

University of Colorado

# A Sound investment in *Colorado*

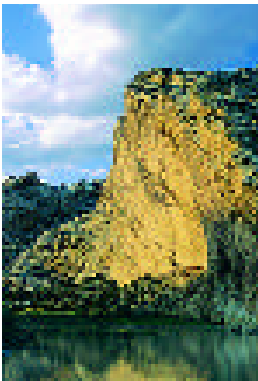


*... from the Eastern Plains to the Western Slope*



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## Economic Impact Executive Summary

- Of the over \$1 billion in total resources available to the University of Colorado in FY 1999, 16.7% was in the form of state appropriations.
- Over 20,000 people are employed by CU. An estimated 18,000 additional jobs in Colorado are also directly attributable to CU. Total Colorado employment generated by the university is estimated at about 38,000, which accounted for 1.8% of total state employment in FY 1999.
- CU spent about \$447 million in the state of Colorado on operating expenses in FY 1999 on such items as capital outlays and intermediate goods and services.
- Travel dollars spent in Colorado that were generated by university visitors, employees, and students are estimated at over \$267.5 million dollars in FY 1999 alone.
- Student spending constitutes a significant direct effect of CU on Colorado's economy. The estimate for FY 1999 indicates that CU students spent almost \$400 million in Colorado.
- CU's direct expenditures of slightly over \$1.2 billion translate into over \$2.2 billion in incremental Gross State Product (GSP).
- Based on employment, the state treasury recaptures at least 37 cents in tax revenues of every dollar allocated to CU. Based on GSP, the treasury recaptures 57 cents in tax revenues of every dollar allocated to CU.
- CU's partnership in 19 new entrepreneurial ventures benefited the state's economy. Colorado ranks sixth in overall venture capital investments; millions of these investment dollars come to companies with licensed technology from CU.

### The Language of Economic Impact

**Gross State Product (GSP)**—a measure of the total value of goods and services produced in Colorado.

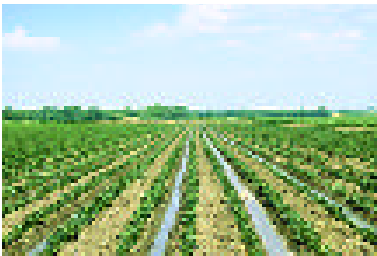
**Demand-side Effects**—the effects that the university has on the Colorado economy based on what goods and services it and its employees, students, and visitors purchase locally.

**Supply-side Effects**—the effects that the university has on the Colorado economy based on the resources it offers to the state, such as research facilities and highly skilled labor.

**Multiplier**—a ratio that helps to calculate the total economic effect for a variety of economic activities. Multipliers are commonly used in economic impact studies.

**Total Economic Impact**—a measure of the direct, indirect, and induced effects of CU on Colorado's economy.

**Adjustment Factor**—all actual numbers in this study (student spending, employment, payroll, etc.) have been adjusted downward to reflect exogenously determined demand.



## A Sound Investment

The University of Colorado, with campuses in Boulder, Colorado Springs, downtown Denver, and the Health Sciences Center, also in Denver, makes a significant contribution to the economic vitality of Colorado. This overview brochure summarizes the highlights of a quantitative study completed in 1999 that assessed how public and private resources invested in the university yield economic benefits to the state in terms of increased employment, local expenditures, gross state product, and tax revenues.<sup>1</sup>

This study is primarily concerned with analyzing the demand-side effects of the university on the state's economy. In other words, it investigates the university's effects on Colorado's economy based on the various goods and services that CU and its employees, students, and visitors purchase locally. These effects are quantifiable because, for example, university employment and local purchases are calculable sums.

Supply-side effects, or the effects that the university has on the Colorado economy based on the resources it offers to the state, are also important to evaluate, even though they are often more difficult to quantify. For example, the presence of research facilities and highly skilled labor attracts increased business activity to the state, some of which may be directly attributable to the university.

Any attempt to evaluate the economic benefits of a complex public institution such as CU will reveal that there are many other benefits that are difficult if not impossible to measure. For example, every major medical breakthrough at the Health Sciences Center provides countless benefits to those whose health is directly affected. Further, by providing access to libraries, noncredit courses, and cultural and athletic events, CU enhances the quality of life for all citizens of the state. Such unmeasured benefits of CU are likely to be even greater than the measured ones, which is the reason why CU continues to receive public financial support. The people of Colorado know that financial support for CU is a sound investment in Colorado.

<sup>1</sup>See "Economic Impact Study" by Christiane W. Griffin, J. Alan Owen, University of Colorado, CU System Office of Information and Analysis, and consultants Ellen Pfalzgraff, Ph.D., Economics and Susan Adams, Ph.D., Educational Consultants, March 2000. For more information call 1-800-2CU-HELP.



## Total Economic Impact

### UNIVERSITY OF COLORADO REVENUE SOURCES, FISCAL YEAR 1999

Revenue Source	Actual Dollars (thousands)	Percent
STATE OF COLORADO APPROPRIATIONS	\$202,994.1	16.7%
STUDENT TUITION AND FEES	\$263,778.4	21.7%
INTEREST AND INVESTMENT INCOME	\$17,504.7	1.4%
FEDERAL GIFTS, CONTRACTS, GRANTS	\$360,060.3	29.6%
STATE/LOCAL CONTRACTS, GRANTS	\$13,856.0	1.1%
PRIVATE GIFTS, CONTRACTS, GRANTS	\$74,057.0	6.1%
SALES AND SERVICES OF EDUCATION DEPTS.	\$62,313.2	5.1%
AUXILIARY OPERATING REVENUE	\$103,923.4	8.5%
ALL OTHER SOURCES	\$119,744.7	9.9%
<b>TOTAL</b>	<b>\$1,218,131.7</b>	<b>100%</b>

Source: 'Statement of Current Funds, Revenues, Expenditures, and Other Changes,' University of Colorado Financial Report Supplement; University Physicians, Inc., Statements of Income, FY 1999.

### SUMMARY OF ECONOMIC IMPACT STUDY MULTIPLIERS

University	Employment Multiplier
NORTHERN ARIZONA, 1987	3.49
UNIVERSITY OF WISCONSIN-MADISON, 1995	2.24
UNIVERSITY OF WISCONSIN-MADISON MEDICAL CENTER	2.24
UNIVERSITY OF COLORADO, 1999	1.83-2.06
UNIVERSITY OF COLORADO HEALTH SCIENCES CENTER, 1990	2.06-2.50
ARIZONA STATE, 1984	1.51
UNIVERSITY OF ARIZONA, 1992	2.95 <sup>2</sup>
UNIVERSITY OF ARIZONA, 1987	2.60 <sup>2</sup>
OHIO STATE UNIVERSITY, 1992	1.90 <sup>2</sup>
TULANE UNIVERSITY, 1988	1.71 <sup>2</sup>
RUTGERS, 1994	1.35 <sup>2</sup>

<sup>2</sup>The value of the multiplier was calculated by dividing the total estimated employment effect by the direct employment effect.

During FY 1999, the state of Colorado provided 16.7% of CU's total budget of \$1.218 billion. The university employed over 22,000 persons and had a monthly payroll in excess of \$66.81 million. The university attracts funding from many sources other than the state, such as tuition from its students, and grants and contracts from federal agencies and other supporters of its research mission. Since these funds are spent in Colorado, they generate additional jobs, business activity, and tax revenues for the state.

This study sought to quantify the economic impact of CU on the state on three levels. First, it measured direct effects, such as the effects of the university's payroll, operating expenses made locally, and local purchases made by students and persons attending university-related functions. Second, it estimated the indirect effects, or the economic activity generated among Colorado firms in order to meet university demand for local goods and services. Third, it looked at the induced effects, which result from expenditures made in the state by CU employees. All three effects were estimated and totaled in order to determine a total economic effect.

To calculate these effects, conservative methods were used to determine a range of estimates. Similarly, the study's use of multipliers is also conservative. A multiplier is the ratio between direct employment and spending effects to allow for the calculation of an estimate of the total economic effect of the university. The multipliers used in this study are on the low end of comparable multipliers used to study economic impacts at other universities.<sup>2</sup>

<sup>2</sup>The economic impacts of CU as estimated in this study are therefore quite conservative, because lower multiplier values translate into lesser economic impacts, other factors being constant.

**UNIVERSITY OF COLORADO PAYROLL BY CAMPUS  
AND EMPLOYMENT CLASSIFICATION, OCTOBER 1999**  
(in millions of current dollars)

Campus	Classified	Salaried	Hourly	Total	% of Total
BOULDER/SYSTEM	\$7.11	\$18.62	\$2.20	\$28.79	48.1%
DENVER	\$0.98	\$4.04	\$0.53	\$5.56	9.3%
COLORADO SPRINGS	\$0.59	\$1.73	\$0.37	\$2.69	4.0%
HEALTH SCIENCES	\$3.79	\$18.41	\$0.37	\$22.57	44.6%
<b>TOTAL</b>	<b>\$12.47</b>	<b>\$43.00</b>	<b>\$3.47</b>	<b>\$66.94</b>	<b>100.0%</b>

Note: The Boulder campus total includes \$1.65 million for University Foundation payroll. The Health Sciences total includes \$7.21 million for University Physicians, Inc. payroll. Numbers may not add due to rounding.

Sources: University of Colorado Payroll Statistical Report, October 1999; University Foundation; University Physicians, Inc. Statements of Income, FY 1999.

Further, all actual numbers (employment, student spending, payroll, etc.) have been adjusted downward to reflect exogenously determined demand. These figures are derived from a segment of the student population, comprised of nonresident students, Health Sciences Center students, and a sample of resident students who indicated that they would leave Colorado if CU did not exist. As a result of this adjustment, all numbers in the study are conservative.

### Employment

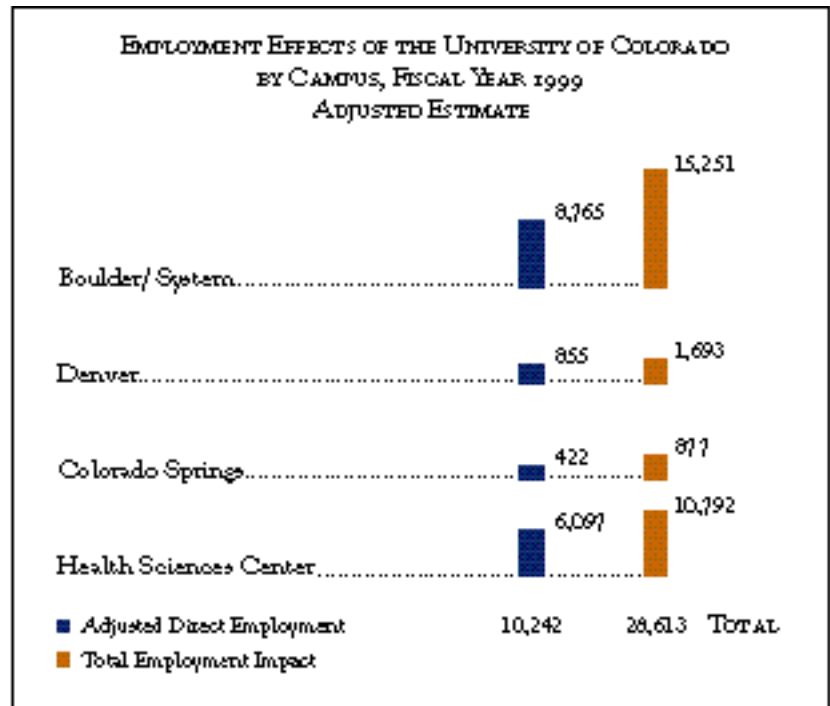
Each job that exists either directly or indirectly as a result of the University of Colorado's presence in the state contributes to Colorado's economic stability and growth.

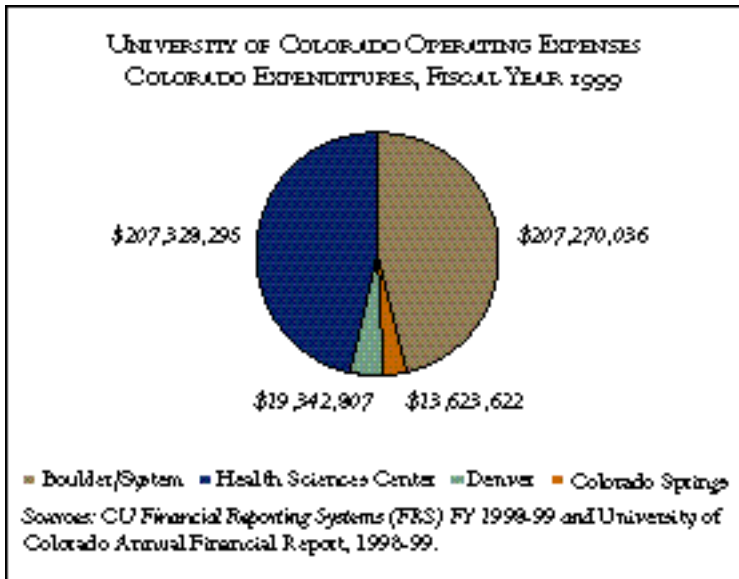
The actual number of people that CU directly employed in 1999 is in excess of 22,000. The chart at right summarizes adjusted employment figures.

To illustrate the economic impact of university employment in another way, the payroll for a representative month (October 1999) is shown at right.

When people are employed by CU, they create a direct demand for additional goods and services in the local economy. An average employment multiplier of 1.8 for all four campuses describes how many more demand-side jobs are created by CU employment.<sup>3</sup>

<sup>3</sup>The employment multipliers actually range from 1.74 to 1.98, depending on the campus. The average is 1.8 for all campuses.





During FY 1999, Colorado as a whole had 2,133,500 jobs. This estimate of the demand-side effects of the university suggests that about 1.3% of these jobs can be attributed to CU through direct, indirect, and induced effects.

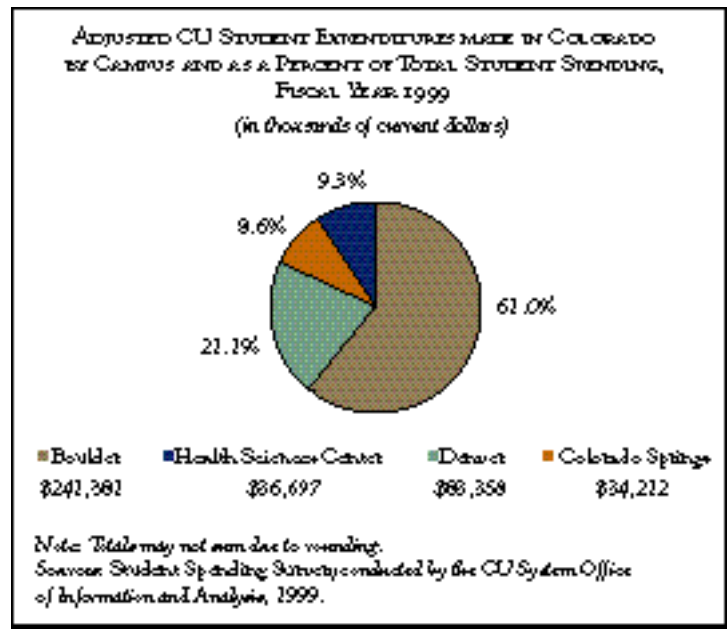
An extremely conservative estimate of the supply-side impact of the university adds over 8,000 jobs, not to mention approximately 8,400 more jobs due to the location in Colorado of various federal science laboratories that work closely with CU and that may not have been located in Colorado in the absence of the university.

### University Expenditures

Another way that the university benefits Colorado's economy relates to the local expenditures it makes associated with operating expenses, which include purchasing office supplies, motor vehicles and their maintenance, utilities, books and periodicals, custodial and repair services, and insurance, just to name a few. In addition, there are capital outlays for equipment, the construction of new buildings, and the improvement of existing ones.

## Student Expenditures

Student spending constitutes a significant direct effect of CU on Colorado's economy. The estimate for FY 1999 indicates that students spent almost \$400 million in Colorado; the Boulder campus has the highest level of expenditures at over \$240 million, followed by the Denver campus at \$83 million.



**ADJUSTED UNIVERSITY OF COLORADO STUDENT EXPENDITURES MADE IN COLORADO BY CAMPUS, FISCAL YEAR 1998-1999**  
(in thousands of current dollars)

Expenditure Category	Boulder	Denver	Colorado Springs	Health Sciences	Total
ROOM/BOARD/UTILITIES	\$108,618.6	\$37,729.9	\$16,176.0	\$19,210.1	\$181,734.6
MEDICAL	\$20,574.5	\$4,133.6	\$1,090.9	\$1,387.7	\$27,186.7
CHILD SUPPORT	\$1,060.6	\$634.2	\$622.6	\$1,469.0	\$3,786.5
PERSONAL EXPENSES	\$36,827.8	\$7,911.3	\$5,133.5	\$2,342.7	\$52,215.3
TRANSPORTATION	\$22,512.0	\$5,774.0	\$3,141.2	\$3,279.8	\$34,707.0
VACATIONS	\$25,221.2	\$5,825.7	\$1,957.3	\$2,210.5	\$35,214.7
TAXES	\$12,463.0	\$18,350.5	\$4,510.7	\$3,421.4	\$38,745.6
BOOKS/SUPPLIES/ETC.	\$14,103.7	\$2,998.8	\$1,597.6	\$3,376.1	\$22,076.2
<b>TOTAL</b>	<b>\$241,381.4</b>	<b>\$83,358.0</b>	<b>\$34,211.8</b>	<b>\$36,697.3</b>	<b>\$395,648.5</b>

## Travel Demand

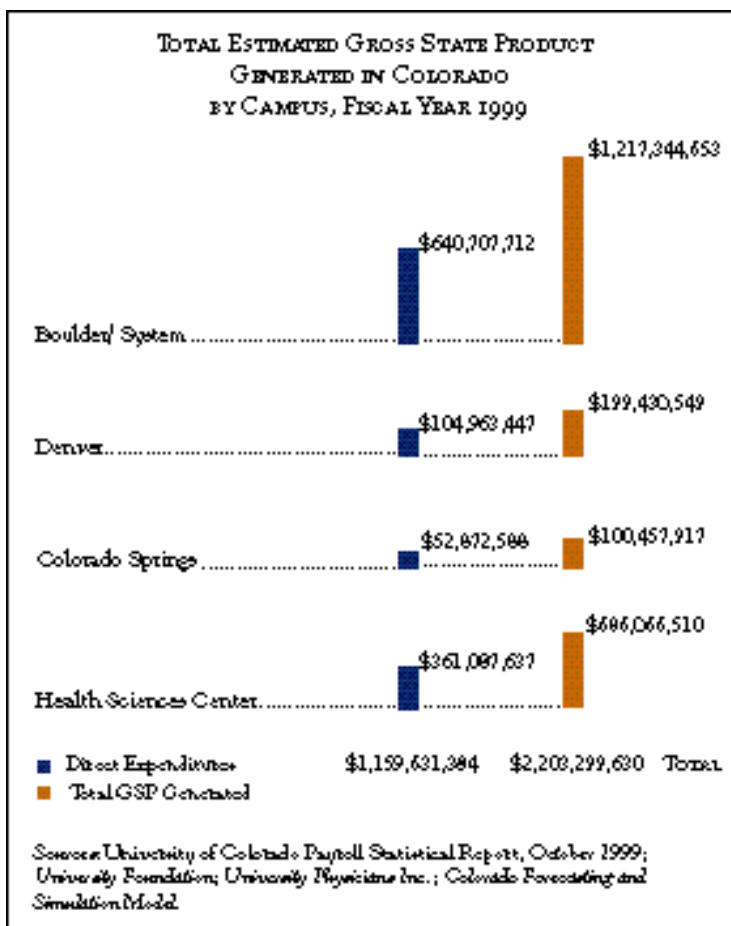
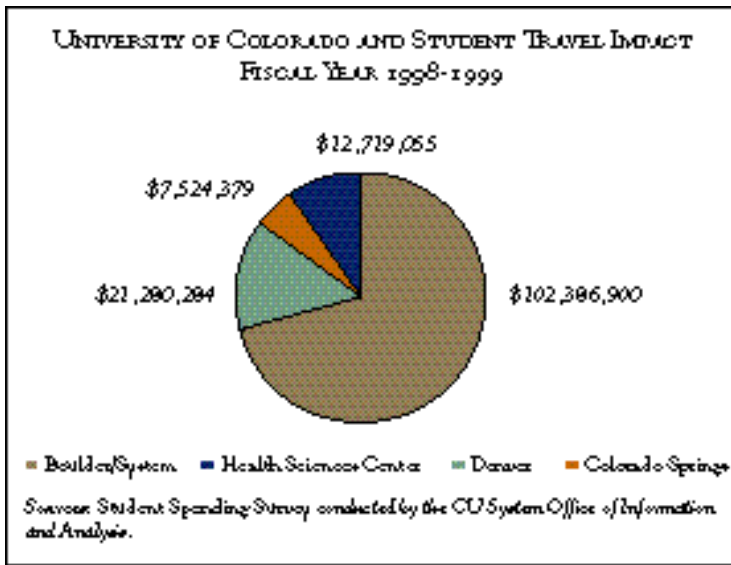
For the purposes of this study, travel expenditures related to CU were categorized as (1) visitors who come from outside Colorado to attend university functions, (2) official university travel sponsored by university funds, (3) out-of-state visitors who come to see students, and (4) in-state vacations taken by students.

Several sources were used to estimate travel demand. The number of visitors who came from outside Colorado to attend university functions was obtained from the departments sponsoring such activities, such as the Department of Intercollegiate Athletics or Conference Services. Estimates of the number of out-of-state visitors who came to see students and the impact of student vacations were made using data from the *Student Spending Survey* conducted in 1999 by the CU System Office of Information and Analysis.

## Gross State Product

Gross state product (GSP) is a measure of the total value of goods and services produced in Colorado. With an average multiplier of 1.9 for this type of economic activity, the university's direct expenditures of almost \$1.2 billion translate into over \$2.2 billion in incremental GSP.

These respective estimates suggest that, based on \$203 million of state support (including some local government), CU generates about \$11.08 of additional GSP per dollar of state support. These figures are very high compared to other uses of state funds and refer to demand-side effects only.



## Taxes

Some fraction of what CU receives in state support flows back into the state coffers as incremental tax returns due to the economic activity attributable to CU. These incremental tax revenues are difficult to measure with any precision, but they suggest that a large fraction of state support provided to CU flows back into the state treasury. Based on incremental employment due to demand-side effects only, the state treasury recaptures at least 37 cents of every dollar allocated to CU. Based on GSP, the treasury recaptures at least 57 cents for every dollar allocated to CU.

In any case, because the state provides only a relatively small fraction of the university's total budget and because tax revenues are generated on much of the university's total spending, the net cost to the state treasury was not \$203 million (FY 1999) but a substantially smaller sum.

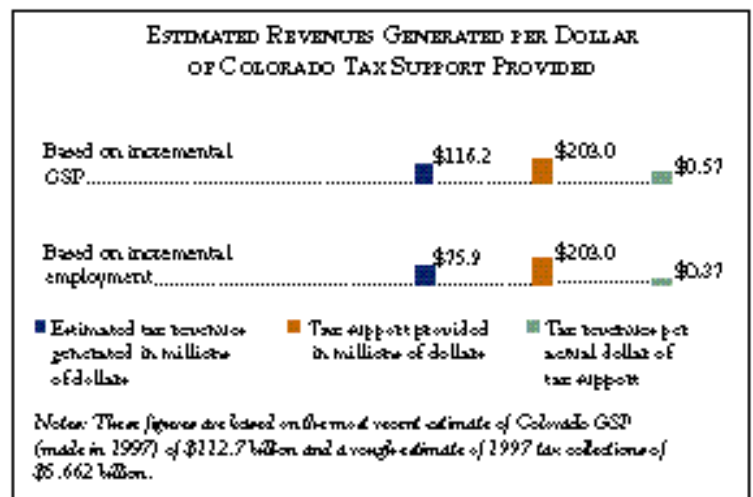
The above estimates of tax receipts per dollar of state spending on CU consider demand-side effects only. These estimates do not include, for example, the greater income tax collections made possible for higher earnings due to the education provided to CU graduates. Neither do they include any supply-side influences, such as the presence of research facilities associated with CU that attract professionals with higher incomes to the state. It is safe to conclude that a large portion of state spending on CU returns to the state in the form of tax collections made possible by economic activity stimulated by the university. These tax collections may even exceed the total state allocations made to CU.

ESTIMATED TOTAL GROSS STATE PRODUCT GENERATED PER COLORADO TAX DOLLAR APPROPRIATED, FISCAL YEAR 1999

	Amount of State Support	Total State GSP Generated per Tax Dollar of Support
STATE AND LOCAL GOVERNMENT ACTIVITIES	\$4.2 (billion)	\$2.49 <sup>2</sup>
UNIVERSITY OF COLORADO	\$208.0 (million)	\$11.08

<sup>2</sup> 1997 Fed. Bureau of Economic Analysis, GSP by state and industry type

ESTIMATED REVENUES GENERATED PER DOLLAR OF COLORADO TAX SUPPORT PROVIDED



## Unmeasured Benefits

Not all benefits and costs of a major institution are easily measurable. For example, the benefits to society of having a more highly educated population are great, but they are not treated as a component of this study.

Moreover, like any major research university, CU has a number of satellite institutions and private firms in its vicinity. The presence of the university accounts for the location of some of these institutions and firms, which have employees, meet payrolls, and generate multiplier effects much like those generated by the university itself. Although these types of organizations are not accounted for in the direct or indirect effects of CU, their presence is important to the state and the local economies.

As a major research institution, CU impacts many such satellite operations. While some of these operations have loose ties to the university, for others the ties are far more tangible. In the absence of a detailed survey, which is beyond the scope of this summary, a few of these operations can at least be noted here.

**Technology Transfer.** University of Colorado professors and other research scientists develop new, often patentable, technologies, and the university participates as a partner in the commercial application of these technologies. In 1999, the University's Office of Intellectual Resources and Technological Transfer helped to create 19 new entrepreneurial ventures that generate substantial economic benefit to the state. Colorado ranks sixth in overall venture capital investments; millions of these investment dollars come to companies with licensed technology from CU.



**Educational Facilities.** There are many ancillary educational facilities that cater to local, national, and international students. For example, the Economics Institute in Boulder employs over 80 people and provides high-quality academic training in the English language and business/economics to international students and professionals who plan to pursue graduate study in the United States or Canada.

**Federal Scientific Installations.** Third, faculty members and professional staff at CU have numerous joint research projects with the scientific community in Colorado. Indeed, the locations of a number of major federal scientific installations in Colorado are due to the presence of the university. The direct effects of these federal facilities are not accounted for in this report, but the magnitude of their operations is clear.

In FY 1999, six federal facilities alone accounted for over 3,700 employees in Colorado. With a multiplier of 2.28, these federal jobs would support over 8,400 total jobs in Colorado, which would in turn generate roughly an additional 9.3 cents of tax revenues per dollar of state and local support allocated to CU.<sup>4</sup>

<sup>4</sup>Data from the 1989 *Colorado Business Survey* produced by the Colorado Office of Economic Development and Analysis were used to calculate this multiplier.

