

**Economic and Fiscal Impact Study: Colorado State University System**  
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## **Introduction**

A thriving Colorado State University System is critical to Colorado's future. Comprising CSU Fort Collins, CSU Pueblo, and CSU Global, the CSU System currently educates more than 60,000 students from Colorado and around the world. After completing their studies, most CSU graduates make the state their home, helping Colorado cement its status as one of the nation's best-educated states and a magnet for businesses seeking high-skilled workers with an entrepreneurial spirit. A CSU education also helps shape the citizenry, with system graduates using their nurtured talents and passions to make significant and life-changing contributions to their neighborhoods and communities.

Similarly, CSU System researchers and outreach and engagement specialists strive every day to strengthen the state and nation. Last year, CSU Fort Collins had more than \$400 million in research expenditures, much of it aiming to address critical problems affecting society, health, the environment, businesses and individuals. These efforts were on full display with the onset of the Covid-19 pandemic, with faculty and staff from across the system mobilizing to protect the health of people across the state. Simply put, the CSU System is a high-impact institution for improving the lives of all Coloradans.

In meeting its diverse teaching, research, and engagement missions, the CSU System makes significant economic and fiscal contributions to the state of Colorado. In this report we document these impacts in three key areas:

- The impacts of more than 112,250 CSU System alumni currently working in Colorado, whose degrees help them earn higher wages, generate jobs, and tax revenues.
- The impacts of the CSU System operational and student spending on the state economy and the economies of Fort Collins and Pueblo.
- The impacts of CSU System research and innovation, which bolsters a wide range of Colorado businesses and industries.

Although our study focuses on economic impacts, it is important to recognize that the benefits of a robust CSU System are much broader. For many, a college degree opens new doors, providing the opportunity for upward economic mobility. Additionally, a large body of evidence shows that higher education beneficially impacts society on a wide array of social, health and fiscal dimensions. For example, the demand for many publicly supported services falls as individual education increases. Crime rates are lower and community engagement is greater in places with more college graduates. Additionally, CSU capital projects, such as the Spur Campus at the National Western Center, can revitalize areas and create construction jobs. While the economic effects of these activities are certainly substantial and persistent, we do not explore them here.

In this report, we present some of the economic and fiscal impacts of the CSU System--both to the state and the Fort Collins and Pueblo areas--homes to the System's two largest physical campuses. Although we present key findings for each of these geographic regions, it is important to note that they are not additive, because it is important to distinguish between new money entering from outside and the reallocation of resources within a state. The CSU System's economic impact is felt statewide by bringing in money from federal agencies, out-of-state students, and by transferring knowledge to businesses and industries across Colorado. The CSU System's economic impact in Fort Collins and Pueblo includes factors considered in the statewide impact plus money injected into the region from both state government and students from across the state.

## **Key Findings**

### Colorado Impacts

#### *CSU Alumni (Yearly Impacts)*

- Nearly 1-in-25 Colorado workers have a CSU System degree. The 112,250 CSU alumni currently working in the state earned an estimated \$7.57 billion from their jobs in 2019.
  - We estimate that the "value-added" from a CSU System degree translates into \$2.9 billion in additional annual wages for working System graduates relative to their earnings had they only finished high school.
- At the state level, total alumni worker earnings support more than \$209 million in income tax revenue and \$128 million in sales, use, and excise tax revenue. This represents about 3 percent of total state tax collections in these categories.
- Since 2005, about 86 percent of the students who were Colorado residents when they started CSU are still in the state. Additionally, the state has managed to keep nearly 50 percent of the students that lived somewhere other than Colorado in the year before coming to Colorado.

#### *CSU Operations, Out-of-state Student Spending, and Knowledge Integration (Yearly Impacts)*

- In 2020, CSU Fort Collins received more than \$400 million in research funding, which translates into innovation that drives technological advances for Colorado businesses.
- CSU has nearly 10,000 out-of-state students currently enrolled at the Fort Collins and Pueblo campuses that bring new money into the Colorado economy.
- We estimate CSU operations and spending by out-of-state students, coupled with knowledge diffusion, supports around 22,785 Colorado jobs and \$237.74 million in-state income (individual and corporate) and sales tax revenue.

### CSU Fort Collins Area Impacts

CSU Fort Collins is Colorado's land-grant institution, enrolling and graduating more in-state students than any other Colorado campus. In the 2019-20 academic year, CSU Fort Collins awarded 5,448 undergraduate and 2,552 graduate and professional degrees.

- The Fort Collins area receives more than \$36 million in local sales and use tax revenues from economic activity related to CSU's operations, student spending and university related start-ups and business assistance. Total direct and indirect city employment impacts are estimated at more than 17,300 jobs. (In 2017, the City of Fort Collins had about 84,000 jobs (LEHD-LODES).)

- CSU Fort Collins directly employs about 7,600 workers, and its payroll exceeds \$644 million.
  - After accounting for multiplier impacts, approximately 14,000 jobs are supported in Fort Collins.
  - Related economic activity provides the city with approximately \$26.16 million in sales and use tax revenue.
- CSU Fort Collins students not originally from the city spend about \$319.1 million dollars a year in the community, which supports 2,700 jobs and \$7.9 million in local sales and use tax revenue, either directly or through multiplier effects. This represents about 5 percent of Fort Collins sales and use tax revenue
- CSU Fort Collins is an innovation incubator. In 2020, funded research exceeded \$400 million for the first time ever. Start-ups and knowledge spillovers related to CSU Fort Collins generate significant additional local economic activity, translating into an additional 645 jobs and \$25.3 million in household income.

### CSU Pueblo Area Impacts

CSU Pueblo enrolls more than 3,700 students, mostly undergraduates, and many first-generation. With 33 percent of its students identifying as Hispanic, CSU Pueblo is designated as a Hispanic Serving Institution. Looking back over 75 years, the institution has graduated more than 30,000 students, with nearly 20,000 alumni living in Colorado.

- We estimate the City of Pueblo receives about \$2.4 million in local sales- and use-tax revenues from economic activity related to CSU Pueblo’s operations and student spending. Total direct and indirect city employment impacts are estimated at nearly 1,500. In 2017, the City of Pueblo had about 43,500 jobs (LEHD-LODES).
  - CSU Pueblo directly employs 712 workers, with a payroll of \$42.5 million.
    - After accounting for multiplier impacts, approximately 1,230 jobs are supported in the community.
    - Related economic activity provides the city with approximately \$1.68 million in local sales and use tax revenue.
  - In Pueblo, student spending for the 2019-20 academic year is estimated at \$61.43 million (excluding tuition). Excluding spending of students originally from Pueblo, we estimate CSU Pueblo students spent about \$30.53 million in the local economy in 2019-20. In Pueblo, we estimate that “out-of-city” student spending supports 261 jobs and \$712,200 in local sales and use tax revenue.

### CSU Global Impacts

CSU Global is a 100 percent online public university ranking among the top three percent of all national online bachelor’s degree programs (U.S. News and World Report’s annual ranking of top Universities). CSU Global focuses on non-traditional, adult professional students, degree completion, and students who are unable to take part in a traditional campus setting. CSU Global employs 119 people across Colorado, including 66 workers at its Aurora headquarters. In the 2019-20 academic year, CSU Global awarded 1,918 bachelor’s degrees and 1,421 graduate and professional degrees. These effects are captured as part of the “alumni impacts” discussed in this report.

## About the CSU System

The Colorado State University System educates more than 60,000 new and returning scholars each year, sowing the seeds for Colorado's leadership in an increasingly knowledge-based economy. Yet the System's impacts extend beyond formal education, as CSU employees conduct research and engagement that informs policymakers and businesses, sparks innovation, and improves economic vibrancy and the quality of life for Coloradans.

The Colorado State University System is comprised of three main campuses:

- CSU Fort Collins - The state's land-grant institution and the flagship of the CSU System
- CSU Pueblo - a federally designated Hispanic-Serving institution which focuses on serving regional education needs and offers a variety of undergraduate and graduate degree programs
- CSU Global - The nation's first, independent, 100 percent online public university

Living alumni of these three campuses number more than 290,000, and they are spread worldwide. Dr. Tony Frank is the current System Chancellor, and the System is overseen by a 15-member Board of Governors. This report focuses on the economic impacts stemming from the three main campuses. The work and impact of CSU's campuses and System office extend statewide and internationally to include a variety of projects and initiatives that have positive impacts including:

- SPUR - A new campus located at the National Western Center in Denver focused on food, water, and health opening in 2022. At this campus, learning will be open and accessible to all and will explore where rural and urban as well as local and global intersect.
- CSU Todos Santos Center - an international extension of the CSU System and an opportunity for CSU students to gain an appreciation for other cultures and participate in international educational and research opportunities.
- The Sturm Collaboration Campus - Located in Castle Rock, Colorado, it provides degree programs and educational programming with a focus on workforce development in partnership with Arapahoe Community College and the Douglas County School District.
- Initiatives - The System has numerous initiatives that focus on thought-leadership and interdisciplinary work including: Center for the New Energy Economy, North American Agricultural Advisory Network, Salazar Center for North American Conservation, and Together We Grow.
- CSU Extension - CSU Extension serves every county in Colorado and delivers community-oriented, research-based information and programming.
- Colorado Agricultural Experiment Stations - CSU's Agricultural Experiment Stations are spread across the state of Colorado with one on-campus and seven off-campus research centers that conduct research to meet agricultural production needs in different regions of the state.

### *Colorado State University Fort Collins*

CSU Fort Collins is Colorado's land-grant institution. Founded in 1870 as the Colorado Agricultural College, CSU Fort Collins has played an essential role in the state's development. While the first graduating class in 1884 had just 3 students, the campus enrolled 32,765 undergraduate, graduate, and professional students in resident and non-residential programs in Fall 2020. In the 2019-20 academic year, CSU Fort Collins awarded 5,448 undergraduate and 2,552 graduate and professional degrees.

CSU Fort Collins offers 74 majors, 80 minors, and 140 concentrations. About two-thirds of the undergraduate students are from Colorado, with most of them electing to stay in the state once they graduate. With more than \$400 million in annual research expenditures, CSU Fort Collins is considered a Carnegie Research I university.

*Colorado State University Pueblo*

For nearly 90 years, CSU Pueblo has served its local community, leading efforts to meet the growing needs for higher education throughout the region. CSU Pueblo was first established in 1933 as a small junior college with 63 students and two instructors. In 1965, it officially became a four-year university and took the name Colorado State University Pueblo in 2003.

Today, CSU Pueblo has transformed into a comprehensive university offering 26 baccalaureate and 6 master’s degree programs. It enrolls more than 3,700 students, mostly undergraduates. With 33 percent of its students identifying as Hispanic, CSU Pueblo is federally designated as a Hispanic Serving Institution. CSU Pueblo opens the world to many, with about 43 percent of its undergraduate population “first-generation.” In the 2019-2020 academic year, CSU Pueblo graduated 680 undergraduate students and 106 graduate and professional students. Looking back over 75 years, the institution has graduated more than 30,000 students, with nearly 20,000 alumni living in Colorado.

*Colorado State University Global*

CSU Global is a 100 percent online public university. Despite no reliance on taxpayer support, CSU Global is ranked among the Top 3 percent of all national online bachelor’s degree programs (U.S. News and World Report’s annual ranking of top universities). Founded in 2007 and headquartered in Aurora, Colorado, where it employs 66 workers, CSU Global offers online undergraduate and graduate degrees as well as certificate programs. With roughly 20,000 students enrolled, CSU Global focuses on non-traditional, adult professional students, degree completion, and students who are unable to take part in a traditional campus setting. In the 2019-2020 academic year, CSU Global awarded 1,918 bachelor’s degrees and 1,421 graduate and professional degrees.

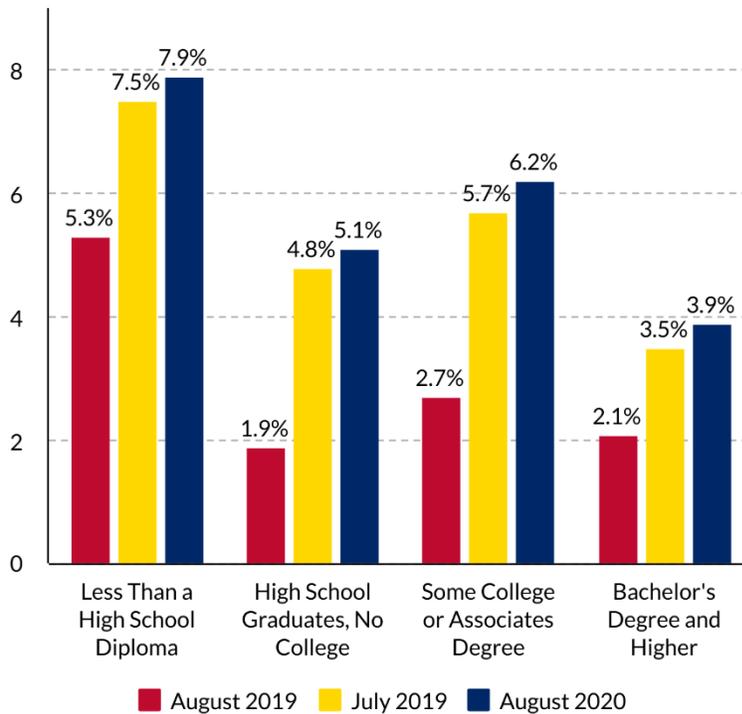
Table 1: CSU System Degrees Awarded, by Campus, 2019-2020 Academic Year

Campus	Bachelor’s	Graduate and Professional
Fort Collins	5,448	2,552
Pueblo	680	106
Global	1,917	1,421
<b>Total</b>	<b>8,045</b>	<b>4,079</b>

**A 4-Year College Degree Enhances Individual Economic Security and Helps Colorado Thrive**

CSU System graduates that live and work in Colorado are important drivers of the state and local economies. Generally, unemployment rates are lower for people with a 4-year degree, and their wages are likely to be higher than those without such a background. This has been especially true during the Covid-19 pandemic, as college-educated workers have seen their jobs less impacted by the recession. Data from the *Current Population Survey* shows that the unemployment rate for college graduates 25+ years of age in Colorado was 3.9 percent in August 2020. By comparison, the August 2020 unemployment rate was 5.1 percent for those 25+ years of age with no education beyond high school.

## Colorado Unemployment Rate by Educational Attainment (25 years and over)

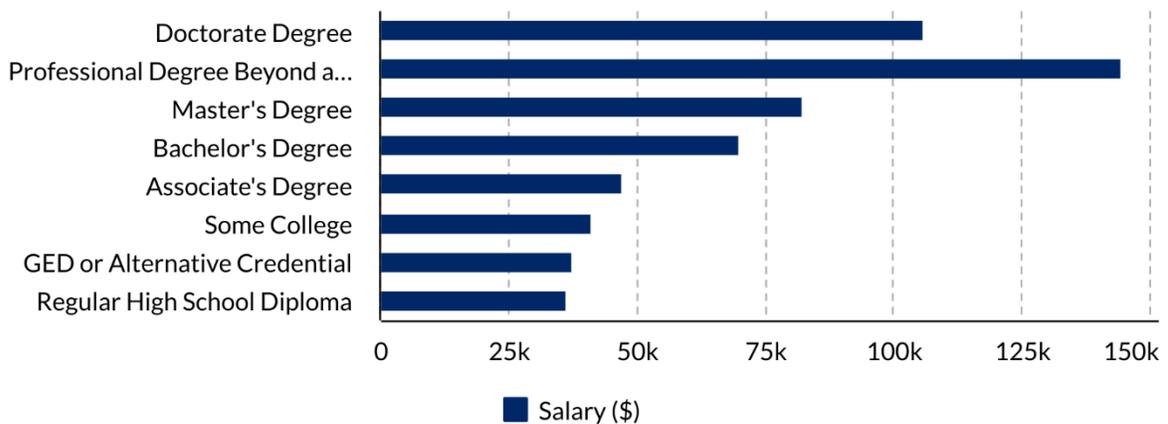


Source: CDLE and Current Population Survey ([https://www.colmgateway.com/admin/gsipub/htmlarea/uploads/Unemployment\\_Rate\\_by\\_Educational\\_Attainment.pdf](https://www.colmgateway.com/admin/gsipub/htmlarea/uploads/Unemployment_Rate_by_Educational_Attainment.pdf))

Further, data from the *American Community Survey* show that the average annual earnings for employed Coloradans with a 4-year degree only (i.e., those without graduate or professional degrees) were nearly \$70,000. By comparison, working residents with a high school degree only had average earnings of slightly more than \$36,000.

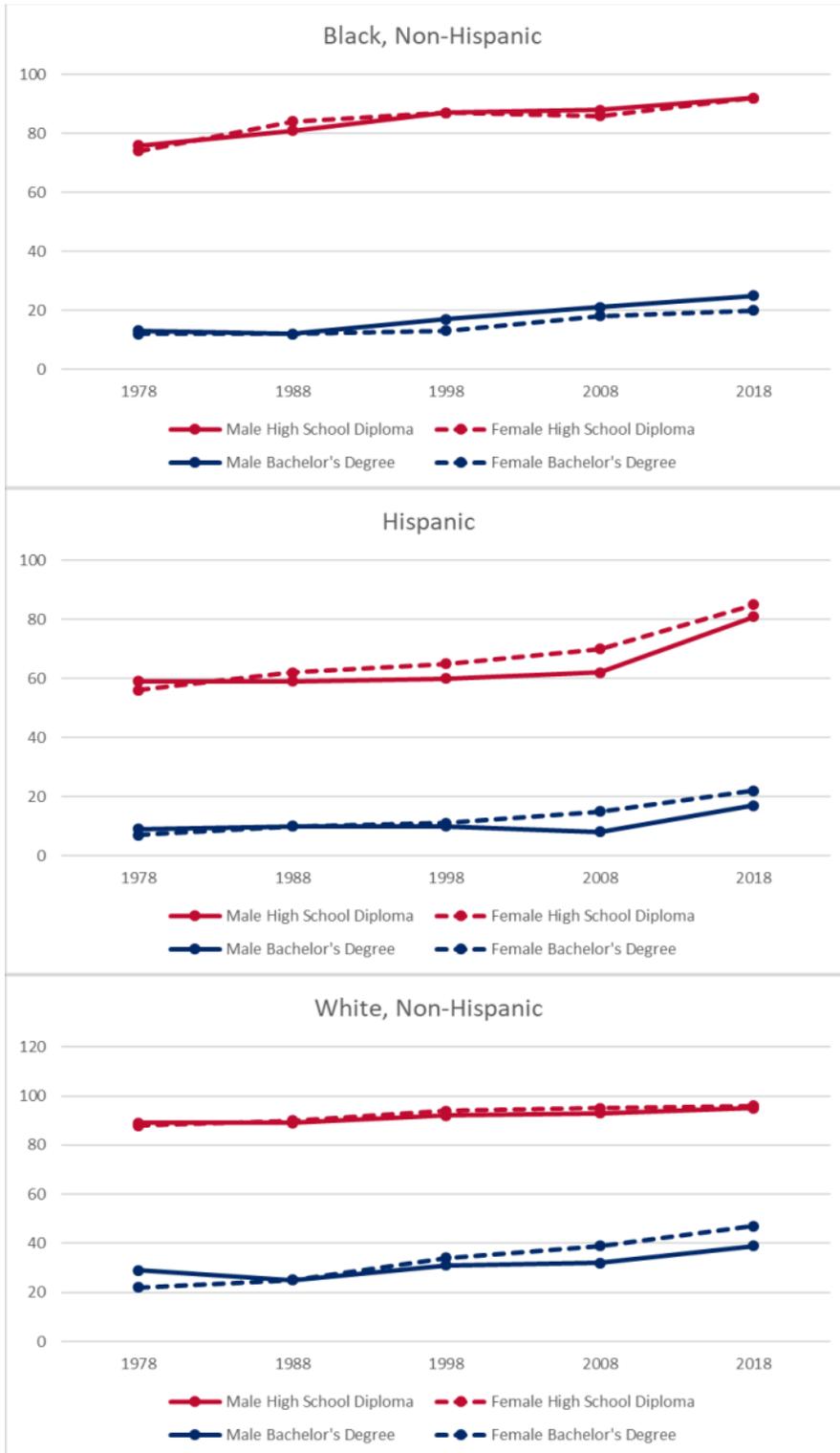
Research shows that a college degree can be the key to upward income mobility, which is especially true for Hispanic and Black populations. Over the past decade, college completion rates for 25-29-year-old, non-Hispanic Black people with high school degrees have grown to exceed 20 percent; between 2008 and 2018, Bachelor's degree attainment rates for 25-29-year-old Hispanic males with high school degrees have more than doubled, growing from 8 percent in 2008 to 17 percent in 2018.

## Colorado Average Annual Wage or Salary Income, by Educational Status for Employed Workers, 2019



Source: American Community Survey, US Census Bureau (special tabulation)

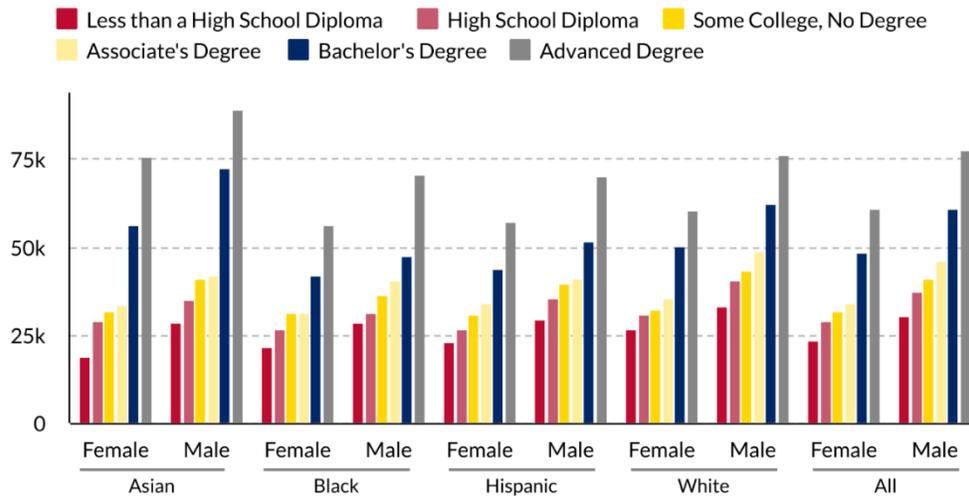
Percentage of 25 to 29-Year-Olds Who Have Completed High School or a Bachelor's Degree, by Race/Ethnicity and Gender, 1978 to 2018



Source: Education Pays 2019: The Benefits of Higher Education for Individuals and Society (2019)

These degrees have important impacts on earnings. Census data show that Hispanic females ages 25-34 with a Bachelor's degree that are employed full-time have median earnings that are \$17,000 higher per year than the same cohort of Hispanic females working full-time with a high school degree only. For Black males working full-time, a Bachelor's degree offers a median pay premium of more than \$16,000 per year relative to Black populations employed full time with a high school degree only. CSU Pueblo—with 33 percent of their student population self-reporting as Hispanic—illustrates the CSU System's role in educating Colorado's minority populations.

## Median Earnings (in 2018 Dollars) of Full-Time Year-Round Workers Age 24 to 34, by Race/Ethnicity, Gender, Education Level 2016-2018

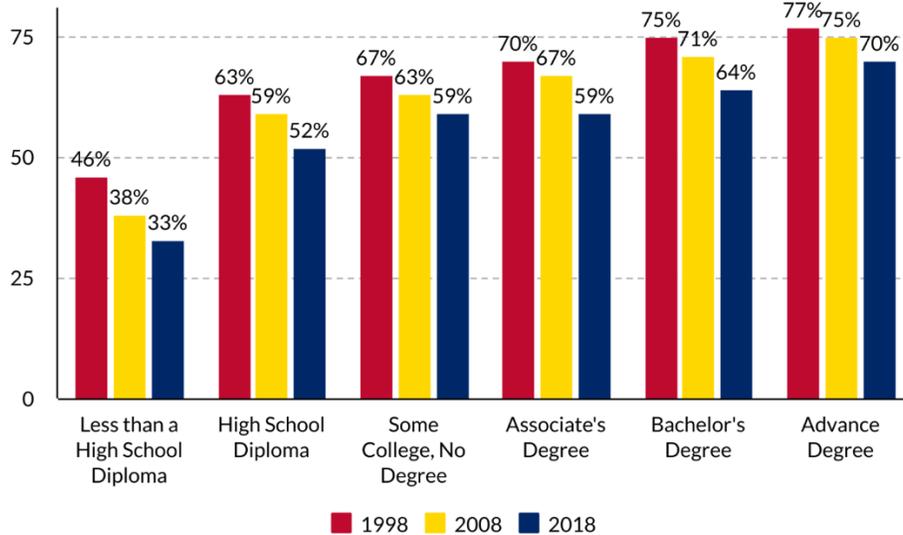


Source: Education Pays 2019: The Benefits of Higher Education for Individuals and Society (2019)

Holders of a 4-year college degree are also more likely to have employer-sponsored health insurance, although overall coverage rates are falling, regardless of educational attainment. Data collected by *The College Board* show that in 2018, 64 percent of full-time workers 25+ years of age with a Bachelor's degree had employer-provided health insurance. In comparison, only 52 percent of full-time workers with a high school degree only had such coverage. With health insurance coverage, individuals are more likely to be healthy and less likely to feel financial stress related to medical expenses. Higher levels of individual employer-sponsored health insurance coverage also help state government finances. According to the *Colorado Health Institute*, the state's general fund provided more than \$48 million for expanded Medicaid coverage as part of provisions of the Affordable Care Act (commonly, Obamacare) in the fiscal year 2019-20.<sup>1</sup> Workers with access to insurance through their employer save the state money.

<sup>1</sup> Colorado Health Institute (2020) *Unfinished Business: Where Colorado Stands on the Goals of the Affordable Care Act 10 Years Later* <https://www.coloradohealthinstitute.org/research/unfinished-business-where-colorado-stands-goals-affordable-care-act-10-years-later>

## Employer-Provided Health Insurance Coverage Among Full-Time Year-Round Workers Age 25 and Older, by Education Level, 1998, 2008, and 2018

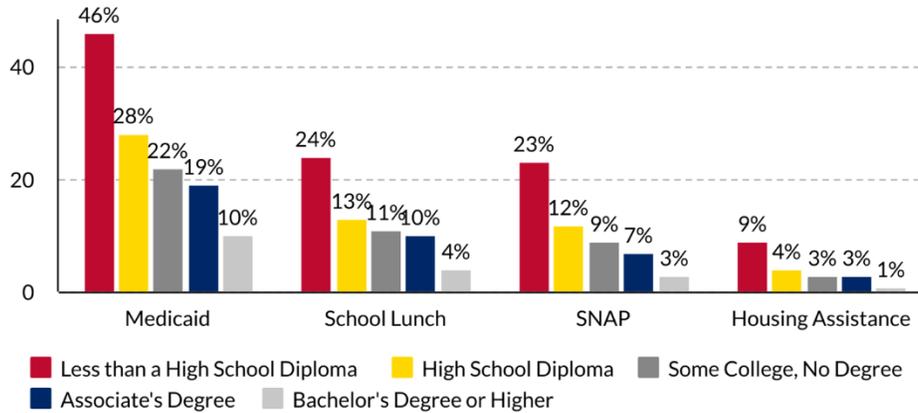


Source: Education Pays 2019: The Benefits of Higher Education for Individuals and Society (2019)

In addition to healthcare, research also shows that college-educated workers are much less likely to access public assistance programs. A recent report by *The College Board*<sup>2</sup> looked at the use of a variety of social support programs such as unemployment compensation, the Supplemental Nutrition Assistance Program (SNAP), and Medicaid, and found that spending is much lower for individuals with higher levels of education. For example, SNAP participation is four times higher among individuals with a high school diploma than it is for those with a Bachelor's degree or higher.

<sup>2</sup> Education Pays 2019: The Benefits of Higher Education for Individuals and Society (2019) Jennifer Ma, Matea Pender and Meredith Welch. The College Board. <https://research.collegeboard.org/pdf/education-pays-2019-full-report.pdf>

## Percentage of Individuals Age 25 and Older Living in Households that Participated in Various Public Assistance Programs, by Education Level, 2018



Source: Education Pays 2019: The Benefits of Higher Education for Individuals and Society (2019)

### CSU System graduates reside in and contribute to the economies of all 64 Colorado counties...

The CSU System provides educational opportunities to people from across the state and around the world. Last year, System campuses awarded more than 12,100 degrees. Thousands more students earned certificates or accessed coursework and training to enhance both personal and professional development. These graduates from CSU fan out across Colorado, using their talents to strengthen businesses, establish and grow companies, lead non-profits, teach the next generation of students, and give back to their communities in uncountable and immeasurable ways. This map shows how System alumni continue to make Colorado their home.

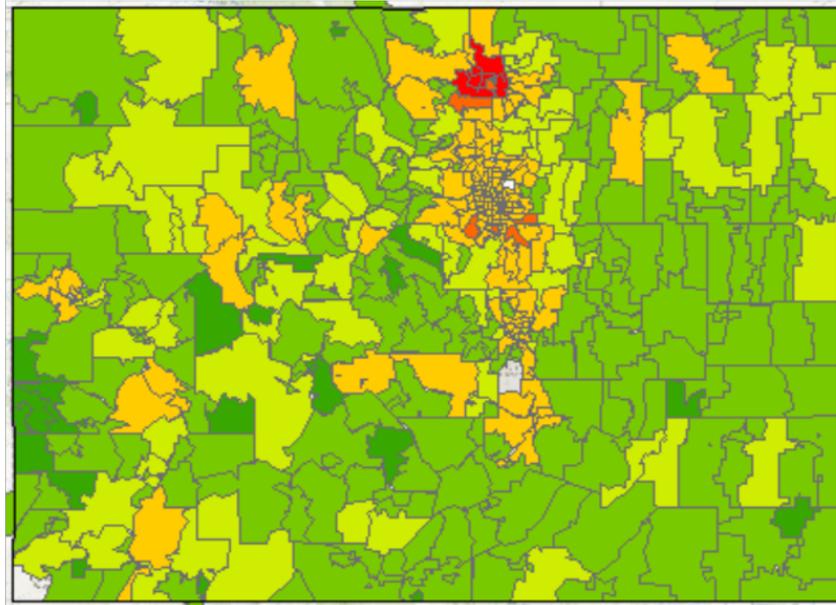
### ...and These Folks Have Substantial Impacts on the State Economy

CSU graduates are a catalyst in creating a more vibrant state economy, more dynamic and resilient communities, and a larger tax base. The effect graduates have spills over beyond the degree holder's household and into the greater community. For example, when a household's income increases because someone graduates from CSU, so, too, does its spending on goods and services. This spending supports jobs and businesses statewide. Similarly, state sales and income tax revenues are greater when household incomes rise.

To understand the economic significance of a CSU degree to the state's economy, we estimate its "value added" effects, using an economic and fiscal impact model of the Colorado economy.<sup>3</sup> Here we consider

<sup>3</sup> The economic and fiscal contributions of the CSU System described in this study are based on computable general equilibrium (CGE) models built specifically for Colorado, Fort Collins and Pueblo. CGE models consider the full spectrum of economic interactions between industries, households and the public sector, and provide information on wages, employment, income distribution and sales and income tax revenues, among other economic indicators. A complete description of the models is available from the authors on request.

## Colorado State University System Alumni Colorado Residents



■ 0 ■ 1-50 ■ 51-150 ■ 151-1500 ■ 1501-2500 ■ More than 2,500

Source: Authors calculations, based on institutional data.

how higher worker earnings—which are attributable to 4-year degree attainment—translate into additional economic activity in Colorado.

We start by estimating the wages individuals earn because they have a 4-year CSU degree and compare it to their estimated earnings had they not gone to college. Since we lack data on specific CSU alumni salaries, we estimate 2018 wages and salaries for CSU system graduates using the *Hamilton Project* dataset, which provides national estimates of worker earnings, by major, for each year of experience.<sup>4</sup> We then merge this with internal data from the CSU Alumni Association, which provides individual information for CSU graduates on current place of residence, major and the year that they graduated. We consider only individuals under the age of 65, assuming those older than that are no longer in the workforce. Together, this gives an estimate of the total employment earnings in the state in 2018 that accrue due to CSU alumni (about \$7.57 billion).

It would be wrong to suggest that all of these earnings are “due to CSU.” Had CSU System graduates not gotten a college degree, many of them would still be working, just in a different occupation. Thus, to properly estimate the contributions of the CSU degree *per se* in an economic impact model, we consider only the economic impacts of the *additional* education. To do so we follow a two-step process. The first step is estimating the difference in an individual’s earnings had they instead had only a high-school degree. For example, the *Hamilton Project* dataset shows an economics major with 10 years of experience working full-time earns about \$83,000 per year, on average. By comparison, a full-time

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<sup>4</sup> The Hamilton Project is an effort by the Brookings Institution to document the lifetime earnings of a college degree, by major. The dataset can be found here: [http://www.hamiltonproject.org/charts/career\\_earnings\\_by\\_college\\_major/](http://www.hamiltonproject.org/charts/career_earnings_by_college_major/).

***The CSU System Strengthens Colorado’s Talent Pool***

*The CSU System is a top destination for Colorado high school graduates. Additionally, it is a magnet for ambitious students from across the US and around the world. Because college-educated workers are the key driver of the knowledge economy, Colorado wins when it retains creative and talented individuals after they graduate. Alumni records show that CSU System graduates tend to stay in the state after completing their studies. Looking back 15 years, about 86 percent of the students who were Colorado residents when they started CSU Fort Collins are still in the state. Additionally, the state has managed to keep nearly 50 percent of the students that lived somewhere other than Colorado in the year before coming to CSU Fort Collins.*

worker of the same age with only a high school degree is estimated to earn about \$33,000 per year. Thus, the raw earnings difference due to the degree is \$50,000 for that worker.

Nevertheless, previous economic research also shows that such an estimate may overstate the value of the college degree. This is because workers with a college degree may differ in important, yet unobservable ways from those without one that makes the individual

more “productive,” regardless of occupation. In other words, if a college graduate had not gone to college, they would still likely earn more than the “typical” worker who initially chose not to go to college. In the second step we account for this, increasing the estimates of what a CSU System graduate would earn had they not gone to college. We do this by increasing the *Hamilton Project’s* projected average earnings of high school graduates by 25 percent. In the example above, this would translate to \$41,250 per year of expected earnings for our CSU graduate had they not gone to college. This means the worker has \$41,750 in additional annual earnings due to the CSU degree. All together, we estimate that CSU degree holders currently working in Colorado earn about \$2.9 billion in aggregate more than they would have with only a high school degree. We consider this the state’s economic “value-added” of the CSU degree.<sup>5</sup>

Table 2: Value-added effect of CSU Education, by Campus

Campus	Estimated CO Earnings*	Value-added of CSU Degree
Fort Collins	\$6.4 Billion	\$2.1 Billion
Pueblo	\$1.0 Billion	\$646.2 Million
Global	\$350.4 Million	\$165.8 Million
<b>Total</b>	<b>\$7.57 Billion</b>	<b>\$2.9 Billion</b>

\* This is a conservative estimate, using only data for 4-year degrees. Typically, annual earnings are higher for those with a graduate or professional degree, but due to limitations in the Hamilton Project database, we are unable to assign appropriate salaries for those with such a CSU education. Instead, we assigned graduate degree holders with the wages for a corresponding 4-year degree.

<sup>5</sup> To model the overall economic impacts of these higher incomes we introduce the aggregate earnings differences into the Colorado model as increases in household income. The additional money is distributed across 5 labor groups and 7 household income categories in the model and are included in economic impact results reported later in this document.

### ***CSU is a global leader in Covid-19 research***

*With the Covid-19 pandemic ravaging the nation, Colorado State University researchers are among the nation's critical "first responders." CSU is in the Top 10 in the world for Best Universities Solving the Coronavirus Pandemic according to SuccessfulStudent.org. Led by the Infectious Disease Research Center, CSU has 170 active COVID-19-related research projects involving over \$16 million. For the 2020 calendar year, CSU ventures reports 23 COVID-related inventions. Some examples include:*

- *SolaVAX: Novel production of vaccines comprising inactivated viral particles*
- *Using existing cellular-network functionalities to track COVID-19*
- *A facial mask capable of detecting COVID-19 via colorimetric indication*
- *Ventilator system: optimized functionality and utilization of non-medical supply chains*
- *Inhibition of SARS-COV2 pathogenesis through targeting small viral RNAs*
- *NFC-based smartphone potentiostat for infectious disease detection*
- *Engineered lactobacilli for use in oral vaccines against COVID-19*
- *Inactivation of viral particles and other pathogens using bulk sterilization*
- *Nasal immunotherapy spray for prevention of viral respiratory tract infections*
- *Delivery system for therapeutic nucleic acids and vaccines*
- *Machine learning based tools that help ensure the integrity of COVID-19 data and news*

*For more information, see CSU's special report on Life in the Time of Corona:  
<https://source.colostate.edu/life-in-the-time-of-corona/>*

### **Colorado State University is an Innovation Incubator**

CSU Fort Collins is an international research leader in a wide range of areas, including atmospheric science, energy, water, veterinary and translational medicine, natural resources, chemistry, occupational therapy, and food production. In fiscal year 2020, the CSU System's annual research expenditures reached a record \$407 million.

CSU Ventures is CSU Fort Collins' technology and intellectual property licensing office, with a mission of moving technologies and ideas from the campus to industry and the marketplace. In fiscal year 2020, CSU Ventures saw 177 patent applications, 69 patents issued, and 32 licenses. CSU ventures has an active portfolio of over 750 inventions, including 425 active issued patents and 346 pending patent applications. In addition, 50 new start-ups have been formed since 2006. NotColorado State University appears on the 2019-2020 *National Academy of Inventors'* top 100 list of international Universities for US patents. The following table identifies many of the companies that have built on knowledge created at CSU.

Related start-ups and knowledge spillovers generate significant additional local economic activity. Business spin-off and increases in regional productivity stemming from CSU Fort Collins translates into an additional 645 jobs and \$25.3 million in household income to the area economy.

Table 3: Colorado State University System Alumni Start-Up Companies in Colorado

Year	Company	Location	Technology/Products
1989	Heska Corporation	Loveland, CO	Animal Healthcare Products, Diagnostic
1996	Numerica, Inc.	Fort Collins, CO	DOD-Based Mathematical Solutions
1999	XY, Inc.	Fort Collins, CO	Sex-Selection Techniques for Non-Human Mammals
2002	OptiBrand Ltd., LLC	Fort Collins, CO	Auto-Capture of Retinal Images
2006	BioPoly, LLC	Fort Wayne, IN	Implants for Cartilage Defects
2006	Brotica, Inc.	Bellvue, CO	Termite Control
2006	Envirofit International	Fort Collins, CO	Energy-Efficient, Low-Emission Engines
2006	Keen Ingredients	Denver, CO	Quinoa Protein Concentrate Technology
2007	Beken Learning Systems	Fort Collins, CO	Math Education Software Programs
2008	KromaTiD, Inc.	Fort Collins, CO	Human Chromosome Painting
2009	XUV Lasers, Inc.	Fort Collins, CO	Ultraviolet/Soft X-Ray Lasers
2010	Diazamed, Inc.	Fort Collins, CO	Coating for Medical Devices/Implants
2010	OptiEnz Sensors LLC	Fort Collins, CO	Multichannel Monitoring Systems
2010	Prieto Battery, Inc.	Fort Collins, CO	Next Generation Li Ion Batteries
2010	VetDC	Fort Collins, CO	Develops human technologies for use in companion animals
2011	CLEAR	Fort Collins, CO	Structured Process for Regenerative Urban Development
2012	SurgiReal, Inc.	Fort Collins, CO	Synthetic tissue for veterinary, medical and nursing students
2012	Ridgeline Instruments, Inc.	Fort Collins, CO	Weather Radar Technology
2013	JobZology, Inc.	Fort Collins, CO	People Analytics Software
2013	Cetya Therapeutics	Fort Collins, CO	Early-Stage HDAC Inhibitor Company
2013	E-Flux LLC	Fort Collins, CO	Products for Monitoring Soil Gas Flux
2013	Endolytics, LLC	Fort Collins, CO	Accelerating Drug Development
2014	Access Sensors	Fort Collins, CO	Pollutant Exposure Sensors
2015	Growcentia	Fort Collins, CO	Organic Soil Supplements
2015	Nexus Bioenergy	Superior, CO	Anaerobic Digesters/Organic Fertilizers
2015	Sapien LLC	Fort Collins, CO	Electronic Devices and Embedded Systems
2016	VetMeasure	Fort Collins, CO	Canine Health Monitoring Device
2016	Plasma Controls	Fort Collins, CO	Electron and Plasma Beam Products
2016	SIVeC Biotechnologies	Fort Collins, CO	Development of Antiviral Products
2017	Ajax Analytics, Inc.	Broomfield, CO	Continuous Environmental Monitoring
2017	Ambient Logic LLC	Denver, CO	Commercial Physical Research
2017	Living Ink Technologies	Aurora, CO	Bio Ink Technology
2017	mAIRsure LLC	Fort Collins, CO	Methane Emissions Monitoring
2018	AxImmune, Inc.	Fort Collins, CO	Clinical Stage Immuno-Oncology Technology
2018	Photon Pharma	Fort Collins, CO	Immuno-Therapy for Solid or Liquid Tumors
2019	AST UPass	Fort Collins, CO	Environmental Sampling
2019	AST On Target	Fort Collins, CO	Environmental Sampling
2019	Cypris Materials, Inc.	Fort Collins, CO	High-Chroma Coatings without Pigments and Dyes
2019	LaPorte Immunotherapeutics	Fort Collins, CO	Immune-Based Therapies for Upper Respiratory and Eye Infections
2019	New Iridium	Boulder, CO	Small Molecule Transformations
2019	S3NSE Technologies	Fort Collins, CO	Environmental Monitoring
2020	Blueline Veterinary Technologies	Fort Collins, CO	Veterinary Boots
2020	Ecometrx LLC	Fort Collins, CO	Soil Modeling Software
2020	Thompson Oncology Devices	Fort Collins, CO	Immunotherapy Device
2020	Validus Therapeutics	Aurora, CO	Activated Mesenchymal Stem Cells

## CSU is an Important Driver of the Fort Collins, Pueblo and State Economies

Beyond education and research, the CSU System plays an important role in the state economy as one of Colorado’s largest employers. These effects are especially pronounced in Fort Collins and Pueblo. In 2019, the CSU System’s total operating budget exceeded \$1.4 billion. Major revenue sources across the system include tuition and fees (\$534 million), research grants and contracts (more than \$400 million), auxiliary enterprises (e.g., room and board) (about \$183 million) and state support (about \$151 million). In this section we document the economic and fiscal impacts of each of the CSU System members: CSU Fort Collins, CSU Pueblo and CSU Global, considering both their host region and the state overall.

For CSU Fort Collins and CSU Pueblo we consider two direct impact channels. First, we look at the impacts of University expenditures, including both payroll and other operating expenditures. Second, we look at the effects of student spending.

### *University Spending Supports the Local Economy*

For both CSU Fort Collins and CSU Pueblo, payroll (salary and fringe) is the largest expenditure item. In Fort Collins, CSU employed about 7,600 full- and part-time workers in the 2019-20 academic year, with a \$644 million payroll. CSU Pueblo employed 712 workers, with a payroll of \$42.5 million. Additionally, both campuses spend significant amounts of money on a wide array of locally produced supplies and services, including maintenance.<sup>6</sup> Further, the spending by employees of both the university and its suppliers generates additional economic activity—this is referred to as the “multiplier” effect, as initial spending is “multiplied” into larger total impacts.

The primary impacts we report here are the total employment, household income and tax revenue impacts supported by CSU spending. We estimate the effects using data obtained from each institution’s financial reports, which categorize spending across a variety of categories. This spending is then entered into our model as a demand shock in the appropriate category.

Table 4: Institutional Expenditures, 2019-2020 Academic Year

	Fort Collins	Pueblo	Global	Total
Employees	7,599	712	876	<b>8,989</b>
Payroll (Salaries & Fringe)	\$644.1 million	\$42.5 million	\$65 million	<b>\$751.6 million</b>
Other Operating Expenditures	\$588.3 million	\$47.8 million	\$34.1 million	<b>\$670.2 million</b>
<b>Total Expenditures</b>	<b>\$1.23 billion</b>	<b>\$90.42 million</b>	<b>\$99.07 million</b>	<b>\$1.42 billion</b>

Using our Fort Collins model, once accounting for multiplier effects, we find that CSU spending supports 14,153 jobs in the local economy. Related economic activity provides the city with approximately \$26.16 million in sales and use tax revenue. For the Pueblo economy, economic activity related to CSU Pueblo expenditures generates 1,231 jobs and \$1.68 million in local sales and use tax revenue.

### *Student Spending Creates Local Jobs and Generates Local Sales Tax Revenue*

Students also make important economic contributions to the Fort Collins and Pueblo economies. Their spending supports local businesses in a wide variety of sectors, including food and beverage, health

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<sup>6</sup> CSU also spends substantial amounts of money on construction projects. The economic impact of these projects is not considered in this report.

care, housing, and recreation. Our economic model translates these purchases into employment, payroll, and local sales tax revenues.

To quantify the effects of this spending, we surveyed students at the two campuses, asking them their average local monthly expenditures on housing, food, recreation and a variety of other goods and services (not including tuition). Overall, more than 5,100 students - including both undergraduate and graduate - responded to the online survey conducted in April 2020. With this information we calculated the “typical” monthly spending per student for each expenditure category. To estimate annual CSU student spending, we multiplied the monthly spending by 10.5, the average number of months a student is on campus each year. These annual per student expenditures are then multiplied by the total number of students at each campus to determine total expenditures. These expenditures are entered as a change in sectoral demand in our economic impact models.

For our state-level analysis, we distinguish between students who are originally from Colorado (i.e., resident) and those that come from elsewhere (i.e., non-resident). This allows us to estimate the effects of expenditures that are *new* to the state, rather than simply a reallocation of economic activity *within* the state. A similar logic applies to the Fort Collins and Pueblo economies. Given that about 4,600 students at CSU Fort Collins hail from that city and half of the CSU Pueblo students are from Pueblo, we adjusted our city-level models to include only expenditures of students originally living outside of those places, as they are considered sources of “new” economic activity in the respective local economies.

Overall, CSU Fort Collins students spent an estimated \$374.11 million during the 2019-20 academic year in the Fort Collins economy (excluding tuition). Out-of-state students account for \$120.42 million of this total. When we only exclude spending by students originally from the local community - as needed for our city model - total student spending in Fort Collins is estimated at \$319.08 million.

In Pueblo, student spending for the 2019-2020 academic year is estimated at \$61.43 million (excluding tuition). We estimate out-of-state students account for \$10.33 million. Excluding spending of students originally from Pueblo, we estimate CSU Pueblo students spent about \$30.53 million in the local economy in 2019-20.

Using our Fort Collins model, we find that spending by students not originally from Fort Collins supports approximately 2,700 jobs in the Fort Collins economy beyond campus and \$7.9 million in local sales and use tax revenue, after accounting for multiplier impacts.<sup>7</sup> In Pueblo, we estimate that “out-of-city” student spending supports 261 jobs and \$712,200 in local sales and use tax revenue.

Table 5: Estimated total annual student spending, academic year: 2019-20

	Fort Collins	Pueblo
Total RI Students in 2019-2020	28,864	3,716
Total Student Spending (in millions)	\$374.11	\$61.43
Number of CO Resident Students	19,644	3,072
Average Spending per Resident student (annual)	\$12,914	\$17,361
Number of non-CO Resident Students	9,220	644
Average Spending per Non-Resident (annual)	\$13,061	\$15,606

<sup>7</sup> County and school district property taxes paid are an additional fiscal contribution made by homeowners, renters and business owners that benefit from economic activity generated by CSU related expenditures. Although substantial, modeling complexities mean these impacts are not estimated here.

Table 6: Estimated average monthly per student expenditures, by category (pre-COVID19): 2019-2020

	Fort Collins	Pueblo
Food and Beverage Away from Home	\$99	\$128
Food and Beverage in the Home	\$172	\$228
Transportation	\$62	\$126
Housing	\$557	\$437
Utilities	\$52	\$123
Monthly Bills (e.g., cell phone and internet)	\$17	\$52
Entertainment and Recreation	\$33	\$49
General Retail	\$44	\$72
Health Care	\$30	\$49
Education Expenses (excluding Tuition)	\$80	\$156
Personal/Animal Care	\$40	\$63
Miscellaneous	\$49	\$92
Total Monthly	\$1,234	\$1,574
<b>Total Annual (=monthly*10.5)</b>	<b>\$12,957</b>	<b>\$16,531</b>

### **Colorado Impacts**

#### Impacts of CSU and Student Spending on the Colorado Economy

The CSU System’s statewide impacts differ somewhat from its local impacts in several important ways. As shown above, the university has alumni working and living across Colorado, effects that are not captured in the city models. Similarly, CSU Extension is actively involved in every county, and faculty and staff from both campuses engage with industries and communities statewide. In this section we expand the analysis in the previous section to quantify such effects on the Colorado economy.

When estimating statewide impacts, it is important not to simply add the impacts of the three local institutions. In general, much of any region or state’s economic growth is attributable to “new money.” In a careful economic impact analysis, it is critical to distinguish between new economic activity in the state and that which is merely reallocated. For example, in the Fort Collins and Pueblo analyses, we consider money new to the cities, which includes state government support and students originally from outside the local area, including elsewhere in Colorado. When looking at CSU’s impacts in all of Colorado; however, we must acknowledge that student expenditures in Fort Collins and Pueblo often come at the expense of other places, and that taxpayers from across the state provide support to CSU Fort Collins and CSU Pueblo (CSU Global receives no state support). In a sense, while Fort Collins and Pueblo may gain, other places in the state see less spending.

Like the Fort Collins and Pueblo analyses, we use CSU System budget data to determine the economic and fiscal impacts of System spending; however, we exclude spending that is based on monies provided by in-state actors, such as in-state student spending on tuition, fees and room and board, and state assistance to the System. We do, though, include the value-added impacts of a CSU System degree, as well as any new in-state spending by out-of-state students. Considering just this new economic activity and the related “multiplier” impacts, we estimate that CSU supports around 22,785 Colorado jobs and \$237.74 million in-state income (individual and corporate) and sales tax revenue. This represents more than 0.8 percent of total state employment, and about 2.2 percent of state revenue in these categories.

## Impacts of Knowledge Integration, CSU Start-ups, Licensing and Patents

Research suggests that universities have important impacts on regional economic performance for reasons other than their own spending and that of students. “Knowledge spillovers” can increase business and organization productivity, resulting from direct or indirect access to a university’s expertise. For example, CSU System faculty and staff work closely with a variety of industries across Colorado, sharing their expertise to assist businesses.

The global economy is fiercely competitive, and research, ideas, creativity and knowledge are essential components for success in such an environment. The CSU System provides research and innovation expertise to businesses across the state to help them compete. Actions and activities include new technologies, patents and licensing, industry partnerships, and an ever-deepening knowledge pool.

Drawing on the extensive body of empirical work done on the impact of research at universities in terms of stimulating economic growth, this analysis (conservatively) assumes that CSU research results in a 0.2 percent increase in productivity for firms in Colorado. This level of productivity effect equates to 11,374 jobs and \$740.7 million in household income annually. This translates into \$60.1 million in additional state tax revenue.

*The Colorado State University System provides important services to communities across the state*

#### *The Colorado State Forest Service*

*In 2020, Colorado was hit with the worst wildfire season in its history, with about 700,000 acres burned. Estimated losses are nearly \$200 million.<sup>1</sup> The Cameron Peak, East Troublesome and Pine Gulch fires were the three largest in state history, threatening several communities and temporarily displacing thousands of residents. Confronting increased wildfire threats due to climate change, the Colorado State Forest Service (CSFS) is an important steward of the state's diverse forest environments. CSFS is headquartered at CSU Fort Collins, and oversees 19 field offices. CSFS promotes diverse, resilient, and sustainable forest environments by:*

- *Providing professional forestry expertise/technical assistance and implementing forest management to accomplish stewardship objectives*
- *Reducing hazardous fuels to help mitigate wildfire risk · Increasing awareness about the benefits of forest management that results in informed action and stewardship*
- *Informing, training, and preparing agency personnel and our publics to anticipate and address changing forest conditions*

#### *Colorado State University Extension*

*CSU Fort Collins is the state's land grant university. Partnering with all 64 Colorado counties and the US Department of Agriculture, Colorado State Extension is a critical provider of informal, "off campus" education, linking education and research with the needs of Colorado residents. Extension topic areas include: · Agriculture · Natural Resources · Animal Health · Nutrition, Food Safety & Health · Energy · Water · Family, Home & Consumer · Yard & Garden · Insects · 4-H Youth Development.*

campus alone has a number of projects in the process of completion, totaling more than \$364 million in new facility spending. Nor does it quantify any of the specific impacts of CSU Extension. Finally, we do not address the widespread, yet non-quantifiable contributions the CSU System makes when its employees and citizens continue working to enhance environmental quality, community vitality and individual health.

#### **Summary**

● In this report we describe some of the substantial economic contributions the Colorado State University System makes to the state, Fort Collins, and Pueblo economies. Simply put, CSU is one of the state's most important economic growth engines and a cornerstone of Colorado's economic future. CSU alumni live in every county in Colorado and, because of their education, they earn significantly more relative to their earnings had they only finished high school (about \$2.9 billion in "value added"). The importance of the CSU System's statewide economic impacts can be seen in its support of 22,785 Colorado jobs and \$237.74 million in-state income (individual and corporate) and sales tax revenue.

As host to the System's two residential instruction campuses, Fort Collins and Pueblo experience the first-hand benefits, with university and student expenditures creating jobs and generating local sales tax revenues. Additionally, university faculty and staff lend their talents and expertise to businesses and organizations throughout their communities. These cities would certainly be economically worse off were it not for these institutions.

It is important to note we merely scratch the surface in quantifying the System's myriad impacts. For example, we do not quantify the impacts of CSU's capital spending. Over the past 12 years, CSU has spent about \$1.6 billion on construction projects. Currently, the Fort Collins