing to the Oregon society and the total social costs of generating those benefits. Comparing the present value of the benefits and the social costs, we have a benefit-cost ratio of 6.9. This means that for every dollar invested in an education from The Alliance member institutions, whether it is the money spent on operations of the institutions or money spent by students on tuition and fees, an average of $6.90 in benefits will accrue to society in Oregon.[43]

## With and without social savings

Earlier in this chapter, social benefits attributable to education (improved health, reduced crime, and reduced demand for income assistance) were defined as externalities that are incidental to the operations of The Alliance member institutions. Some would question the legitimacy of including these benefits in the calculation of rates of return to education, arguing that only the tangible benefits (higher earnings) should be counted. Table 3.4 and Table 3.6 are inclusive of social benefits reported as attributable to The Alliance member institutions. Recognizing the other point of view, Table 3.7 shows benefits for taxpayers and rates of return for society, exclusive of social benefits. As indicated, taxpayers still receive sizable benefits; and, from the social perspective, returns are still above threshold values (a net present value greater than zero and a benefit-cost ratio greater than 1.0), confirming that Oregon's broader society receives value from investing in The Alliance member institutions.

**Figure 3.3: Present value of benefits to society**




Source: Lightcast impact model.

**Table 3.7: Taxpayer and social perspectives with and without social savings**

| | Including social savings | Excluding social savings |
|---|---|---|
| **Taxpayer perspective** | | |
| Present value benefits (millions) | $929.4 | $773.0 |
| **Social perspective** | | |
| Net present value (millions) | $6,653.1 | $6,170.1 |
| Benefit-cost ratio | 6.9 | 6.5 |

Source: Lightcast impact model.

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

Table 3.6: **Projected benefits and costs, social perspective**

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| Year | Benefits to society (millions) | Social costs (millions) | Net cash flow (millions) |
| 0 | $656.9 | $1,015.5 | -$358.6 |
| 1 | $31.2 | $5.1 | $26.0 |
| 2 | $45.7 | $5.1 | $40.5 |
| 3 | $72.2 | $5.1 | $67.0 |
| 4 | $110.0 | $5.1 | $104.8 |
| 5 | $156.3 | $5.1 | $151.2 |
| 6 | $160.7 | $5.1 | $155.6 |
| 7 | $165.1 | $5.1 | $160.0 |
| 8 | $169.4 | $5.1 | $164.2 |
| 9 | $173.4 | $5.1 | $168.2 |
| 10 | $177.2 | $5.1 | $172.0 |
| 11 | $180.8 | $5.1 | $175.7 |
| 12 | $184.2 | $5.1 | $179.1 |
| 13 | $187.4 | $5.1 | $182.3 |
| 14 | $190.3 | $5.1 | $185.2 |
| 15 | $192.9 | $5.1 | $187.8 |
| 16 | $195.2 | $4.5 | $190.7 |
| 17 | $197.1 | $4.5 | $192.6 |
| 18 | $198.6 | $4.5 | $194.1 |
| 19 | $199.7 | $4.5 | $195.2 |
| 20 | $200.4 | $4.5 | $195.9 |
| 21 | $200.6 | $0.0 | $200.6 |
| 22 | $200.4 | $0.0 | $200.4 |
| 23 | $199.8 | $0.0 | $199.8 |
| 24 | $198.7 | $0.0 | $198.7 |
| 25 | $197.1 | $0.0 | $197.1 |
| 26 | $195.1 | $0.0 | $195.1 |
| 27 | $192.6 | $0.0 | $192.6 |
| 28 | $189.6 | $0.0 | $189.6 |
| 29 | $186.2 | $0.0 | $186.2 |
| 30 | $182.4 | $0.0 | $182.4 |
| 31 | $178.1 | $0.0 | $178.1 |
| 32 | $173.6 | $0.0 | $173.6 |
| 33 | $168.6 | $0.0 | $168.6 |
| 34 | $163.4 | $0.0 | $163.4 |
| 35 | $157.8 | $0.0 | $157.8 |
| 36 | $152.0 | $0.0 | $152.0 |
| 37 | $146.0 | $0.0 | $146.0 |
| 38 | $139.9 | $0.0 | $139.9 |
| 39 | $133.6 | $0.0 | $133.6 |
| 40 | $127.3 | $0.0 | $127.3 |
| **Present value** | **$7,771.4** | **$1,118.2** | **$6,653.1** |

Numbers reflect aggregate values for all institutions and are subject to fluctuations due to the institutions' varying time horizons.

Source: Lightcast impact model.

Benefit-cost ratio
6.9

Payback period (years)
4.8

## University of Portland resources help students find purpose and community

When she first arrived at University of Portland, Maya Struzak felt a little lost. But once she started to get involved in clubs and began taking advantage of the many resources UP provides, she quickly found her purpose and her community. She took a world-expanding service trip to Ghana, conducted research with professors that led to a soon-to-be-published paper, and started a Human Powered Vehicle Design club with funding from the Shiley School of Engineering—all before her senior year. These experiences have crystallized her interest in environmental engineering and the university can't wait to see what she does next.

## Western Seminary student helps mobilize aid to Ukraine

When Russia invaded Ukraine in February 2022, Paul Billings was ready to help. He and his family traveled from the Middle East to the Ukrainian-Hungarian border to meet up with family members who were fleeing the country. From there, Paul drove into Ukraine to help more relatives escape with their families. The Billings family has many ties to Ukraine. Although they currently serve as church planters in the Middle East, they spent several years planting a church in Chernihiv, Ukraine. Paul's wife Melanie also has three brothers who are all church pastors in the country. "Ukraine is a second home for me," said Paul, an online student at Western Seminary. "For my wife, it is home."

As the conflict dragged on, Paul began to hear of growing needs from his network of pastors and friends still living inside Ukraine. In addition to requests for food and medical supplies, there was a need for tourniquets and first-aid supplies for injured soldiers. Rather than wait for relief organizations to step up, he and several friends decided they would use their connections in Ukraine to bring the aid themselves. "There were a few aid groups on the ground at the beginning of the war, but the scale of the crisis was more than what people were expecting," said Paul.

He got in touch with friends in Poland who had been helping refugees at the border, and they came up with a plan to transport food and supplies from Poland into Ukraine. A Polish businessman offered up a warehouse for free, and Paul purchased trucks and 18-wheelers thanks to financial contributions from churches throughout Europe and the U.S. They began transporting food and supplies to Ukraine all the way up to the front lines of the fighting with the help of military chaplains. "It was really cool to see churches across denominational lines respond," he said.

Paul was eager to bring supplies to Chernihiv, the city where he had lived and served as a pastor. For over a month, Russian forces had completely cut off the city from any outside aid. "We were concerned and in touch with people inside the city. There were crazy stories you can't even believe." There was an acute need in Chernihiv for insulin and thyroid medication, especially after one of the insulin factories near Kyiv was destroyed. Paul even had a request from a government official for insulin.

In April, Paul got the news that Chernihiv had become accessible, and he and a few others quickly loaded up a van and truck with food, insulin, and diesel fuel and headed to Kyiv. From there they went north towards Chernihiv, being careful to travel on back roads and across pontoon bridges to avoid the minefields left behind by the Russian forces. "It was surreal for me to drive into that part of the country I had lived in and knew so well, and to see blown-up tanks and destruction everywhere," admitted Paul. The convoy made it successfully to Chernihiv and took the medicine to the main hospital, where it could be distributed throughout the city to those in need. Paul was grateful to be there in person to donate the supplies on behalf of so many churches and believers around the world. "It was cool to go to the Ukrainians and say to them, 'This isn't from the U.N. or the Red Cross. This is just from believers all around the world who are praying for you guys.' What a blessing to be able to do that in the name of Jesus."

As Paul continues to schedule visits to Ukraine, he is often overwhelmed by the destruction and pain inflicted on the Ukrainian people. Many of his friends have successfully navigated minefields to flee the country with their families. But some haven't survived. While some parts of the country are more stable now, other parts are still completely cut off from aid. Paul knows the situation can change in an instant, which is why he continues to keep the food and medical supplies coming.

## Faculty/student research at Reed College yields significant findings

A team of biologists led by Professor Sam Fey recently published new findings that shed light on how phytoplankton respond to big swings in temperature—findings with significant implications for how ecologists make predictions about the ultimate fate of populations in unstable ecosystems, from sea urchins to manatees to human beings. The research was supported by a multi-year grant from the National Science Foundation. The research team, which included Maeve Kolk, Delaney Brubaker, biology lab manager Tamara Layden, and researchers from UCLA and Yale University, studied colonies of phytoplankton both in the lab and in the canyon that runs through the Reed College campus. After years of work, they developed a new mathematical framework for predicting the effect of plasticity when conditions change suddenly.

## Willamette University helps students on path to success at global sustainability leader

As a sustainability program manager at tech giant HP, Shannon Lee, recently received a promotion that's positioned her to help drive healthy forestry practices. Lee credits her cross-disciplinary education within Atkinson Graduate School of Management at Willamette University as key to her success as a leader in the global sustainability. "My MBA studies definitely prepared me to switch contexts (in terms of business operating units) and still have a strategic view, which is crucial in the work I do," said Lee. She's on a company-wide team that leads sustainability at HP. "At Willamette, there was an emphasis on learning a bit of everything before going in-depth in one field," Lee said.

And if it weren't for a connection Lee made as a 12-year-old, she might not be making a difference the way she is today. Lee traces the inspiration to a 2010 documentary about the social structures of crows. "This documentary opened up my mind to the idea that humans are more than intertwined with nature, humans are a part of nature, and with this realization comes the duty to respect nature as we respect other humans and ourselves," Lee said.

Fast forward to 2016, Lee had graduated high school and headed off to college. She was curious to learn more about biology, ecology, and sustainability. "Soon after I got to Willamette, I remembered one of the scientists from that documentary who really inspired me—David Craig—was a professor of biology there," she said. "At the time, I was starstruck and really freaking out about the coincidence," Lee said. She was introduced to Craig, went on group birding outings, and eventually landed on environmental sciences as her undergraduate major.

For her master's of business administration, Lee focused on the economics of corporate sustainability, worked as a research assistant on corporate social responsibility research for Professor Emeritus of Marketing Elliot Maltz, and began as an intern with HP in 2020. "Companies have to balance making money with making money the right way, and Willamette University put me in a good position to speak to that. HP is doing a great job with sustainability and I am helping find ways to do it even better," she said.

## Corban University alumnus brings economic empowerment to Ugandans

As the founder of Kijani Forestry in Gulu, Uganda, Quinn Neely's organization helps bring economic empowerment to local Ugandans while also confronting the problem of rampant deforestation in the country, driven by an unsustainable charcoal industry. Last year, Kijani partnered with local farmers to plant over 6 million trees, with plans to plant 40 million this year. Kijani's method is generating 50% more charcoal than the existing industry and doing so sustainably, without the need for cutting down indigenous forests. "We are working with local farmers," says Neely. "We provide the method, the kilns, the seeds, and the pots, and we show them how to build nurseries and guide them through the whole process. If we are able to provide economic empowerment now, we believe the next generations will be able to enjoy permanent, long-term effects on their communities, country, and the world."

## Multnomah University's Global Studies program allows student to step into dream career

Each of us is gifted with unique skills and passions, but sometimes you have to seek good soil to grow to uncover your calling. Growing up in a deaf family, Katarina Kerr always had a heart for American Sign Language (ASL). During Kat's sophomore year at a state school, she witnessed her mother have a cross-cultural experience on a mission trip with other deaf people like her. Kat saw the difference made by making the gospel accessible in sign language and came home with a new mission. Kat followed her calling from God to pursue deaf ministry, which led her to Multnomah University.

When Kat joined Multnomah's Global Studies program, she was blown away by the experience of taking Bible classes at a small college. She shared, "There were so many opportunities for me to talk to professors and other peers about what I was processing in my classes and what I was learning. It was just like a safe place to wrestle... I think it really challenged me to dig deep and figure out what I feel like God's called me to do."

Alongside her classes, Multnomah's Global Studies program required Kat to earn internship experience, which opened the door to her job with Pioneer Bible Translators. The internship challenged Kat to step out of her comfort zone and figure out what she was passionate about. It also allowed her to step into her dream career of working in a deaf ministry.

Today, Kat still feels the support of Multnomah from Texas where she works in Donor Engagement on Pioneer Bible Translator's Advancement Team. Kat shared this about Multnomah's professors, "They were just so willing to cheer me on, and they still cheer me on to this day. They get my newsletters and email me every so often. Knowing that you have professors in your corner and cheering for you to help push you towards your goals was what led me to my career and where I am today."

Chapter 4:

# Conclusion

: University of Portland

**WHILE THE ALLIANCE MEMBER INSTITUTIONS' VALUE** to Oregon is larger than simply their economic impact, understanding the dollars and cents value is an important asset to understanding the member institutions' value as a whole. To fully assess their value to the state economy, this report has evaluated the member institutions from the perspectives of economic impact analysis and investment analysis.

From an economic impact perspective, we calculated that The Alliance member institutions generate a total economic impact of **$3.5 billion** in total added income for the state economy. This represents the sum of several different impacts, including the institutions':

- Operations spending impact (**$491.2 million**);
- Visitor spending impact (**$26 million**);
- Student spending impact (**$114.1 million**); and
- Alumni impact (**$2.9 billion**).

**One out of every 59 jobs** in Oregon is supported by the activities of The Alliance member institutions and their students.

The total impact of $3.5 billion is equivalent to approximately **1.3%** of the total GSP of Oregon and is equivalent to supporting **43,396 jobs**. For perspective, this means that **one out of every 59 jobs** in Oregon is supported by the activities of The Alliance member institutions and their students.

Since The Alliance member institutions' activity represents an investment by various parties, including students and society as a whole, we also considered the institutions as an investment to see the value they provide to these investors. For each dollar invested by students and society, member institutions offer a benefit of **$3.50** and **$6.90**, respectively. These results indicate that The Alliance member institutions are an attractive investment to students with rates of return that exceed alternative investment opportunities. At the same time, the presence of the institutions expands the state economy and creates a wide range of positive social benefits that accrue to taxpayers and society in general within Oregon. Finally, even though The Alliance consists of private, nonprofit institutions, and state and local governments invest very little in them, Oregon taxpayers will still receive **$929.4 million** in benefits throughout the students' working lives.

Modeling the impact of the institutions is subject to many factors, the variability of which we considered in our sensitivity analysis (Appendix 2). With this variability accounted for, we present the findings of this study as a robust picture of the economic value of The Alliance member institutions.

## George Fox University student offered job months before graduation

Mitchell Henry now works at DTG Enterprises as a multimedia producer, brainstorming and implementing video, photo, and digital content marketing ideas, with the goal of growing the company's brand awareness throughout the region.

"It felt fantastic to secure a position before I graduated," he says. "I give a lot of credit for my professional development to the internships that I have worked over the years. George Fox University offered me incredible internships where I was trained by professionals in their craft and learned countless skills."

"My professors in the College of Business are incredible," he adds. "They want to see you succeed in a way that's hard to describe; almost akin to the way a family roots for each other's success and helps in any way possible. Countless times, I have scheduled meetings with my professors strictly to learn from them and to soak up whatever advice that they have for me."

## Multnomah University, small community near big-city career opportunities

One of the best parts about attending Multnomah University is that you won't have to sacrifice big opportunities for a small community. Situated in the suburbs of Portland, the city is bursting with exciting career opportunities for students. 2022 graduate Alyssa Mehalovich found a business career in her dream industry just a few miles from campus. As a student-athlete at Multnomah, it was important to Alyssa to find a career that allowed her to continue to work in a team environment.

When Alyssa started looking around for internships for her Business program, she discovered the Portland Pickles Baseball team was hiring a social media marketing intern. After a summer working for the Pickles, Alyssa was perfectly aligned for her final college internship that would turn into a career with the Portland Winterhawks hockey team. Alyssa was able to seize the opportunities the big city had to offer, all while being a student athlete at Multnomah. However, Alyssa's story isn't only about the career opportunities created by living in Portland. Her days on campus also helped Alyssa grow as a person.

Reflecting on her time at Multnomah, Alyssa shared, "I made friendships and memories I know I'll have forever. I was able to be a part of a small community and make an impact with where I was at, and that was one of the best parts about it." As a team captain for the volleyball team, Alyssa also learned to lean on God for guidance. "In those challenging times, I had to rely on my faith and reach out to God, and I created a new relationship with Him that I didn't have before coming here."

Multnomah University offers more to its students than just a great location. It provides students with a loving community of Christ-followers who will be with them every step of the way during their college journey. Multnomah is a place to experience a small community in a big city and leave ready to pursue the career of your dreams.

## Being a University of Portland Pilot

What's it like to be a University of Portland Pilot? Driven by mission, steeped in tradition, and transformed by learning and serving, UP attracts students who are innovators, researchers, and change-makers. The culture of UP is about embracing challenges, trying something new, and giving back to its communities.

## Linfield University's Emma Libby took her wine studies education out of the classroom

Linfield University was checking off all the boxes on Emma's college wish list before even stepping foot onto campus. The campus and community looked inviting throughout her research but in person, Linfield proved to be so much more. Emma was able to imagine herself walking to classes under the comforting shade of tall oak trees, greeting the friendly smiles of familiar faces, and soaking up the beauty of a small town surrounded by vineyards. The campus community overflows with things to appreciate.

Seeing the school in person affirmed Emma's feeling that Linfield was the kind of school she'd want to attend. So much was yet to be discovered but Emma was confident. "Being there in person I knew, okay, this is where I need to be," said Libby. "Linfield advertises that our community is great, but I feel like every college [promotes] that. You really don't feel it until you're personally on campus. It is something that you can't just research." The positive impacts of being a Linfield student stretch far beyond the campus's joyful environment. Dedicated professors, small class sizes, and endless opportunities to get involved all contribute to the school's appeal. However, the ways in which Linfield encourages students to be active off campus are just as profound.

Emma's internship program with the Oregon Wine History Archives at Linfield is a prime example of how beneficial experiential opportunities can be. Emma's internship took her all around Oregon where she visited vineyards and interviewed people in the wine industry. As wine studies and journalism and media studies (JAMS) double major this opportunity was huge. Her internship simultaneously helped her pursue her career and build her education outside of the classroom. She practiced her interview skills and exercised other traits essential to being a JAMS major, while also increasing her knowledge of wine. Arguably one of the most important elements of this work is how it deepened her connection with the industry she hopes to work in after graduation. "Hearing about people's passion in the industry gives me a nice window into where I want to be," said Emma.

An additional way Emma has deepened this connection has been through her overseas study. Emma, like many Linfield students, took advantage of the university's many versatile study-abroad opportunities. She spent the spring semester of 2022 learning about wine in France. "The passion there is amazing," said Emma. "Wine is really integrated into social life and everyday life in France. The drinking culture there is so different than that of the U.S." There is so much to appreciate while studying abroad. It is one of Linfield's many must-have experiences. Emma explained, "You really experience [more than] the country. No matter what country you're going to, the way of life is always so different." Students become more independent while studying abroad. They learn more about themselves, build lifelong memories and new skills, and have a better understanding of the world—all strengthening the foundation of who you are.

Lightcast

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# Appendix 1: The Oregon Alliance of Independent Colleges and Universities

| Institution | Establishment year | Student headcount in FY 2020-21 |
|---|---|---|
| Bushnell University | 1895 | 849 |
| Corban University | 1935 | 1,687 |
| George Fox University | 1891 | 4,623 |
| Lewis & Clark College | 1867 | 3,477 |
| Linfield University | 1858 | 2,175 |
| Multnomah University | 1936 | 650 |
| Pacific University | 1849 | 4,261 |
| Reed College | 1908 | 1,455 |
| University of Portland | 1901 | 4,330 |
| Warner Pacific University | 1937 | 1,126 |
| Western Seminary | 1927 | 826 |
| Willamette University | 1842 | 2,309 |

# Appendix 2: Sensitivity analysis



Sensitivity analysis measures the extent to which a model's outputs are affected by hypothetical changes in the background data and assumptions. This is especially important when those variables are inherently uncertain. This analysis allows us to identify a plausible range of potential results that would occur if the value of any of the variables is in fact different from what was expected. In this chapter we test the sensitivity of the model to the following input factors: 1) the alternative education variable, 2) the labor import effect variable, 3) the student employment variables, 4) the discount rate, and 5) the retained student variable.

## Alternative education variable

The alternative education variable (10%) accounts for the counterfactual scenario where students would have to seek a similar education elsewhere absent the member institutions in the state. Given the difficulty in accurately specifying the alternative education variable, we test the sensitivity of the taxpayer and social investment analysis results to its magnitude. Variations in the alternative education assumption are calculated around base case results listed in the middle column of Table A2.1. Next, the model brackets the base case assumption on either side with a plus or minus 10%, 25%, and 50% variation in assumptions. Analyses are then repeated introducing one change at a time, holding all other variables constant. For example, an increase of 10% in the alternative education assumption (from 10% to 11%) reduces the taxpayer perspective present value of benefits from $929.4 million to $919.0 million. Likewise, a decrease of 10% (from 10% to 9%) in the assumption increases the present value from $929.4 million to $939.7 million.

**Table A2.1: Sensitivity analysis of alternative education variable, taxpayer and social perspectives**

| % variation in assumption | -50% | -25% | -10% | Base case | 10% | 25% | 50% |
|---|---|---|---|---|---|---|---|
| **Alternative education variable** | **5.0%** | **7.5%** | **9.0%** | **10.0%** | **11.0%** | **12.5%** | **15.0%** |
| **Taxpayer perspective** | | | | | | | |
| Present value benefits (millions) | $981.0 | $955.2 | $939.7 | $929.4 | $919.0 | $903.6 | $877.7 |
| **Social perspective** | | | | | | | |
| Net present value (millions) | $7,339 | $6,996 | $6,790 | $6,653 | $6,516 | $6,310 | $5,967 |
| Benefit-cost ratio | 7.6 | 7.3 | 7.1 | 6.9 | 6.8 | 6.6 | 6.3 |

Based on this sensitivity analysis, the conclusion can be drawn that The Alliance member institutions' investment analysis results from the taxpayer and social perspectives are not very sensitive to relatively large variations in the alternative education variable. As indicated, taxpayers will still receive financial benefits, and social results are still above their threshold levels (a net present value greater than zero and a benefit-cost

ratio greater than 1.0), even when the alternative education assumption is increased by as much as 50% (from 10% to 15%). The conclusion is that although the assumption is difficult to specify, its impact on overall investment analysis results for the taxpayer and social perspectives is not very sensitive.

## Labor import effect variable

The labor import effect variable only affects the alumni impact calculation in Table 2.8. In the model we assume a labor import effect variable of 50%, which means that 50% of the state's labor demands would have been satisfied without the presence of The Alliance member institutions. In other words, businesses that hired the institutions' students could have substituted some of these workers with equally-qualified people from outside the state had there been no students from the member institutions to hire. Therefore, we attribute only the remaining 50% of the initial labor income generated by increased alumni productivity to the institutions.

Table A2.2 presents the results of the sensitivity analysis for the labor import effect variable. As explained earlier, the assumption increases and decreases relative to the base case of 50% by the increments indicated in the table. Alumni productivity impacts attributable to The Alliance member institutions, for example, range from a high of $4.3 billion at a -50% variation to a low of $1.4 billion at a +50% variation from the base case assumption. This means that if the labor import effect variable increases, the impact that we claim as attributable to alumni decreases. Even under the most conservative assumptions, the alumni impact on the Oregon economy still remains sizeable.

**Table A2.2: Sensitivity analysis of labor import effect variable**

| % variation in assumption | -50% | -25% | -10% | Base case | 10% | 25% | 50% |
|---|---|---|---|---|---|---|---|
| Labor import effect variable | 25% | 38% | 45% | 50% | 55% | 63% | 75% |
| Alumni impact (millions) | $4,340 | $3,617 | $3,183 | $2,893 | $2,604 | $2,170 | $1,447 |

## Student employment variables

Student employment variables are difficult to estimate because many students do not report their employment status or because institutions generally do not collect this kind of information. Employment variables include the following: 1) the percentage of students who are employed while attending the institutions and 2) the percentage of earnings that working students receive relative to the earnings they would have received had they not chosen to attend the institutions. Both employment variables affect the investment analysis results from the student perspective.

Students incur substantial expense by attending the institutions because of the time they spend not gainfully employed. Some of that cost is recaptured if students remain partially (or fully) employed while attending. It is estimated that 62% of students are employed.[44] This variable is tested in the sensitivity analysis by changing it first to 100% and then to 0%.

44 Lightcast provided estimates of the percentage of students employed for institutions unable to provide data. This figure excludes dual credit high school students, who are not included in the opportunity cost calculations.

The second student employment variable is more difficult to estimate. In this study we estimate that students who are working while attending the institutions earn only 83%, on average, of the earnings that they statistically would have received if not attending the institutions. This suggests that many students hold part-time jobs that accommodate their attendance at the institutions, though it is at an additional cost in terms of receiving a wage that is less than what they otherwise might make. The 83% variable is an estimation based on the average hourly wages of the most common jobs held by students while attending college relative to the average hourly wages of all occupations in Oregon. The model captures this difference in wages and counts it as part of the opportunity cost of time. As above, the 83% estimate is tested in the sensitivity analysis by changing it to 100% and then to 0%.

The changes generate results summarized in Table A2.3, with *A* defined as the percent of students employed and *B* defined as the percent that students earn relative to their full earning potential. Base case results appear in the shaded row; here the assumptions remain unchanged, with *A* equal to 62% and *B* equal to 83%. Sensitivity analysis results are shown in non-shaded rows. Scenario 1 increases *A* to 100% while holding *B* constant, Scenario 2 increases *B* to 100% while holding *A* constant, Scenario 3 increases both *A* and *B* to 100%, and Scenario 4 decreases both *A* and *B* to 0%.

**Table A2.3: Sensitivity analysis of student employment variables**

| Variations in assumptions | Net present value (millions) | Internal rate of return | Benefit-cost ratio |
|---|---|---|---|
| Base case: A = 62%, B = 83% | $2,207.8 | 12.5% | 3.5 |
| Scenario 1: A = 100%, B = 83% | $2,414.4 | 15.2% | 4.5 |
| Scenario 2: A = 62%, B = 100% | $2,277.0 | 13.3% | 3.8 |
| Scenario 3: A = 100%, B = 100% | $2,528.7 | 17.4% | 5.4 |
| Scenario 4: A = 0%, B = 0% | $1,890.6 | 9.8% | 2.6 |

Note: A = percent of students employed; B = percent earned relative to statistical averages

- **Scenario 1:** Increasing the percentage of students employed (A) from 62% to 100%, the net present value, internal rate of return, and benefit-cost ratio improve to $2.4 billion, 15.2%, and 4.5, respectively, relative to base case results. Improved results are attributable to a lower opportunity cost of time; all students are employed in this case.
- **Scenario 2:** Increasing earnings relative to statistical averages (B) from 83% to 100%, the net present value, internal rate of return, and benefit-cost ratio results improve to $2.3 billion, 13.3%, and 3.8, respectively, relative to base case results; a strong improvement, again attributable to a lower opportunity cost of time.
- **Scenario 3:** Increasing both assumptions *A* and *B* to 100% simultaneously, the net present value, internal rate of return, and benefit-cost ratio improve yet further to $2.5 billion, 17.4%, and 5.4, respectively, relative to base case results. This scenario assumes that all students are fully employed and earning full salaries (equal to statistical averages) while attending classes.

- **Scenario 4:** Finally, decreasing both *A* and *B* to 0% reduces the net present value, internal rate of return, and benefit-cost ratio to $1.9 billion, 9.8%, and 2.6, respectively, relative to base case results. These results are reflective of an increased opportunity cost; none of the students are employed in this case.[45]

It is strongly emphasized in this section that base case results are very attractive in that results are all above their threshold levels. As is clearly demonstrated here, results of the first three alternative scenarios appear much more attractive, although they overstate benefits. Results presented in Chapter 3 are realistic, indicating that investments in The Alliance member institutions generate excellent returns, well above the long-term average percent rates of return in stock and bond markets.

## Discount rate

The discount rate is a rate of interest that converts future monies to their present value. In investment analysis, the discount rate accounts for two fundamental principles: 1) the time value of money, and 2) the level of risk that an investor is willing to accept. Time value of money refers to the value of money after interest or inflation has accrued over a given length of time. An investor must be willing to forego the use of money in the present to receive compensation for it in the future. The discount rate also addresses the investors' risk preferences by serving as a proxy for the minimum rate of return that the proposed risky asset must be expected to yield before the investors will be persuaded to invest in it. Typically, this minimum rate of return is determined by the known returns of less risky assets where the investors might alternatively consider placing their money.

In this study, we assume a 3.7% discount rate for students and a -0.3% discount rate for society and taxpayers.[46] Similar to the sensitivity analysis of the alternative education variable, we vary the base case discount rates for students, taxpayers, and society on either side by increasing the discount rate by 10%, 25%, and 50%, and then reducing it by 10%, 25%, and 50%. Note that, because the rate of return and the payback period are both based on the undiscounted cash flows, they are unaffected by changes in the discount rate. As such, only variations in the net present value and the benefit-cost ratio are shown for students, taxpayers, and society in Table A2.4.

As demonstrated in the table, an increase in the discount rate leads to a corresponding decrease in the expected returns, and vice versa. For example, increasing the student discount rate by 50% (from 3.7% to 5.6%) reduces the students' benefit-cost ratio from 3.5 to 2.5. Conversely, reducing the discount rate for students by 50% (from 3.7% to 1.9%) increases the benefit-cost ratio from 3.5 to 5.0. The sensitivity analysis results

45 Note that reducing the percent of students employed to 0% automatically negates the percent they earn relative to full earning potential, since none of the students receive any earnings in this case.

46 These values are based on the baseline forecasts for the 10-year Treasury rate published by the Congressional Budget Office and the real treasury interest rates reported by the Office of Management and Budget for 30-year investments. See the Congressional Budget Office "Table 5. Federal Student Loan Programs: Projected Interest Rates: CBO's July 2021 Baseline" and the Office of Management and Budget "Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses."

for society and taxpayers show the same inverse relationship between the discount rate and the benefit-cost ratio, accounting for the negative real value of the former.

**Table A2.4: Sensitivity analysis of discount rate**

| % variation in assumption | -50% | -25% | -10% | Base case | 10% | 25% | 50% |
|---|---|---|---|---|---|---|---|
| **Student perspective** | | | | | | | |
| Discount rate | 1.9% | 2.8% | 3.4% | 3.7% | 4.1% | 4.7% | 5.6% |
| Net present value (millions) | $3,594 | $2,817 | $2,434 | $2,208 | $2,001 | $1,725 | $1,339 |
| Benefit-cost ratio | 5.0 | 4.1 | 3.7 | 3.5 | 3.2 | 2.9 | 2.5 |
| **Taxpayer perspective** | | | | | | | |
| Discount rate | -0.15% | -0.23% | -0.27% | -0.30% | -0.33% | -0.38% | -0.45% |
| Present value benefits (millions) | $902.2 | $915.7 | $923.9 | $929.4 | $934.9 | $943.4 | $957.7 |
| **Social perspective** | | | | | | | |
| Discount rate | -0.15% | -0.23% | -0.27% | -0.30% | -0.33% | -0.38% | -0.45% |
| Net present value (millions) | $6,428 | $6,539 | $6,607 | $6,653 | $6,699 | $6,769 | $6,888 |
| Benefit-cost ratio | 6.7 | 6.8 | 6.9 | 6.9 | 7.0 | 7.1 | 7.2 |

## Retained student variable

The retained student variable only affects the student spending impact calculation in Table 2.6. For this analysis, we assume a retained student variable of 10%, which means that 10% of the institutions' students who originated from Oregon would have left the state for other opportunities, whether that be education or employment, if The Alliance member institutions did not exist. The money these retained students spent in the state for accommodation and other personal and household expenses is attributable to the member institutions.

Table A2.5 presents the results of the sensitivity analysis for the retained student variable. The assumption increases and decreases relative to the base case of 10% by the increments indicated in the table. The student spending impact is recalculated at each value of the assumption, holding all else constant. Student spending impacts attributable to The Alliance member institutions range from a high of $121.3 million when the retained student variable is 15% to a low of $106.7 million when the retained student variable is 5%. This means as the retained student variable decreases, the student spending attributable to the member institutions decreases. Even under the most conservative assumptions, the student spending impact on the Oregon economy remains substantial.

**Table A2.5: Sensitivity analysis of retained student variable**

| % variation in assumption | -50% | -25% | -10% | Base case | 10% | 25% | 50% |
|---|---|---|---|---|---|---|---|
| Retained student variable | 5% | 8% | 9% | 10% | 11% | 13% | 15% |
| Student spending impact (thousands) | $106,721 | $110,353 | $112,533 | $114,150 | $115,439 | $117,619 | $121,251 |

# Appendix 3: Glossary of terms



**Alternative education:** A "with" and "without" measure of the percent of students who would still be able to avail themselves of education if the institutions under analysis did not exist. An estimate of 10%, for example, means that 10% of students do not depend directly on the existence of the institutions in order to obtain their education.

**Alternative use of funds:** A measure of how monies that are currently used to fund the institutions might otherwise have been used if the institutions did not exist.

**Asset value:** Capitalized value of a stream of future returns. Asset value measures what someone would have to pay today for an instrument that provides the same stream of future revenues.

**Attrition rate:** The rate at which students leave the workforce due to out-migration, unemployment, retirement, or death.

**Benefit-cost ratio:** Present value of benefits divided by present value of costs. If the benefit-cost ratio is greater than 1, then benefits exceed costs, and the investment is feasible.

**Counterfactual scenario:** What would have happened if a given event had not occurred. In the case of this economic impact study, the counterfactual scenario is a scenario where the institutions did not exist.

**Credit hour equivalent:** Credit hour equivalent, or CHE, is defined as 15 contact hours of education if on a semester system, and 10 contact hours if on a quarter system. In general, it requires 450 contact hours to complete one full-time equivalent, or FTE.

**Demand:** Relationship between the market price of education and the volume of education demanded (expressed in terms of enrollment). The law of the downward-sloping demand curve is related to the fact that enrollment increases only if the price (tuition and fees) is lowered, or conversely, enrollment decreases if price increases.

**Discounting:** Expressing future revenues and costs in present value terms.

**Earnings (labor income):** Income that is received as a result of labor; i.e., wages.

**Economics:** Study of the allocation of scarce resources among alternative and competing ends. Economics is not normative (what ought to be done), but positive (describes what is, or how people are likely to behave in response to economic changes).

**Elasticity of demand:** Degree of responsiveness of the quantity of education demanded (enrollment) to changes in market prices (tuition and fees). If a decrease in fees increases or decreases total enrollment by a significant amount, demand is elastic. If enrollment remains the same or changes only slightly, demand is inelastic.

**Externalities:** Impacts (positive and negative) for which there is no compensation. Positive externalities of education include improved social behaviors such as improved health, lower crime, and reduced demand for income assistance. Educational institutions do not receive compensation for these benefits, but benefits still occur because education is statistically proven to lead to improved social behaviors.

**Gross state product:** Measure of the final value of all goods and services produced in a state after netting out the cost of goods used in production. Alternatively, gross state product (GSP) equals the combined incomes of all factors of production; i.e., labor, land and capital. These include wages, salaries, proprietors' incomes, profits, rents, and other. Gross state product is also sometimes called value added or added income.

**Initial effect:** Income generated by the initial injection of monies into the economy through the payroll of the institutions and the higher earnings of their students.

**Input-output analysis:** Relationship between a given set of demands for final goods and services and the implied amounts of manufactured inputs, raw materials, and labor that this requires. When educational institutions pay wages and salaries and spend money for supplies in the state, they also generate earnings in all sectors of the economy, thereby increasing the demand for goods and services and jobs. Moreover, as students enter or rejoin the workforce with higher skills, they earn higher salaries and wages. In turn, this generates more consumption and spending in other sectors of the economy.

**Internal rate of return:** Rate of interest that, when used to discount cash flows associated with investing in education, reduces its net present value to zero (i.e., where the present value of revenues accruing from the investment are just equal to the present value of costs incurred). This, in effect, is the breakeven rate of return on investment since it shows the highest rate of interest at which the investment makes neither a profit nor a loss.

**Multiplier effect:** Additional income created in the economy as the institutions and their students spend money in the state. It consists of the income created by the supply chain of the industries initially affected by the spending of the institutions and their students (i.e., the direct effect), income created by the supply chain of the initial supply chain (i.e., the indirect effect), and the income created by the increased spending of the household sector (i.e., the induced effect).

**NAICS:** The North American Industry Classification System (NAICS) classifies North American business establishment in order to better collect, analyze, and publish statistical data related to the business economy.

**Net cash flow:** Benefits minus costs, i.e., the sum of revenues accruing from an investment minus costs incurred.

**Net present value:** Net cash flow discounted to the present. All future cash flows are collapsed into one number, which, if positive, indicates feasibility. The result is expressed as a monetary measure.

**Non-labor income:** Income received from investments, such as rent, interest, and dividends.

**Opportunity cost:** Benefits foregone from alternative B once a decision is made to allocate resources to alternative A. Or, if individuals choose to attend college, they forego earnings that they would have received had they chose instead to work full-time. Foregone earnings, therefore, are the "price tag" of choosing to attend college.

**Payback period:** Length of time required to recover an investment. The shorter the period, the more attractive the investment. The formula for computing payback period is:

*Payback period = cost of investment/net return per period*

# Appendix 4: Frequently asked questions (FAQs)

*This appendix provides answers to some frequently asked questions about the results.*

## What is economic impact analysis?

Economic impact analysis quantifies the impact from a given economic event—in this case, the presence of the institutions—on the economy of a specified region.

## What is investment analysis?

Investment analysis is a standard method for determining whether or not an existing or proposed investment is economically viable. This methodology is appropriate in situations where a stakeholder puts up a certain amount of money with the expectation of receiving benefits in return, where the benefits that the stakeholder receives are distributed over time, and where a discount rate must be applied in order to account for the time value of money.

## Do the results differ by region, and if so, why?

Yes. Regional economic data are drawn from Lightcast's proprietary MR-SAM model, the Census Bureau, and other sources to reflect the specific earnings levels, jobs numbers, unemployment rates, population demographics, and other key characteristics of the region served by the institutions. Therefore, model results for the institutions are specific to the given region.

## Are the funds transferred to the institutions increasing in value, or simply being re-directed?

Lightcast's approach is not a simple "rearranging of the furniture" where the impact of operations spending is essentially a restatement of the level of funding received by the institutions. Rather, it is an impact assessment of the additional income created in the region as a result of the institutions' spending on payroll and other non-pay expenditures, net of any impacts that would have occurred anyway if the institutions did not exist.

## How does my system's rates of return compare to that of other systems?

In general, Lightcast discourages comparisons between systems or institutions since many factors, such as regional economic conditions, institutional differences, and

student demographics are outside of the institutions' control. It is best to compare the rate of return to the discount rates of 3.7% (for students) and -0.3% (for society and taxpayers), which can also be seen as the opportunity cost of the investment (since these stakeholder groups could be spending their time and money in other investment schemes besides education). If the rate of return is higher than the discount rate, the stakeholder groups can expect to receive a positive return on their educational investment.

Lightcast recognizes that some institutions may want to make comparisons. As a word of caution, if comparing to an institution that had a study commissioned by a firm other than Lightcast, then differences in methodology will create an "apples to oranges" comparison and will therefore be difficult. The study results should be seen as unique to each institution.

## Net present value (NPV): How do I communicate this in laymen's terms?

Which would you rather have: a dollar right now or a dollar 30 years from now? That most people will choose a dollar now is the crux of net present value. The preference for a dollar today means today's dollar is therefore worth more than it would be in the future (in most people's opinion). Because the dollar today is worth more than a dollar in 30 years, the dollar 30 years from now needs to be adjusted to express its worth today. Adjusting the values for this "time value of money" is called discounting and the result of adding them all up after discounting each value is called net present value.

## Internal rate of return (IRR): How do I communicate this in laymen's terms?

Using the bank as an example, an individual needs to decide between spending all of their paycheck today and putting it into savings. If they spend it today, they know what it is worth: $1 = $1. If they put it into savings, they need to know that there will be some sort of return to them for spending those dollars in the future rather than now. This is why banks offer interest rates and deposit interest earnings. This makes it so an individual can expect, for example, a 3% return in the future for money that they put into savings now.

## Total economic impact: How do I communicate this in laymen's terms?

Big numbers are great but putting them into perspective can be a challenge. To add perspective, find an industry with roughly the same "% of GSP" as your system (Table 1.3). This percentage represents its portion of the total gross state product in the state (similar to the nationally recognized gross domestic product but at a state level). This allows the system to say that the institutions' brick and mortar campuses do just as much for Oregon as the entire Utilities *industry*, for example. This powerful statement can help put the large total impact number into perspective.

# Appendix 5: Example of sales versus income



Lightcast's economic impact study differs from many other studies because we prefer to report the impacts in terms of income rather than sales (or output). Income is synonymous with value added or gross state product (GSP). Sales include all the intermediary costs associated with producing goods and services. Income is a net measure that excludes these intermediary costs:

*Income = Sales – Intermediary Costs*

For this reason, income is a more meaningful measure of new economic activity than reporting sales. This is evidenced by the use of gross domestic product (GDP)—a measure of income—by economists when considering the economic growth or size of a country. The difference is GSP reflects a state and GDP a country.

To demonstrate the difference between income and sales, let us consider an example of a baker's production of a loaf of bread. The baker buys the ingredients such as eggs, flour, and yeast for $2.00. He uses capital such as a mixer to combine the ingredients and an oven to bake the bread and convert it into a final product. Overhead costs for these steps are $1.00. Total intermediary costs are $3.00. The baker then sells the loaf of bread for $5.00.

The sales amount of the loaf of bread is $5.00. The income from the loaf of bread is equal to the sales amount less the intermediary costs:

*Income = $5.00 – $3.00 = $2.00*

In our analysis, we provide context behind the income figures by also reporting the associated number of jobs. The impacts are also reported in sales and earnings terms for reference.

# Appendix 6: Lightcast MR-SAM



Lightcast's MR-SAM represents the flow of all economic transactions in a given region. It replaces Lightcast's previous input-output (IO) model, which operated with some 1,000 industries, four layers of government, a single household consumption sector, and an investment sector. The old IO model was used to simulate the ripple effects (i.e., multipliers) in the state economy as a result of industries entering or exiting the region. The MR-SAM model performs the same tasks as the old IO model, but it also does much more. Along with the same 1,000 industries, government, household and investment sectors embedded in the old IO tool, the MR-SAM exhibits much more functionality, a greater amount of data, and a higher level of detail on the demographic and occupational components of jobs (16 demographic cohorts and about 750 occupations are characterized).

This appendix presents a high-level overview of the MR-SAM. Additional documentation on the technical aspects of the model is available upon request.

## Data sources for the model

The Lightcast MR-SAM model relies on a number of internal and external data sources, mostly compiled by the federal government. What follows is a listing and short explanation of our sources. The use of these data will be covered in more detail later in this appendix.

**Lightcast Data** are produced from many data sources to produce detailed industry, occupation, and demographic jobs and earnings data at the local level. This information (especially sales-to-jobs ratios derived from jobs and earnings-to-sales ratios) is used to help regionalize the national matrices as well as to disaggregate them into more detailed industries than are normally available.

**BEA Make and Use Tables (MUT)** are the basis for input-output models in the U.S. The *make* table is a matrix that describes the amount of each commodity made by each industry in a given year. Industries are placed in the rows and commodities in the columns. The *use* table is a matrix that describes the amount of each commodity used by each industry in a given year. In the use table, commodities are placed in the rows and industries in the columns. The BEA produces two different sets of MUTs, the benchmark and the summary. The benchmark set contains about 500 sectors and is released every five years, with a five-year lag time (e.g., 2002 benchmark MUTs were released in 2007). The summary set contains about 80 sectors and is released every year, with a two-year lag (e.g., 2010 summary MUTs were released in late 2011/early 2012). The MUTs are used in the Lightcast MR-SAM model to produce an industry-by-industry matrix describing all industry purchases from all industries.

**BEA Gross Domestic Product by State (GSP)** describes gross domestic product from the value added (also known as added income) perspective. Value added is equal to employee compensation, gross operating surplus, and taxes on production and imports, less subsidies. Each of these components is reported for each state and an aggregate group of industries. This dataset is updated once per year, with a one-year lag. The Lightcast MR-SAM model makes use of this data as a control and pegs certain pieces of the model to values from this dataset.

**BEA National Income and Product Accounts (NIPA)** cover a wide variety of economic measures for the nation, including gross domestic product (GDP), sources of output, and distribution of income. This dataset is updated periodically throughout the year and can be between a month and several years old depending on the specific account. NIPA data are used in many of the Lightcast MR-SAM processes as both controls and seeds.

**BEA Local Area Income (LPI)** encapsulates multiple tables with geographies down to the county level. The following two tables are specifically used: CA05 (Personal income and earnings by industry) and CA91 (Gross flow of earnings). CA91 is used when creating the commuting submodel and CA05 is used in several processes to help with place-of-work and place-of-residence differences, as well as to calculate personal income, transfers, dividends, interest, and rent.

**Bureau of Labor Statistics Consumer Expenditure Survey (CEX)** reports on the buying habits of consumers along with some information as to their income, consumer unit, and demographics. Lightcast utilizes this data heavily in the creation of the national demographic by income type consumption on industries.

**Census of Government's (CoG)** state and local government finance dataset is used specifically to aid breaking out state and local data that is reported in the MUTs. This allows Lightcast to have unique production functions for each of its state and local government sectors.

**Census' OnTheMap (OTM)** is a collection of three datasets for the census block level for multiple years. **Origin-Destination (OD)** offers job totals associated with both home census blocks and a work census block. **Residence Area Characteristics (RAC)** offers jobs totaled by home census block. **Workplace Area Characteristics (WAC)** offers jobs totaled by work census block. All three of these are used in the commuting submodel to gain better estimates of earnings by industry that may be counted as commuting. This dataset has holes for specific years and regions. These holes are filled with Census' Journey-to-Work described later.

**Census' Current Population Survey (CPS)** is used as the basis for the demographic breakout data of the MR-SAM model. This set is used to estimate the ratios of demographic cohorts and their income for the three different income categories (i.e., wages, property income, and transfers).

**Census' Journey-to-Work (JtW)** is part of the 2000 Census and describes the amount of commuting jobs between counties. This set is used to fill in the areas where OTM does not have data.

**Census' American Community Survey (ACS) Public Use Microdata Sample (PUMS)** is the replacement for Census' long form and is used by Lightcast to fill the holes in the CPS data.

**Oak Ridge National Lab (ORNL) County-to-County Distance Matrix (Skim Tree)** contains a matrix of distances and network impedances between each county via various modes of transportation such as highway, railroad, water, and combined highway-rail. Also included in this set are minimum impedances utilizing the best combination of paths. The ORNL distance matrix is used in Lightcast's gravitational flows model that estimates the amount of trade between counties in the country.

## Overview of the MR-SAM model

Lightcast's MR-SAM modeling system is a comparative static model in the same general class as RIMS II (Bureau of Economic Analysis) and IMPLAN (Minnesota Implan Group). The MR-SAM model is thus not an econometric model, the primary example of which is PolicyInsight by REMI. It relies on a matrix representation of industry-to-industry purchasing patterns originally based on national data which are regionalized with the use of local data and mathematical manipulation (i.e., non-survey methods). Models of this type estimate the ripple effects of changes in jobs, earnings, or sales in one or more industries upon other industries in a region.

The Lightcast MR-SAM model shows final equilibrium impacts—that is, the user enters a change that perturbs the economy and the model shows the changes required to establish a new equilibrium. As such, it is not a dynamic model that shows year-by-year changes over time (as REMI's does).

### National SAM

Following standard practice, the SAM model appears as a square matrix, with each row sum exactly equaling the corresponding column sum. Reflecting its kinship with the standard Leontief input-output framework, individual SAM elements show accounting flows between row and column sectors during a chosen base year. Read across rows, SAM entries show the flow of funds into column accounts (also known as receipts or the appropriation of funds by those column accounts). Read down columns, SAM entries show the flow of funds into row accounts (also known as expenditures or the dispersal of funds to those row accounts).

The SAM may be broken into three different aggregation layers: broad accounts, sub-accounts, and detailed accounts. The broad layer is the most aggregate and will be covered first. Broad accounts cover between one and four sub-accounts, which in turn cover many detailed accounts. This appendix will not discuss detailed accounts directly because of their number. For example, in the industry broad account, there are two sub-accounts and over 1,000 detailed accounts.

### Multi-regional aspect of the MR-SAM

Multi-regional (MR) describes a non-survey model that has the ability to analyze the transactions and ripple effects (i.e., multipliers) of not just a single region, but multiple regions interacting with each other. Regions in this case are made up of a collection of counties.

Lightcast's multi-regional model is built off of gravitational flows, assuming that the larger a county's economy, the more influence it will have on the surrounding counties' purchases and sales. The equation behind this model is essentially the same that Isaac Newton used to calculate the gravitational pull between planets and stars. In Newton's equation, the masses of both objects are multiplied, then divided by the distance separating them and multiplied by a constant. In Lightcast's model, the masses are replaced with the supply of a sector for one county and the demand for that same sector from another county. The distance is replaced with an impedance value that considers the distance, type of roads, rail lines, and other modes of transportation. Once this is calculated for every county-to-county pair, a set of mathematical operations is performed to make sure all counties absorb the correct amount of supply from every county and the correct amount of demand from every county. These operations produce more than 200 million data points.

## Components of the Lightcast MR-SAM model

The Lightcast MR-SAM is built from a number of different components that are gathered together to display information whenever a user selects a region. What follows is a description of each of these components and how each is created. Lightcast's internally created data are used to a great extent throughout the processes described below, but its creation is not described in this appendix.

### County earnings distribution matrix

The county earnings distribution matrices describe the earnings spent by every industry on every occupation for a year—i.e., earnings by occupation. The matrices are built utilizing Lightcast's industry earnings, occupational average earnings, and staffing patterns.

Each matrix starts with a region's staffing pattern matrix which is multiplied by the industry jobs vector. This produces the number of occupational jobs in each industry for the region. Next, the occupational average hourly earnings per job are multiplied by 2,080 hours, which converts the average hourly earnings into a yearly estimate. Then the matrix of occupational jobs is multiplied by the occupational annual earnings per job, converting it into earnings values. Last, all earnings are adjusted to match the known industry totals. This is a fairly simple process, but one that is very important. These matrices describe the place-of-work earnings used by the MR-SAM.

### Commuting model

The commuting sub-model is an integral part of Lightcast's MR-SAM model. It allows the regional and multi-regional models to know what amount of the earnings can be

attributed to place-of-residence vs. place-of-work. The commuting data describe the flow of earnings from any county to any other county (including within the counties themselves). For this situation, the commuted earnings are not just a single value describing total earnings flows over a complete year but are broken out by occupation and demographic. Breaking out the earnings allows for analysis of place-of-residence and place-of-work earnings. These data are created using Bureau of Labor Statistics' OnTheMap dataset, Census' Journey-to-Work, BEA's LPI CA91 and CA05 tables, and some of Lightcast's data. The process incorporates the cleanup and disaggregation of the OnTheMap data, the estimation of a closed system of county inflows and outflows of earnings, and the creation of finalized commuting data.

### National SAM

The national SAM as described above is made up of several different components. Many of the elements discussed are filled in with values from the national Z matrix—or industry-to-industry transaction matrix. This matrix is built from BEA data that describe which industries make and use what commodities at the national level. These data are manipulated with some industry standard equations to produce the national Z matrix. The data in the Z matrix act as the basis for the majority of the data in the national SAM. The rest of the values are filled in with data from the county earnings distribution matrices, the commuting data, and the BEA's National Income and Product Accounts.

One of the major issues that affect any SAM project is the combination of data from multiple sources that may not be consistent with one another. Matrix balancing is the broad name for the techniques used to correct this problem. Lightcast uses a modification of the "diagonal similarity scaling" algorithm to balance the national SAM.

### Gravitational flows model

The most important piece of the Lightcast MR-SAM model is the gravitational flows model that produces county-by-county regional purchasing coefficients (RPCs). RPCs estimate how much an industry purchases from other industries inside and outside of the defined region. This information is critical for calculating all IO models.

Gravity modeling starts with the creation of an impedance matrix that values the difficulty of moving a product from county to county. For each sector, an impedance matrix is created based on a set of distance impedance methods for that sector. A distance impedance method is one of the measurements reported in the Oak Ridge National Laboratory's County-to-County Distance Matrix. In this matrix, every county-to-county relationship is accounted for in six measures: great-circle distance, highway impedance, rail miles, rail impedance, water impedance, and highway-rail-highway impedance. Next, using the impedance information, the trade flows for each industry in every county are solved for. The result is an estimate of multi-regional flows from every county to every county. These flows are divided by each respective county's demand to produce multi-regional RPCs.

# Appendix 7: Value per credit hour equivalent and the Mincer function

Two key components in the analysis are 1) the value of the students' educational achievements, and 2) the change in that value over the students' working careers. Both of these components are described in detail in this appendix.

## Value per CHE

Typically, the educational achievements of students are marked by the credentials they earn. However, not all students who attended the institutions in the 2020-21 analysis year obtained a degree or certificate. Some returned the following year to complete their education goals, while others took a few courses and entered the workforce without graduating. As such, the only way to measure the value of the students' achievement is through their credit hour equivalents, or CHEs. This approach allows us to see the benefits to all students who attended the institutions, not just those who earned a credential.

To calculate the value per CHE, we first determine how many CHEs are required to complete each education level. For example, assuming that there are 30 CHEs in an academic year, a student generally completes 120 CHEs in order to move from a high school diploma to a bachelor's degree, another 60 CHEs to move from a bachelor's degree to a master's degree, and so on. This progression of CHEs generates an education ladder beginning at the less than high school level and ending with the completion of a doctoral degree, with each level of education representing a separate stage in the progression.

The second step is to assign a unique value to the CHEs in the education ladder based on the wage differentials presented in Table 1.4. For example, the difference in state earnings between a high school diploma and a bachelor's degree is $35,700. We spread this $35,700 wage differential across the 120 CHEs that occur between a high school diploma and a bachelor's degree, applying a ceremonial "boost" to the last CHE in the stage to mark the achievement of the degree.[47] We repeat this process for each education level in the ladder.

Next, we map the CHE production of the FY 2020-21 student population to the education ladder. Table 1.2 provides information on the CHE production of students attending The Alliance member institutions, broken out by educational achievement. In total, students completed 682,293 CHEs during the analysis year, excluding personal

47 Economic theory holds that workers that acquire education credentials send a signal to employers about their ability level. This phenomenon is commonly known as the sheepskin effect or signaling effect. The ceremonial boosts applied to the achievement of degrees in the Lightcast impact model are derived from Jaeger and Page (1996).

enrichment students. We map each of these CHEs to the education ladder depending on the students' education level and the average number of CHEs they completed during the year. For example, bachelor's degree graduates are allocated to the stage between the associate degree and the bachelor's degree, and the average number of CHEs they completed informs the shape of the distribution curve used to spread out their total CHE production within that stage of the progression.

The sum product of the CHEs earned at each step within the education ladder and their corresponding value yields the students' aggregate annual increase in income (*ΔE)*, as shown in the following equation:

$$\Delta E = \sum_{i=1}^{n} e_i h_i \text{ where } i \in 1, 2, \ldots n$$

and $n$ is the number of steps in the education ladder, $e_i$ is the marginal earnings gain at step $i$, and $h_i$ is the number of CHEs completed at step $i$.

Table A7.1 displays the result for the students' aggregate annual increase in income (*ΔE)*, a total of $169.1 million. By dividing this value by the students' total production of 682,293 CHEs during the analysis year, we derive an overall value of $248 per CHE.

**Table A7.1: Aggregate annual increase in income of students and value per CHE**

| | |
|---|---|
| Aggregate annual increase in income | $169,075,951 |
| Total credit hour equivalents (CHEs) in FY 2020-21* | 682,293 |
| **Value per CHE** | **$248** |

* Excludes the CHE production of personal enrichment students.

Source: Lightcast impact model.

## Mincer function

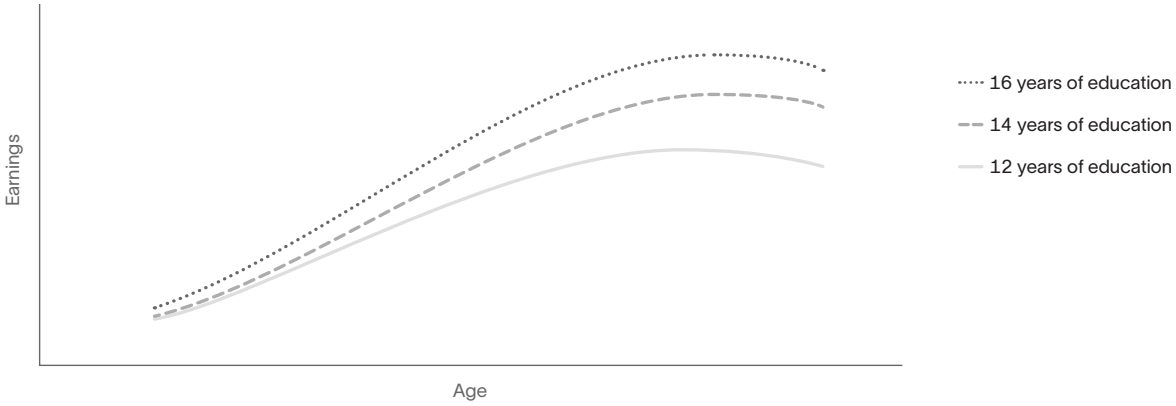
The $248 value per CHE in Table A7.1 only tells part of the story, however. Human capital theory holds that earnings levels do not remain constant; rather, they start relatively low and gradually increase as the worker gains more experience. Research also shows that the earnings increment between educated and non-educated workers grows through time. These basic patterns in earnings over time were originally identified by Jacob Mincer, who viewed the lifecycle earnings distribution as a function with the key elements being earnings, years of education, and work experience, with age serving as a proxy for experience.[48] While some have criticized Mincer's earnings function, it is still upheld in recent data and has served as the foundation for a variety of research pertaining to labor economics. Those critical of the Mincer function point to several unobserved factors such as ability, socioeconomic status, and family background that also help explain higher earnings. Failure to account for these factors results in what is known as an "ability bias." Research by Card (1999 and 2001) suggests that the benefits estimated using Mincer's function are biased upwards by 10% or less. As

48 See Mincer (1958 and 1974).

such, we reduce the estimated benefits by 10%. We use state-specific and education level-specific Mincer coefficients.

Figure A7.1 illustrates several important points about the Mincer function. First, as demonstrated by the shape of the curves, an individual's earnings initially increase at an increasing rate, then increase at a decreasing rate, reach a maximum somewhere well after the midpoint of the working career, and then decline in later years. Second, individuals with higher levels of education reach their maximum earnings at an older age compared to individuals with lower levels of education (recall that age serves as a proxy for years of experience). And third, the benefits of education, as measured by the difference in earnings between education levels, increase with age.

**Figure A7.1: Lifecycle change in earnings**




In calculating the alumni impact in Chapter 2, we use the slope of the curve in Mincer's earnings function to condition the $248 value per CHE to the students' age and work experience. To the students just starting their career during the analysis year, we apply a lower value per CHE; to the students in the latter half or approaching the end of their careers we apply a higher value per CHE. The original $248 value per CHE applies only to the CHE production of students precisely at the midpoint of their careers during the analysis year.

In Chapter 3 we again apply the Mincer function, this time to project the benefits stream of the FY 2020-21 student population into the future. Here too the value per CHE is lower for students at the start of their career and higher near the end of it, in accordance with the scalars derived from the slope of the Mincer curve illustrated in Figure A7.1.

# Appendix 8: Alternative education variable



In a scenario where the institutions did not exist, some of their students would still be able to avail themselves of an alternative comparable education. These students create benefits in the state even in the absence of the institutions. The alternative education variable accounts for these students and is used to discount the benefits we attribute to the institutions.

Recall this analysis considers only relevant economic information regarding the institutions. Considering the existence of various other academic institutions surrounding the institutions, we have to assume that a portion of the students could find alternative education and either remain in or return to the state. For example, some students may participate in online programs while remaining in the state. Others may attend an out-of-state institution and return to the state upon completing their studies. For these students—who would have found an alternative education and produced benefits in the state regardless of the presence of the institutions—we discount the benefits attributed to the institutions. An important distinction must be made here: the benefits from students who would find alternative education outside the state and not return to the state are *not* discounted. Because these benefits would not occur in the state without the presence of the institutions, they must be included.

In the absence of the institutions, we assume 10% of the institutions' students would find alternative education opportunities and remain in or return to the state. We account for this by discounting the alumni impact, the benefits to taxpayers, and the benefits to society in the state in Chapters 2 and 3 by 10%. In other words, we assume 10% of the benefits created by the institutions' students would have occurred anyway in the counterfactual scenario where the institutions did not exist. A sensitivity analysis of this adjustment is presented in Appendix 2.

# Appendix 9: Overview of investment analysis measures



The appendix provides context to the investment analysis results using the simple hypothetical example summarized in Table A9.1 below. The table shows the projected benefits and costs for a single student over time and associated investment analysis results.[49]

**Table A9.1: Example of the benefits and costs of education for a single student**

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| **Year** | **Tuition** | **Opportunity cost** | **Total cost** | **Higher earnings** | **Net cash flow** |
| 1 | $1,500 | $20,000 | $21,500 | $0 | -$21,500 |
| 2 | $0 | $0 | $0 | $5,000 | $5,000 |
| 3 | $0 | $0 | $0 | $5,000 | $5,000 |
| 4 | $0 | $0 | $0 | $5,000 | $5,000 |
| 5 | $0 | $0 | $0 | $5,000 | $5,000 |
| 6 | $0 | $0 | $0 | $5,000 | $5,000 |
| 7 | $0 | $0 | $0 | $5,000 | $5,000 |
| 8 | $0 | $0 | $0 | $5,000 | $5,000 |
| 9 | $0 | $0 | $0 | $5,000 | $5,000 |
| 10 | $0 | $0 | $0 | $5,000 | $5,000 |
| **Net present value** | | | **$21,500** | **$35,753** | **$14,253** |

Benefit-cost ratio
1.7

Internal rate of return
18.0%

Payback period (years)
4.2

Assumptions are as follows:

- Benefits and costs are projected out 10 years into the future (Column 1).
- The student attends the institutions for one year, and the cost of tuition is $1,500 (Column 2).
- Earnings foregone while attending the institutions for one year (opportunity cost) come to $20,000 (Column 3).

49 Note that this is a hypothetical example. The numbers used are not based on data collected from an existing institution.

- Together, tuition and earnings foregone cost sum to $21,500. This represents the out-of-pocket investment made by the student (Column 4).
- In return, the student earns $5,000 more per year than he otherwise would have earned without the education (Column 5).
- The net cash flow (NCF) in Column 6 shows higher earnings (Column 5) less the total cost (Column 4).
- The assumed going rate of interest is 4%, the rate of return from alternative investment schemes for the use of the $21,500.

Results are expressed in standard investment analysis terms, which are as follows: the net present value, the internal rate of return, the benefit-cost ratio, and the payback period. Each of these is briefly explained below in the context of the cash flow numbers presented in Table A9.1.

## Net present value

The student in Table A9.1 can choose either to attend college or to forego post-secondary education and maintain his present employment. If he decides to enroll, certain economic implications unfold. Tuition and fees must be paid, and earnings will cease for one year. In exchange, the student calculates that with post-secondary education, his earnings will increase by at least the $5,000 per year, as indicated in the table.

The question is simple: Will the prospective student be economically better off by choosing to enroll? If he adds up higher earnings of $5,000 per year for the remaining nine years in Table A9.1, the total will be $45,000. Compared to a total investment of $21,500, this appears to be a very solid investment. The reality, however, is different. Benefits are far lower than $45,000 because future money is worth less than present money. Costs (tuition plus earnings foregone) are felt immediately because they are incurred today, in the present. Benefits, on the other hand, occur in the future. They are not yet available. All future benefits must be discounted by the going rate of interest (referred to as the discount rate) to be able to express them in present value terms.[50]

Let us take a brief example. At 4%, the present value of $5,000 to be received one year from today is $4,807. If the $5,000 were to be received in year 10, the present value would reduce to $3,377. Put another way, $4,807 deposited in the bank today earning 4% interest will grow to $5,000 in one year; and $3,377 deposited today would grow to $5,000 in 10 years. An "economically rational" person would, therefore, be equally satisfied receiving $3,377 today or $5,000 10 years from today given the going rate of interest of 4%. The process of discounting—finding the present value of future higher earnings—allows the model to express values on an equal basis in future or present value terms.

50 Technically, the interest rate is applied to compounding—the process of looking at deposits today and determining how much they will be worth in the future. The same interest rate is called a discount rate when the process is reversed—determining the present value of future earnings.

The goal is to express all future higher earnings in present value terms so that they can be compared to investments incurred today (in this example, tuition plus earnings foregone). As indicated in Table A9.1 the cumulative present value of $5,000 worth of higher earnings between years 2 and 10 is $35,753 given the 4% interest rate, far lower than the undiscounted $45,000 discussed above.

The net present value of the investment is $14,253. This is simply the present value of the benefits less the present value of the costs, or $35,753 - $21,500 = $14,253. In other words, the present value of benefits exceeds the present value of costs by as much as $14,253. The criterion for an economically worthwhile investment is that the net present value is equal to or greater than zero. Given this result, it can be concluded that, in this case, and given these assumptions, this particular investment in education is very strong.

## Internal rate of return

The internal rate of return is another way of measuring the worth of investing in education using the same cash flows shown in Table A9.1. In technical terms, the internal rate of return is a measure of the average earning power of money used over the life of the investment. It is simply the interest rate that makes the net present value equal to zero. In the discussion of the net present value above, the model applies the going rate of interest of 4% and computes a positive net present value of $14,253. The question now is what the interest rate would have to be in order to reduce the net present value to zero. Obviously, it would have to be higher—18.0% in fact, as indicated in Table A9.1. Or, if a discount rate of 18.0% were applied to the net present value calculations instead of the 4%, then the net present value would reduce to zero.

What does this mean? The internal rate of return of 18.0% defines a breakeven solution—the point where the present value of benefits just equals the present value of costs, or where the net present value equals zero. Or, at 18.0%, higher earnings of $5,000 per year for the next nine years will earn back all investments of $21,500 made plus pay 18.0% for the use of that money ($21,500) in the meantime. Is this a good return? Indeed, it is. If it is compared to the 4% going rate of interest applied to the net present value calculations, 18.0% is far higher than 4%. It may be concluded, therefore, that the investment in this case is solid. Alternatively, comparing the 18.0% rate of return to the long-term 10.5% rate or so obtained from investments in stocks and bonds also indicates that the investment in education is strong relative to the stock market returns (on average).

## Benefit-cost ratio

The benefit-cost ratio is simply the present value of benefits divided by present value of costs, or $35,753 ÷ $21,500 = 1.7 (based on the 4% discount rate). Of course, any change in the discount rate would also change the benefit-cost ratio. Applying the 18.0% internal rate of return discussed above would reduce the benefit-cost ratio to 1.0, the breakeven solution where benefits just equal costs. Applying a discount rate higher than the 18.0% would reduce the ratio to lower than 1.0, and the investment

would not be feasible. The 1.7 ratio means that a dollar invested today will return a cumulative $1.70 over the ten-year time period.

## Payback period

This is the length of time from the beginning of the investment (consisting of tuition and earnings foregone) until higher future earnings give a return on the investment made. For the student in Table A9.1, it will take roughly 4.2 years of $5,000 worth of higher earnings to recapture his investment of $1,500 in tuition and the $20,000 in earnings foregone while attending the institutions. Higher earnings that occur beyond 4.2 years are the returns that make the investment in education in this example economically worthwhile. The payback period is a fairly rough, albeit common, means of choosing between investments. The shorter the payback period, the stronger the investment.

# Appendix 10: Social externalities



Education has a predictable and positive effect on a diverse array of social benefits. These, when quantified in dollar terms, represent significant social savings that directly benefit society communities and citizens throughout the state, including taxpayers. In this appendix we discuss the following three main benefit categories: 1) improved health, 2) reductions in crime, and 3) reduced demand for government-funded income assistance.

It is important to note that the data and estimates presented here should not be viewed as exact, but rather as indicative of the positive impacts of education on an individual's quality of life. The process of quantifying these impacts requires a number of assumptions to be made, creating a level of uncertainty that should be borne in mind when reviewing the results.

## Health

Statistics show a correlation between increased education and improved health. The manifestations of this are found in five health-related variables: smoking, alcohol dependence, obesity, depression, and drug abuse. There are other health-related areas that link to educational attainment, but these are omitted from the analysis until we can invoke adequate (and mutually exclusive) databases and are able to fully develop the functional relationships between them.

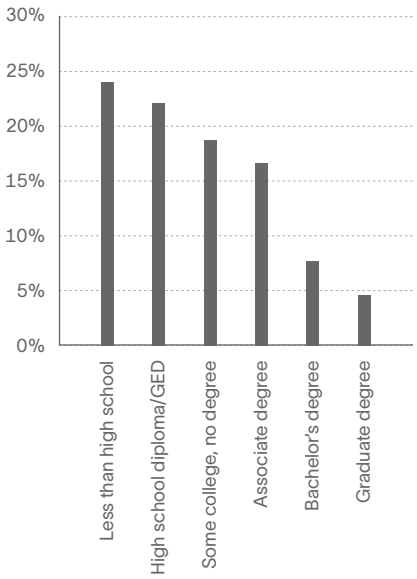
### Smoking

Despite a marked decline over the last several decades in the percentage of U.S. residents who smoke, a sizeable percentage of the U.S. population still smokes. The negative health effects of smoking are well documented in the literature, which identifies smoking as one of the most serious health issues in the U.S.

Figure A10.1 shows the prevalence of cigarette smoking among adults, 25 years and over, based on data provided by the National Health Interview Survey.[51] The data include adults who reported smoking more than 100 cigarettes during their lifetime and who, at the time of interview, reported smoking every day or some days. As indicated, the percent of who smoke begins to decline beyond the level of high school education.

The Centers for Disease Control and Prevention (CDC) reports the percentage of adults who are current smokers by state.[52] We use this information to create an index value by

**Figure A10.1: Prevalence of smoking among U.S. adults by education level**




Source: Centers for Disease Control and Prevention.

51 Centers for Disease Control and Prevention. "Table. Characteristics of current adult cigarette smokers," National Health Interview Survey, United States, 2016.

52 Centers for Disease Control and Prevention. "Current Cigarette Use Among Adults (Behavior Risk Factor Surveillance System) 2018." *Behavioral Risk Factor Surveillance System Prevalence and Trends Data,* 2018.

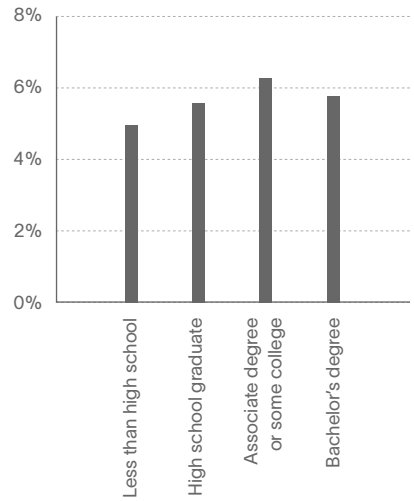
which we adjust the national prevalence data on smoking to each state. For example, 15.6% of Oregon adults were smokers in 2018, relative to 15.9% for the nation. We thus apply a scalar of 0.98 to the national probabilities of smoking in order to adjust them to the state of Oregon.

## Alcohol dependence

Although alcohol dependence has large public and private costs, it is difficult to measure and define. There are many patterns of drinking, ranging from abstinence to heavy drinking. Alcohol abuse is riddled with social costs, including health care expenditures for treatment, prevention, and support; workplace losses due to reduced worker productivity; and other effects.

Figure A10.2 compares the percentage of adults, 18 and older, that abuse or depend on alcohol by education level, based on data from the Substance Abuse and Mental Health Services Administration (SAMHSA).[53] These statistics give an indication of the correlation between education and the reduced probability of alcohol dependence. Adults with an associate degree or some college have higher rates of alcohol dependence than adults with a high school diploma or lower. Prevalence rates are lower for adults with a bachelor's degree or higher than those with an associate degree or some college. Although the data do not maintain a pattern of decreased alcohol dependence at every level of increased education, we include these rates in our model to ensure we provide a comprehensive view of the social benefits and costs correlated with education.

**Figure A10.2: Prevalence of alcohol dependence or abuse by education level**



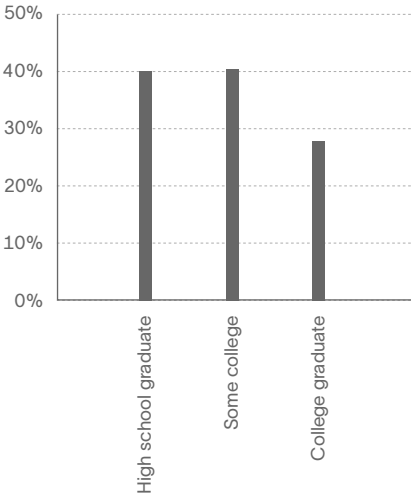

Source: Centers for Disease Control and Prevention.

## Obesity

The rise in obesity and diet-related chronic diseases has led to increased attention on how expenditures relating to obesity have increased in recent years. The average cost of obesity-related medical conditions is calculated using information from the *Journal of Occupational and Environmental Medicine*, which reports incremental medical expenditures and productivity losses due to excess weight.[54]

Data for Figure A10.3 is derived from the National Center for Health Statistics which shows the prevalence of obesity among adults aged 20 years and over by education, gender, and ethnicity.[55] As indicated, college graduates are less likely to be obese than individuals with a high school diploma. However, the prevalence of obesity among adults with some college is actually greater than those with just a high school diploma. In general, though, obesity tends to decline with increasing levels of education.

**Figure A10.3: Prevalence of obesity by education level**




Source: Derived from data provided by the National Center for Health Statistics.

53 Substance Abuse and Mental Health Services Administration. "Table 5.4B—Alcohol Use Disorder in Past Year among Persons Aged 12 or Older, by Age Group and Demographic Characteristics: Percentages, 2017 and 2018." SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2017 and 2018.

54 Eric A. Finkelstein, Marco da Costa DiBonaventura, Somali M. Burgess, and Brent C. Hale, "The Costs of Obesity in the Workplace," *Journal of Occupational and Environmental Medicine* 52, no. 10 (October 2010): 971-976.

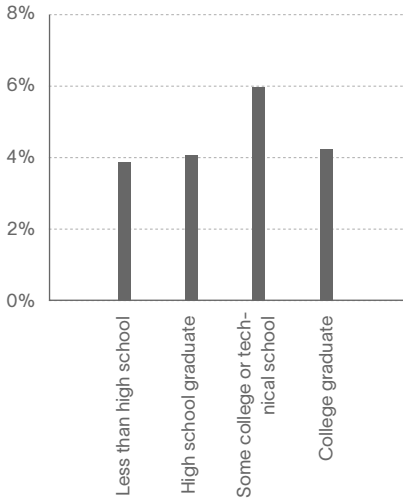
55 Ogden Cynthia L., Tala H. Fakhouri, Margaret D. Carroll, Craig M. Hales, Cheryl D. Fryar, Xianfen Li, David S. Freedman. "Prevalence of Obesity Among Adults, by Household Income and Education—United States, 2011–2014" National Center for Health Statistics, *Morbidity and Mortality Weekly Report*, 66:1369–1373 (2017).

### Depression

Capturing the full economic cost of mental illness is difficult because not all mental disorders have a correlation with education. For this reason, we only examine the economic costs associated with major depressive disorder (MDD), which are comprised of medical and pharmaceutical costs, workplace costs such as absenteeism, and suicide-related costs.[56]

Figure A10.4 summarizes the prevalence of MDD among adults by education level, based on data provided by the CDC.[57] As shown, people with some college are most likely to have MDD compared to those with other levels of educational attainment. People with a high school diploma or less, along with college graduates, are all fairly similar in the prevalence rates.

**Figure A10.4: Prevalence of major depressive episode by education level**

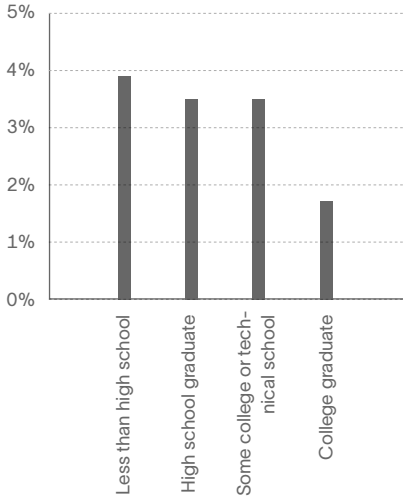



Source: National Survey on Drug Use and Health.

### Drug abuse

The burden and cost of illicit drug abuse is enormous in the U.S., but little is known about the magnitude of costs and effects at a national level. What is known is that the rate of people abusing drugs is inversely proportional to their education level. The higher the education level, the less likely a person is to abuse or depend on illicit drugs. The probability that a person with less than a high school diploma will abuse drugs is 3.9%, twice as large as the probability of drug abuse for college graduates (1.7%). This relationship is presented in Figure A10.5 based on data supplied by SAMHSA.[58] Similar to alcohol abuse, prevalence does not strictly decline at every education level. Health costs associated with illegal drug use are also available from SAMSHA, with costs to state government representing 40% of the total cost related to illegal drug use.[59]

**Figure A10.5: Prevalence of illicit drug dependence or abuse by education level**




Source: Substance Abuse and Mental Health Services Administration.

## Crime

As people achieve higher education levels, they are statistically less likely to commit crimes. The analysis identifies the following three types of crime-related expenses: 1) criminal justice expenditures, including police protection, judicial and legal, and corrections, 2) victim costs, and 3) productivity lost as a result of time spent in jail or prison rather than working.

56 Greenberg, Paul, Andree-Anne Fournier, Tammy Sisitsky, Crystal Pike, and Ronald Kesslaer. "The Economic Burden of Adults with Major Depressive Disorder in the United States (2005 and 2010)" *Journal of Clinical Psychiatry* 76:2, 2015.

57 National Survey on Drug Use and Health. "Table 8.40B: Major Depressive Episode (MDE) or MDE with Severe Impairment in Past Year among Persons Aged 18 or Older, and Receipt of Treatment for Depression in Past Year among Persons Aged 18 or Older with MDE or MDE with Severe Impairment in Past Year, by Geographic, Socioeconomic, and Health Characteristics: Numbers in Thousands, 2017 and 2018."

58 Substance Abuse and Mental Health Services Administration. "Table 5.3B—Illicit Drug Use Disorder in Past Year among Persons Aged 12 or Older, by Age Group and Demographic Characteristics: Percentages, 2017 and 2018." SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2017 and 2018.

59 Substance Abuse and Mental Health Services Administration. "Table A.2. Spending by Payer: Levels and Percent Distribution for Mental Health and Substance Abuse (MHSA), Mental Health (MH), Substance Abuse (SA), Alcohol Abuse (AA), Drug Abuse (DA), and All-Health, 2014." *Behavioral Health Spending & Use Accounts, 1986–2014. HHS Publication No. SMA-16-4975*, 2016.

Figure A10.6 displays the educational attainment of the incarcerated population in the U.S. Data are derived from the breakdown of the inmate population by education level in federal, state, and local prisons as provided by the U.S. Census Bureau.[60]

Victim costs comprise material, medical, physical, and emotional losses suffered by crime victims. Some of these costs are hidden, while others are available in various databases. Estimates of victim costs vary widely, attributable to differences in how the costs are measured. The lower end of the scale includes only tangible out-of-pocket costs, while the higher end includes intangible costs related to pain and suffering.[61]

Yet another measurable cost is the economic productivity of people who are incarcerated and are thus not employed. The measurable productivity cost is simply the number of additional incarcerated people, who could have been in the labor force, multiplied by the average income of their corresponding education levels.

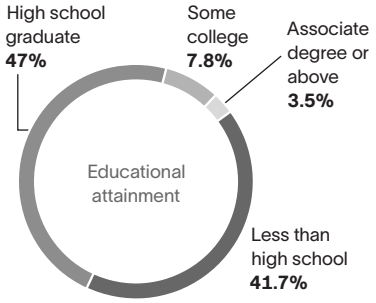
## Income assistance

Statistics show that as education levels increase, the number of applicants for government-funded income assistance such as welfare and unemployment benefits declines. Welfare and unemployment claimants can receive assistance from a variety of different sources, including Temporary Assistance for Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP), Medicaid, Supplemental Security Income (SSI), and unemployment insurance.[62]

Figure A10.7 relates the breakdown of TANF recipients by education level, derived from data provided by the U.S. Department of Health and Human Services.[63] As shown, the demographic characteristics of TANF recipients are weighted heavily towards the less than high school and high school categories, with a much smaller representation of individuals with greater than a high school education.

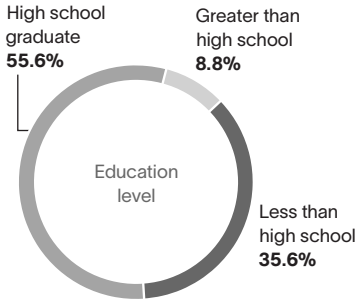
Unemployment rates also decline with increasing levels of education, as illustrated in Figure A10.8. These data are provided by the Bureau of Labor Statistics.[64] As shown, unemployment rates range from 5.4% for those with less than a high school diploma to 1.9% for those at the graduate degree level or higher.

**Figure A10.6:**
**Educational attainment of the incarcerated population**



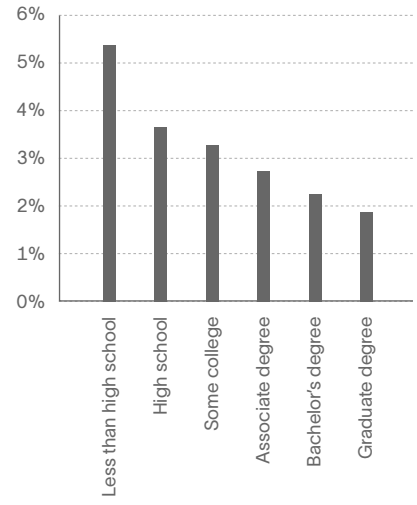

Source: Derived from data provided by the U.S. Census Bureau.

**Figure A10.7:**
**Breakdown of TANF recipients by education level**




Source: US. Department of Health and Human Services, Office of Family Assistance.

**Figure A10.8: Unemployment by education level**




Source: Bureau of Labor Statistics.

60 U.S. Census Bureau. "Educational Characteristics of Prisoners: Data from the ACS." 2011.

61 McCollister, Kathryn E., Michael T. French, and Hai Fang. "The Cost of Crime to Society: New Crime-Specific Estimates for Policy and Program Evaluation." *Drug and Alcohol Dependence* 108, no. 1-2 (April 2010): 98-109.

62 Medicaid is not considered in this analysis because it overlaps with the medical expenses in the analyses for smoking, alcohol dependence, obesity, depression, and drug abuse. We also exclude any welfare benefits associated with disability and age.

63 U.S. Department of Health and Human Services, Office of Family Assistance. "Characteristics and Financial Circumstances of TANF Recipients, Fiscal Year 2018."

64 Bureau of Labor Statistics. "Table 7. Employment status of the civilian noninstitutional population 25 years and over by educational attainment, sex, race, and Hispanic or Latino ethnicity." Current Population Survey, Labor Force Statistics, Household Data Annual Averages, 2019.