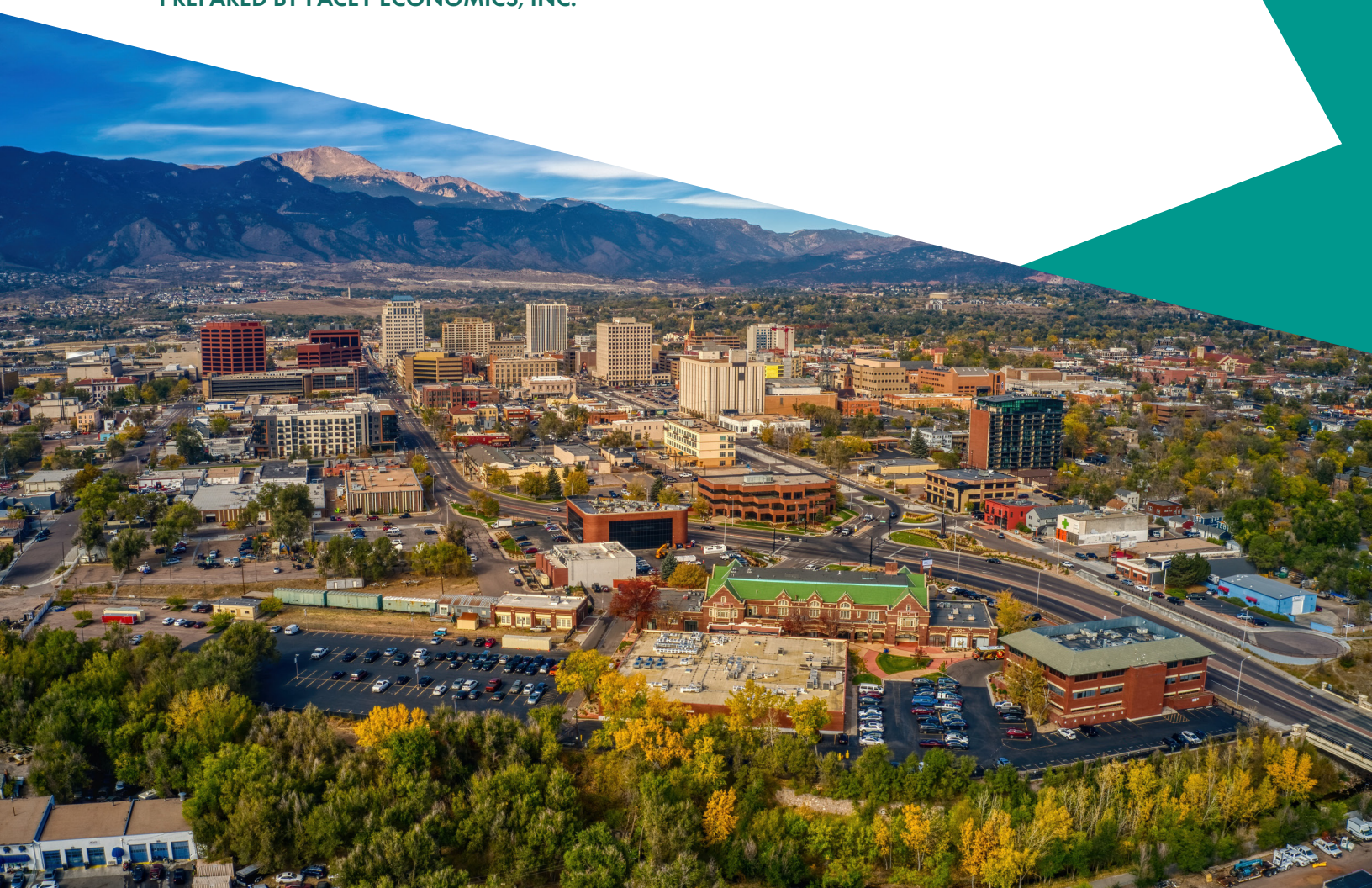




COLORADO PERA'S ECONOMIC AND FISCAL IMPACTS

2022

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INTRODUCTION

This study provides a brief overview of the background of the Colorado Public Employees' Retirement Association (PERA), for both the active members and benefit recipients of PERA (by division), discusses the magnitude of their impact on output, income, and employment to the state as well as to regional and local economies. This June 2022 study is a follow-up to the earlier reports performed in August 2009 and subsequent studies in 2011, 2015, 2016, 2018, and 2020. We also include a perspective on the changes in the impacts over the prior decade. Although the recent worldwide health emergency has changed the future outlook for all economies, the stability and magnitude of PERA's monthly benefit payments have clearly contributed to Colorado's ability to weather and recover more quickly from the negative impacts of the pandemic. One key factor for this recovery is this near century-old PERA program. This PERA investment continues to grow, providing continuity and predictability for the citizens of the state and our civil servants, who help us to continue to prosper and enjoy Colorado.

EXECUTIVE SUMMARY

Colorado PERA is the retirement plan for over 400 public entities and government agencies within the State of Colorado. Since 2010, when the Denver Public Schools (DPS) joined the PERA rolls, there has been a nominal change in the number of organizations served by PERA. With the addition of DPS, PERA is comprised of five divisions as identified below. School and State continue to dominate PERA recipients and the proportion of recipients within each division has remained relatively consistent over the last 13 years.

- ▶ School Division
- ▶ State Division
- ▶ Local Government Division
- ▶ Judicial Division
- ▶ DPS Division

PERA continues to be important to the state as well as the regional and local (county) economies.

- ▶ PERA provides retirement distributions of \$4.35 billion annually to Colorado residents (based on monthly retirement distributions as of December 2021 annualized). This annual amount is up 77% from \$2.45 billion in 2009, and is due, in large part, to the ongoing retirement of baby-boomers from various divisions.
- ▶ These PERA retirement distributions include only monthly pension retirement distributions and not health care benefits provided to retirees or refunds to members, understating the full advantages the community receives from its PERA recipients.
- ▶ For perspective, retirement distributions can be examined on a per capita basis as well as compared to total payroll. Per capita, as opposed to per recipient, retirement distributions in 2021 average some \$752 per person at the state level; however, the per capita figures in rural regions range from the \$800's to the highest in the Pueblo-Southern Mountains Region at \$1,510 per person, highlighting the importance of PERA retirement payments in these areas.
- ▶ When measured against total payroll, which includes Payroll Protection Program (PPP) monies, retirement distributions amount to 2.9% at the state level vis-à-vis 2.7% in 2009; however, adjusting for this temporary subsidy, PERA distributions would have amounted to approximately 3.2% at the state level. Again, as in past studies, the rural areas, such as the Pueblo-Southern Mountains and San Luis Valley Regions, amount to 12.3% and 11.5% of local area payroll in 2021, respectively, but are even higher had there not been the PPP and other government subsidies. Again, highlighting the importance of these PERA retirement benefits for rural communities.

- ▶ As will be demonstrated in this study, PERA distributions provide reliable, predictable income allowing for an “automatic stabilizing effect” on state, regional and local economies, especially in economic downturns.

Commonly recognized economic impact measures include output, value-added, labor income, and employment. The \$4.35 billion annual PERA distributions to Colorado residents results in the following:

- ▶ **\$6.80 billion** in output (all goods and services transactions)
- ▶ **\$3.16 billion** in value-added (state gross domestic product)
- ▶ **\$1.80 billion** in labor income (which measures worker impact in wages)
- ▶ **31,449 jobs**
- ▶ **\$382.2 million** in state and local tax revenues

The Colorado economy experienced increases in all economic impact measures since the 2020 study with the exception of jobs, where there was a slight decrease related to the general economic trend of low employment in 2020 due to the pandemic. Although jobs were down since the prior study, those able to maintain their employment were able to maintain consistent wage increases even with the pandemic.

When the impact results are analyzed on an industry sector basis, there are six sectors (Real Estate and Rental and Leasing; Health Care and Social Assistance; Finance and Insurance; Retail Trade; Professional, Scientific, and Tech; and Government) which continue to account for two-thirds of the value-added to our state economy from PERA retirement distributions.

There are variations in the impacts on a county level with the largest variation in the value-added and labor income impacts, where rural counties continue to benefit more from PERA retirement distributions as measured on a per capita basis. This is likely due to differences in the distribution of PERA benefit recipients relative to their county population and their retail purchase opportunities, along with the geographic expansiveness of the state.

Contributions from both employees and employers are utilized by PERA to provide a healthy return on investment. Since the Great Recession, PERA, as a defined benefit plan with the characteristic of a large pool of investors with varying ages and retirement dates, has experienced an average 10.9% return on investment over the last decade, up from 9.1% for the decade predating the 2020 study, and continues to exceed the expected rate of return of 7.25%.

COLORADO PERA BACKGROUND

- ▶ The Colorado Public Employees' Retirement Association (PERA), established by state law in 1931, operates by authority of the Colorado General Assembly and is administered under Title 24, Article 51 of the Colorado Revised Statutes.
- ▶ Initially, PERA covered only state employees, but over the years has expanded to over 400 government agencies and public entities within the State of Colorado including all Colorado school districts, state judicial systems, and many municipal and local governments.
- ▶ Retirement distributions are pre-funded: while a member is working both the member and the employer contribute a fixed percentage of the member's salary to the retirement trust funds. The employee's contribution for the first half of 2020 is 8.75%, which increased to 10% for the second half of 2020 and the first half of 2021 for most members. In July 2021, employee contributions for most members increased to 10.5% and are scheduled to increase in July 2022 to 11%. The employer's contribution in the early 2000's was approximately 10% but in 2004 and 2006 legislation was passed that required employers to remit additional contributions to PERA. Most division employers contributed 20.9% in 2021, plus 1.02% for the health care fund. (But in reality, of the 20.9%, 5.5% is to be funded by monies otherwise available for employee wage increases. Thus, the employer's contribution was approximately 15.4% for 2021, while the employee's contribution was approximately 15.5% for the first half of 2021 and 16% for the second half of 2021 for the School Division.)
- ▶ PERA provides retirement distributions to members at retirement (or upon determination of disability or to a survivor upon a member's death). Most PERA members do not participate in Social Security for the minimum 10 years and thus are not eligible to receive Social Security retirement income. Although some members have or will participate in Social Security for the required 10 years, they will receive a much-reduced Social Security benefit due to the Social Security windfall elimination provision. Therefore, the PERA retirement distribution is designed and funded to provide total retirement monies consistent with the private sector where retirement is based on a combination of a private plan and Social Security.
- ▶ As of December 31, 2021, PERA's membership included 207,269 active members, 129,325 retirement distribution recipients, and 2,483 survivor benefit recipients, while the 2020 study showed 213,249 active members, 122,568 retirement distribution recipients, and 2,450 survivor benefit recipients. However, this trend appears to be similar to the ratio of active workers to retirees in the general population. The total PERA retirement distributions to recipients amounted to just under \$5 billion with an average per recipient monthly distribution of \$3,280 and \$2,866 for in- and out-of-state residents, respectively. This monthly distribution allows PERA recipients with more than 30 years of service to receive approximately 75% of their pre-retirement income from retirement distributions, a 'replacement ratio' recommended by financial experts.
- ▶ The trust funds are invested by PERA under the direction of a Board of Trustees. PERA's investment strategy uses actuarially established investment objectives with long-term goals and policies. For the year ended December 31, 2021, the time-weighted net-of-fees annualized rate of return for the pooled investment assets over the last 10 years was 10.9% which is some 30% above the target rate of return of 7.25%. Not surprisingly, this 10.9% return includes three years with lower than target returns and seven years with returns higher than target returns, with five of those seven years more than double the target return, consistent with typical market variations and further highlighting the benefits of long-term risk pooling.



PERA AND PERSPECTIVE ON THE MAGNITUDE OF PERA RETIREMENT DISTRIBUTIONS

As noted earlier, initially PERA covered only state employees but over the years the system has expanded to over 400 government agencies and entities within the State of Colorado including all Colorado school districts, the state judicial system, and many municipal and local governments, including Denver Public Schools joining PERA in 2010. As of December 31, 2021, PERA included 207,269 active members and 129,325 retirement distribution recipients with some \$5 billion in annual retirement distributions (including in-state and out-of-state residents). The average beneficiary payment is \$3,220 per month in 2021, an increase of 18% since the average 2009 benefit of \$2,739 per month.

PERA's membership includes:

- ▶ Employees of Colorado state government and many university/community college employees
- ▶ Teachers and all K-12 school employees
- ▶ Judges
- ▶ State Troopers, Colorado Bureau of Investigation Officers, Sheriffs, and Corrections Officers
- ▶ Cities, counties, special districts, and other local governments

PERA covers the workers that provide many of our basic social needs including education, health care, law enforcement, justice, safety, etc.

As noted earlier, the largest division of members and retirement distribution recipients is the School Division followed by the State Division and then the Local Government Division. The Judicial Division is the smallest. A breakdown of active members and retirement distribution recipients by division is identified in Table A.

Table A

PERA Active Members and Retirement Distribution Recipients by Division

Source: Colorado PERA Annual Comprehensive Financial Report for the Fiscal Year Ended December 31, 2021.

	State Division	School Division	Local Government Division	Judicial Division	Denver Public Schools Division	Total
Active Members	53,477	125,007	12,745	345	15,695	207,269
Inactive Members	85,985	147,435	28,333	7	15,426	277,186
Recipients receiving retirement distributions	41,990	71,479	8,392	422	7,042	129,325
Average monthly benefit (retirement benefits)	\$3,419	\$3,079	\$3,212	\$6,237	\$3,293	\$3,220
Recipients receiving survivor benefits	947	1,211	178	10	137	2,483

From a longer-term perspective, the number of active members and retirement distribution recipients has increased over the past three decades from 132,311 active members with 34,416 retirement distribution recipients in 1991 to 207,269 active members with 129,325 retirement distribution recipients in 2021. Until the pandemic, the trend of active members had modest increases, although the retirement distribution recipients also increased, but at a faster rate. The recent drop in active members is attributable primarily to the pandemic given temporary school closings and both temporary and permanent layoffs of personnel. The change in active members is consistent with the state population more than doubling over this same timeframe and the approximate doubling of the state, school, and judicial systems to support this population. The growth in retirement distribution recipients relative to active members is consistent with the demographic phenomena of an increasing number of retirees relative to active workers in our society.



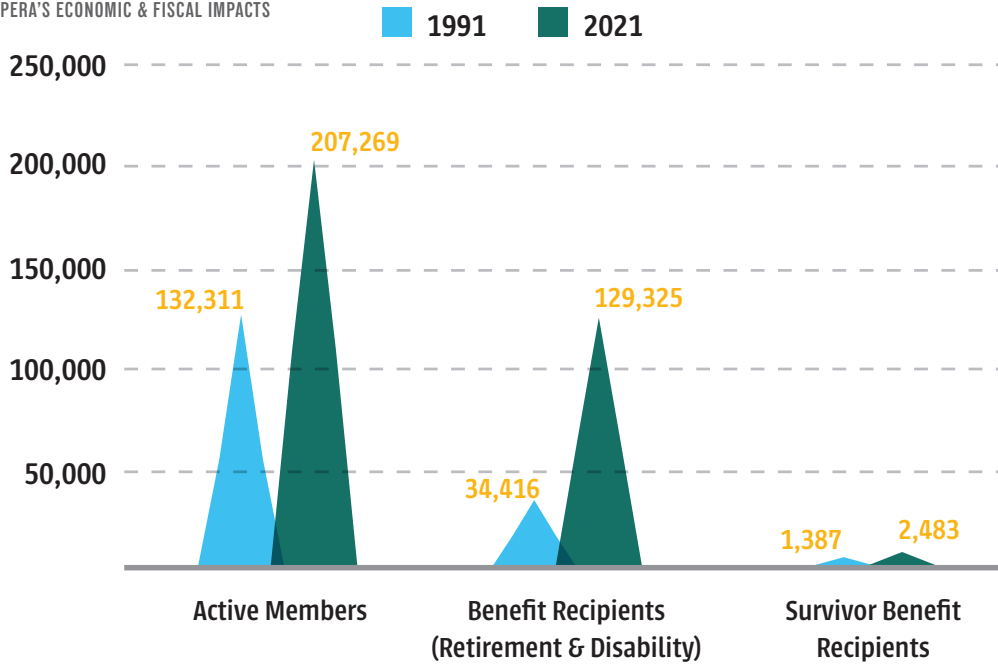


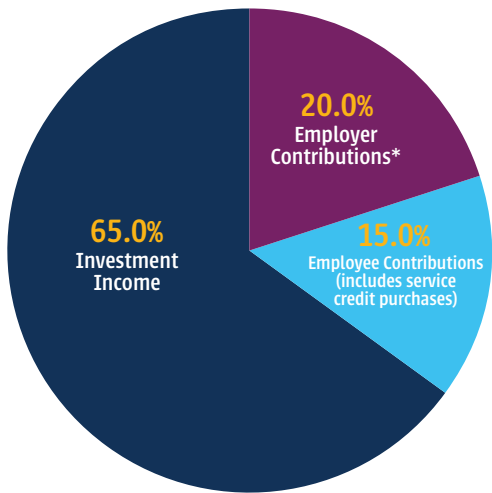
Figure 1

Number of PERA Active Members and Retirement Distribution Recipients, 1991 and 2021

Source: Colorado PERA Annual Comprehensive Financial Reports.

Figure 2

Additions to the PERA Trust Funds, 1988-2021



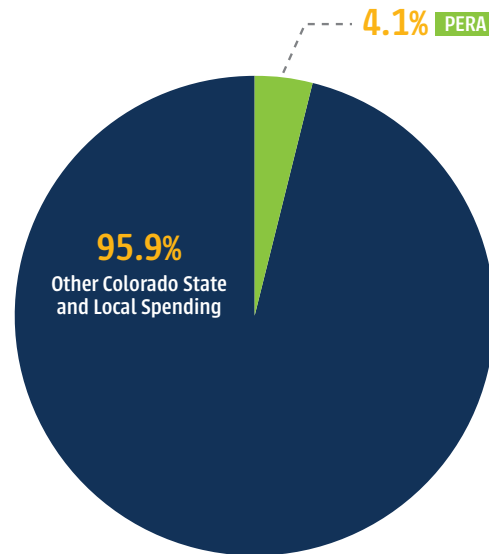
Source: Colorado PERA Annual Comprehensive Financial Reports.

*Includes \$675M from SB 18-200.

A key element of PERA funding is the ability to generate income from the investment of employer and employee contributions. A summary of the source of PERA assets is provided in Figure 2. Over the last 30 years, the largest portion of additions to the trust fund has been investment income amounting to 64% of additions, even when including the dramatic downturn in investment monies from the Great Recession.

Figure 3

Colorado State and Local Government Spending



Source: National Association of State Retirement Administrators (NASRA) February 2022 Issue Brief.

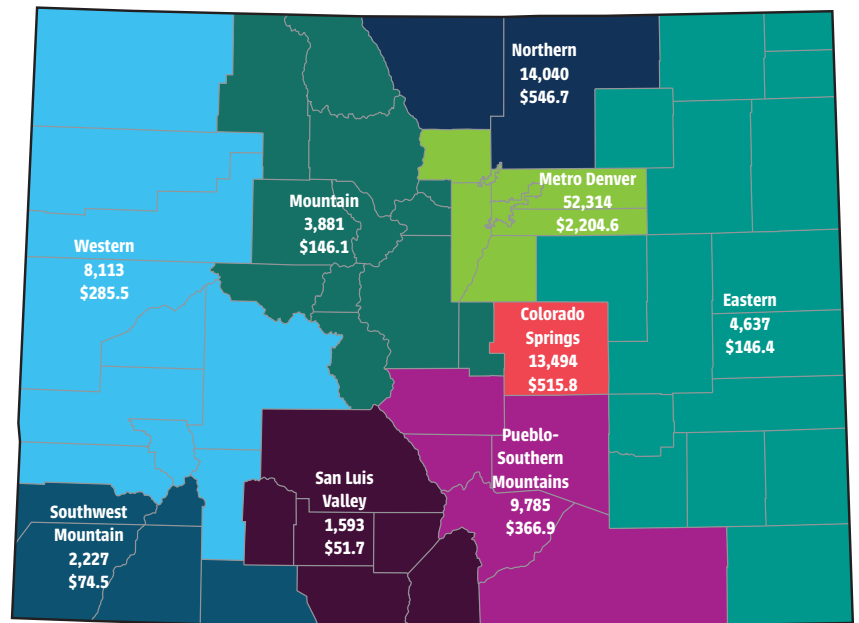
Figure 3 above provides perspective on the relative expense of PERA compared to other state and local expenditures. PERA employer contributions in fiscal year 2019 accounted for only 4.1% of the overall spending of its participating employers based on a February 2022 study from the National Association of State Retirement Administrators (NASRA). Such a percentage is lower than the national average state and local spending on pensions as a share of overall spending of 5.2%.

The nine regions identified in this research continue to consist of the same counties and designations as utilized by the Colorado Legislative Council for its economic forecasts and allows for long-term comparisons of PERA trends. The map shows the number of PERA retirement distribution recipients and the total annual PERA payments for each region. Since 2009, the statewide annual PERA payments have increased 78%, while each region has increased more than 60%, with the exception of the Pueblo-Southern region, which has increased 52%. Notably, the annual PERA payments in the Metro Denver and Mountain regions increased by approximately 89% and 78%, respectively.

Although smaller numbers of PERA participants reside outside the Metro Denver region, the monetary impact of PERA distributions on maintaining the health of the regions in more rural areas is more substantial as noted in earlier studies and will be further discussed in this study.

Figure 4

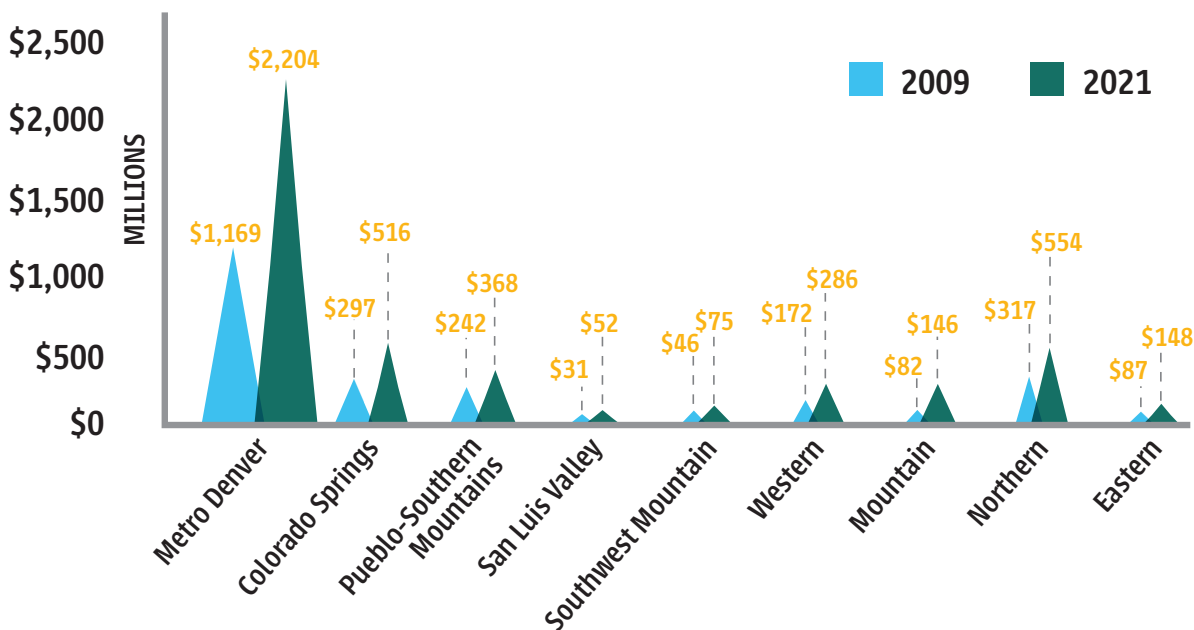
Number of PERA Recipients and Annual PERA Payments by Region (PERA payments shown in millions)



Source: Data from Colorado PERA as of December 2021. Retirement distributions have been annualized.

Figure 5

PERA Retirement Distributions by Region (in millions)



Source: Data from Colorado PERA as of December 2021. Retirement distributions have been annualized.

As of December 2021, approximately \$4.35 billion dollars (on an annualized basis) will be paid by PERA to recipients who continue to reside in Colorado through the end of the year. The 2021 geographic dispersal of PERA retirement distributions by regions is illustrated in Figure 5. Not surprisingly, due to the population growth and urbanization in Colorado over the past 13 years, Metro Denver and/or the Front Range have grown at a faster rate than the rural areas, such as the Pueblo-Southern Mountains, since 2009. This asymmetric population growth renders PERA distributions even more important to rural population areas.

Total retirement distributions are concentrated in the Metro Denver region (see Figure 5); however, Figure 6 identifies the PERA retirement distributions on a per capita basis and demonstrates the relative importance of the PERA payments to each region. The per capita PERA monies are especially important in rural regions such as the Pueblo-Southern Mountains where these payments amount to over \$1,500 per year per person (i.e., when measured by all persons in the region, not only PERA recipients). Since 2009, PERA retirement distributions on a per capita basis have increased by over 50%, statewide, and have increased by approximately 75% in the Mountain, Eastern, and San Luis Valley regions. The higher per capita increase in these three regions is consistent with the well-recognized phenomena in Colorado and across the country where there is reduced employment opportunities in rural areas and with the high cost of living in our Mountain region, both resulting in the relocation of some of the working population.

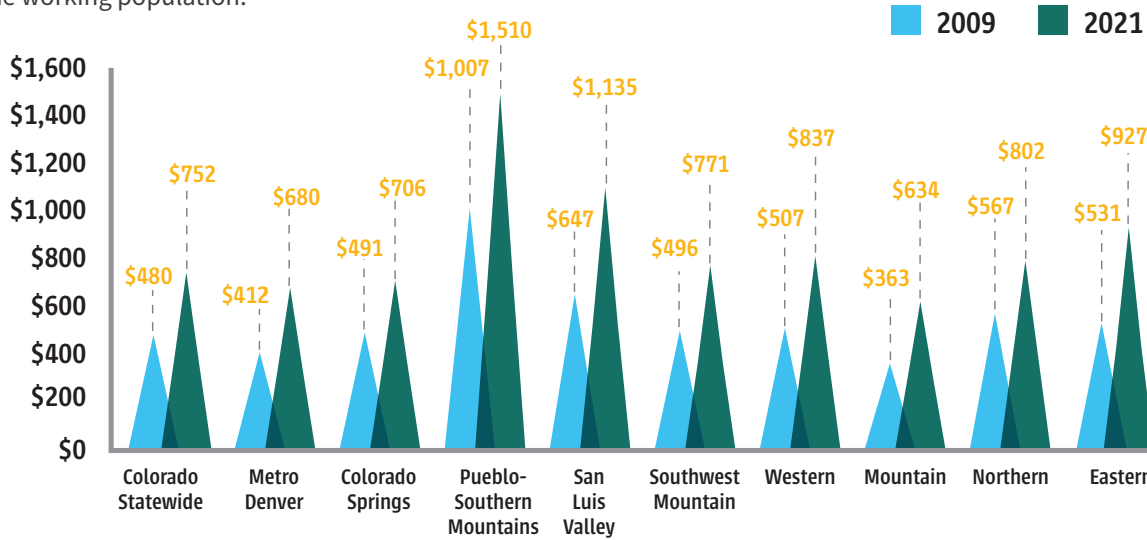


Figure 6

Regional Per Capita PERA Retirement Distributions

Source: Data from Colorado PERA as of December 2021.

Table B and Figure 7 provide a perspective on the magnitude of PERA payments to recipients relative to the state, regional, and local (county) economies. Annual PERA recipient payments to Colorado residents amount to \$4.35 billion and represent 2.9% of statewide payroll. However, these payments represent as much as 11% or 12% of payroll in the rural counties of San Luis Valley and Pueblo-Southern Mountains, respectively, further confirming that PERA payments are especially important in rural regions and less critical, but still important, in the Metro Denver and Mountain regions. Notably, PERA benefit recipients, for the state of Colorado, now contribute approximately 8% more as a percentage of payroll to the Colorado economy than in 2009. Importantly, the annual payroll figure includes monies from the Payroll Protection Program (PPP) as well as other federal aid. When subtracting out PPP funds from annual payroll the PERA payments as a percentage of payroll are some 5% to 15% greater in some regions. Similarly, the statewide figure would be 3.2% rather than 2.9%.

State/Region	2021 Retirement Distributions	State Annual Payroll ¹ (adjusted to 2021)	Payroll Protection Program (adjusted to 2021\$)	PERA Payments as Percentage of Payroll	PERA Payments as Percentage of Payroll less PPP Monies
State of Colorado	\$4,350.4	\$148,695.9	\$10,883.8	2.9%	3.2%
Metro Denver	2,204.3	104,645.1	7,027.4	2.1%	2.3%
Colorado Springs	516.2	14,018.8	937.0	3.7%	3.9%
Pueblo-Southern Mountains	367.6	2,987.0	202.4	12.3%	13.2%
San Luis Valley	52.3	456.2	56.7	11.5%	13.1%
Southwest Mountain	75.3	1,657.9	201.6	4.5%	5.2%
Western	286.3	5,477.1	571.8	5.2%	5.8%
Mountain	146.0	5,113.1	569.5	2.9%	3.2%
Northern	554.2	12,749.0	1,133.1	4.3%	4.8%
Eastern	148.3	1,591.7	184.3	9.3%	10.5%

Table B

PERA Recipient Payments as Percentage of Payroll (Dollars in millions)

Source: Retirement distribution data is from December 2021 Colorado PERA. Payroll data is from the 2020 County Business Patterns, U.S. Census Bureau (publicly released April 2022). PPP data is from the Payroll Protection Program Freedom of Information Act, Small Business Administration. For purposes of comparison, the payroll and PPP data are adjusted to 2021 dollars.

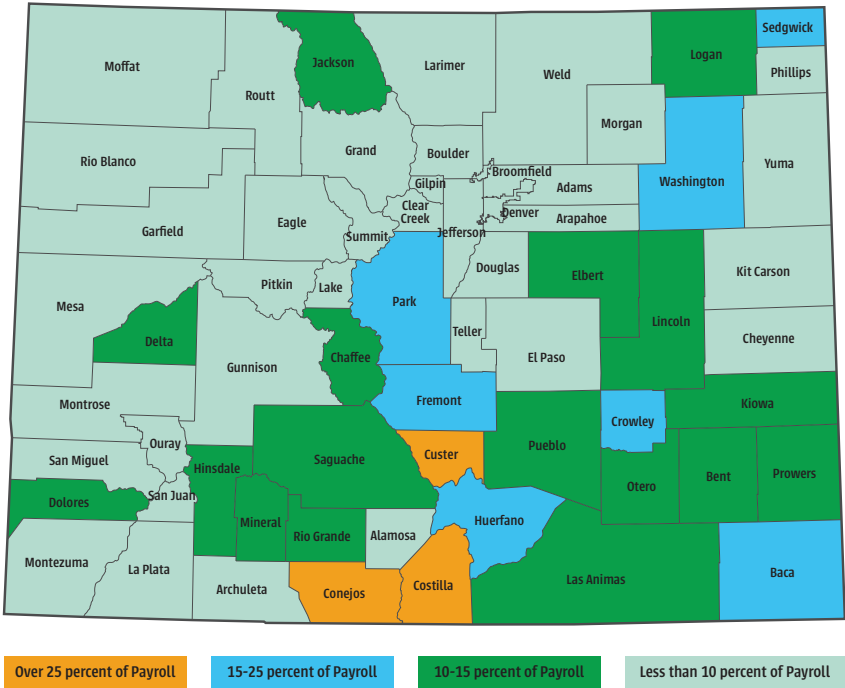
¹Statewide payroll is collected from the County Business Pattern, where data items are extracted from the Business Register (BR), a database of all known single and multi-establishment employer companies maintained and updated by the U.S. Census Bureau. This series includes the number of establishments, employment during the week of March 12, 2020, first quarter payroll, and annual payroll.

Figure 7 illustrates PERA retirement distributions as a percent of county payroll and shows PERA continues to be a significant contributor to local economies.

- ▶ PERA retirement distributions represent a larger share of the local economy in the less populated regions of the San Luis Valley, Pueblo-Southern Mountains, and Eastern regions.
- ▶ In more affluent or urban areas, this percentage is less than 5 percent; however, for a substantial number of rural counties, PERA retirement distributions are in the range of 5% to 20% with some notable exceptions including the counties of Custer (37.4%), Costilla (29.6%), Conejos (30.1%), and Fremont (23.8%).
- ▶ PERA retirement distributions are an important source of financial stability in the state economy, especially during times of recession.
- ▶ As noted previously, when subtracting out PPP funds from annual payroll the PERA payments are a larger percentage of state payroll. Appendix A provides county-by-county detailed tables demonstrating PERA distributions as a percent of annual payroll and PERA distributions as a percent of annual payroll less PPP monies.

Figure 7

PERA Retirement Distributions Relative to Payroll by County



MEASURING ECONOMIC AND FISCAL IMPACTS

When a household receives PERA retirement distributions, it represents an infusion of income into the local economy that creates a chain of economic activities whose total impact is greater than the initial retirement distribution payment. That is, these payments have substantial “ripple” or “multiplier” effects where one recipient’s spending becomes someone else’s income. With \$4.35 billion paid to recipients who reside in Colorado, PERA has a large economic footprint on the state, regional, and local economies.

The impact of the PERA retirement distributions reaches well beyond those who receive the initial retirement distributions (retirees or survivors) as the recipient can fulfill obligations such as purchasing groceries, apparel, gasoline, etc. with these monthly PERA payments. This creates the “multiplier” effect as described and illustrated below.

The Multiplier Effect

- ▶ PERA makes lifetime monthly distributions to recipients (retirees and survivors).
- ▶ PERA recipients spend the monthly monies on household needs (such as food, gasoline, and utilities) and pay taxes and fees.
 - PERA recipients may also “save” some of the monthly monies and this “savings” leaks out of the multiplier effect, but since most recipients are in the decumulation phase of life, most of the distributions are spent.
- ▶ Businesses and/or governments providing those needs use their existing inventory or purchase new inventory and may also be required to hire labor to sell or produce their products or provide their services.
- ▶ Then business owners as well as their employees obtain income from these purchases (initially by the PERA recipient) and they too then go out and buy goods and services.
- ▶ Which, in turn, means added business income and wages/salaries.
- ▶ And the cycle repeats.

To measure the multiplier effect, sophisticated mathematical procedures (generally referred to as input-output models) are created to track the flow of dollars through an economy. These input-output models recognize the relationships between industries and institutions (households, business, and government sectors) in the economy of a certain geographic area (state, region, or county). The models incorporate the prevalence of different industry sectors in different geographic regions and recognize certain industries retain more of the dollars within the region than other industries.

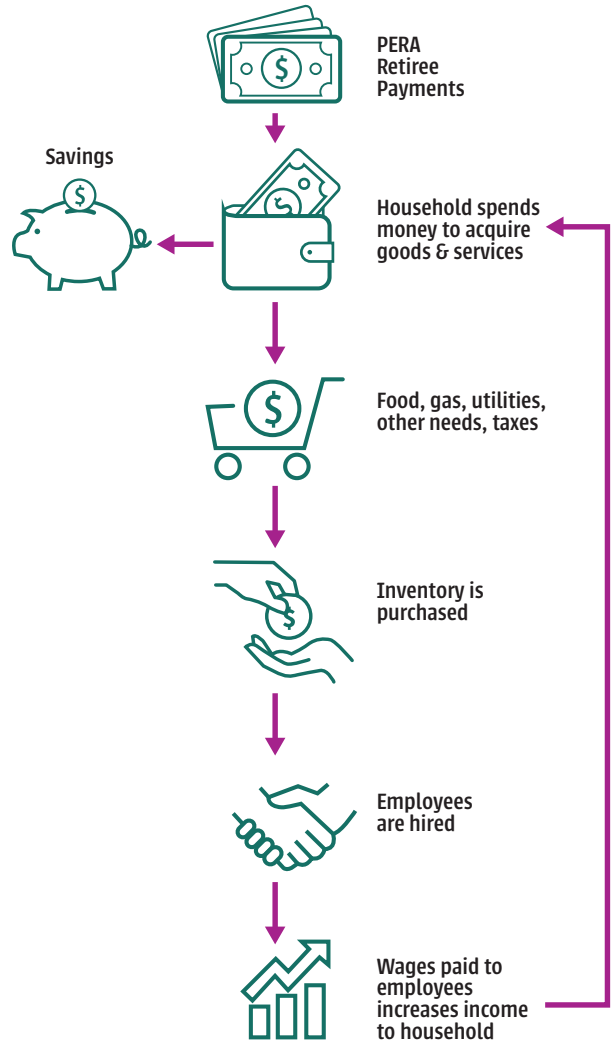
For example, money spent on professional services or accommodations/food are more likely to stay within the area and benefit the local community while mining or manufacturing sectors may improve employment and wages, but if much of the product is sent out of the area or the input needs are purchased elsewhere, the economic impact will be more limited. Also, another integral piece of the model is the weighting of different consumer expenditure patterns by income levels.

There are a number of well-recognized input-output models including RIMS II, IMPLAN, REMI, etc. This research utilizes the **IMPLAN** (formerly an acronym for **IMP**act Analysis for **PLAN**ning) input-output model to estimate the economic and fiscal impact of PERA retirement distributions to the state and regional economies. (Appendix E provides more detailed information regarding the methodology used for this research.)

Key and commonly recognized economic impact measures include output, value-added, labor income, and employment. Definitions and examples for each of these measures are provided and illustrated on the following pages.

Figure 8

The Multiplier Effect of Household Expenditures



Definitions

OUTPUT

This broad measure includes the total sales or revenues generated by firms, government, and households, from initial stimulus (i.e., the PERA benefit payment) and subsequent expenditures.

VALUE-ADDED

A key economic performance measure that includes only “additions” in the economy, i.e., newly created goods and services resulting from the PERA distribution; not the sum of sales at each transaction, but rather, the component of sales that represents the additional production of goods and services; commonly referred to as Gross Domestic Product (GDP).

A classic example is presented to assist in understanding the output and value.



OUTPUT	VALUE-ADDED	
\$0.50	$(\$0.50 - \$0.25)$	= \$0.25
+\$1.00	$+(\$1.00 - \$0.50)$	= \$0.50
+\$1.75	$+(\$1.75 - \$1.00)$	= \$0.75
\$3.25	\$1.50	\$1.50

Output and value-added are measures of economic impact that include all types of economic activity. That is, when PERA retirement distribution recipients spend money in grocery stores, retail shops, restaurants, etc., those businesses respond by buying more supplies, utilities, building space, etc. Businesses also respond by hiring more workers. The employment component of the economic impact on workers from a stimulus to the economy, such as PERA retirement distributions, is of particular interest and measured by labor income (which measures worker impact in wages) and employment (which measures worker impact in number of jobs).

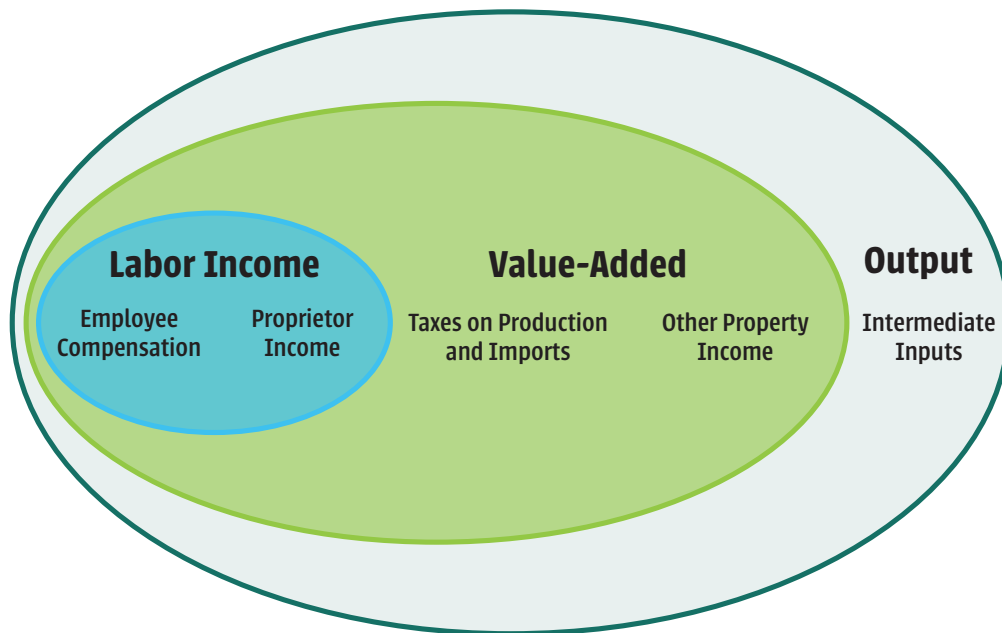
LABOR INCOME

A component of value-added, labor income, measures the portion of newly created value that is employee compensation and self-employment income required to produce or sell the additional goods and services.

EMPLOYMENT

Employment is the level of full-time and part-time jobs generated by the PERA payments; i.e., ongoing PERA payments support this level of jobs.

The chart below demonstrates the relationship between the various economic impact measures. IMPLAN identifies five components of economic impact: intermediate inputs, employee compensation, proprietor income, taxes on production and imports, and other property income. Of these five measures, labor income is comprised of employee compensation and proprietor income. Value-added includes the two components of labor income PLUS taxes on production and imports and other property income. Output is the broadest measure and includes all four components of value-added PLUS intermediate inputs.



PERA ECONOMIC AND FISCAL IMPACTS

PERA retirement distributions are a critical source of reliable, predictable income and provide an “automatic stabilizing effect” on state, regional, and local economies, especially in economic downturns as these monies provide important stimulus to local and state market activity. As noted in the previous section, these steady monthly retirement distributions are especially vital to small communities due to the lack of diverse local industries when other steady sources of income are not readily available. Households with stable incomes can be counted on to spend on basic needs and other purchases as well as pay taxes and fees generating revenue for state and local governments. In addition, monthly distribution recipients are less subject to extreme economic and life events that would result in the need for government assistance. The following sections estimate the effect of spending from PERA retirement distributions, including the overall economic impact and by industry sectors, as well as a narrower analysis of the fiscal impact on state and local government revenues. (For a more detailed description of the methodology used in this analysis, see Appendix E. The methodology is well accepted and widely used by federal, state, and local governments, research organizations, academic institutions, and businesses to assess the economic and fiscal impacts of a variety of developments, including numerous analyses of the retirement distributions of publicly funded pension plans. Notable IMPLAN clients include but are not limited to the Bureau of Economic Analysis (BEA), the Federal Reserve, Colorado Department of Labor and Employment, both University of Colorado and Colorado State University, as well as private sector organizations.)

Figure 9 illustrates the economic impacts of PERA on the State of Colorado as calculated using the well-recognized and well-accepted IMPLAN model. The \$4.35 billion in annual PERA retirement distributions to Colorado residents results in \$6.80 billion in output, up 92% from 2009, while both value-added and labor income has more than doubled over the past 13 years to \$3.16 billion and \$1.80 billion, respectively, with an increase from 20,635 jobs in 2009 to 31,449 jobs (down slightly from 2020 study). Such an economic output amounts to 1.6% of 2021 Colorado gross domestic product. Of note, the impact on employment is measured in “annual average jobs”

and reflects jobs supported for one year. The ongoing PERA retirement distributions would continue to support these jobs and additional increases in retirement distributions to PERA recipients (such as an increase in the number of recipients or increases in retirement distributions) over subsequent years will, on the margin, add new jobs to the economy. The economic impact to state/local governments through tax receipts amounts to \$382.2 million, up from the 2020 study of \$360.1 million. Despite the slight downturn in jobs, labor income and tax receipts increased to \$1.80 billion and \$382.2 million from \$1.71 billion and \$360.1 million in the 2020 study, respectively, both contributing to the upturn in the Colorado economy.

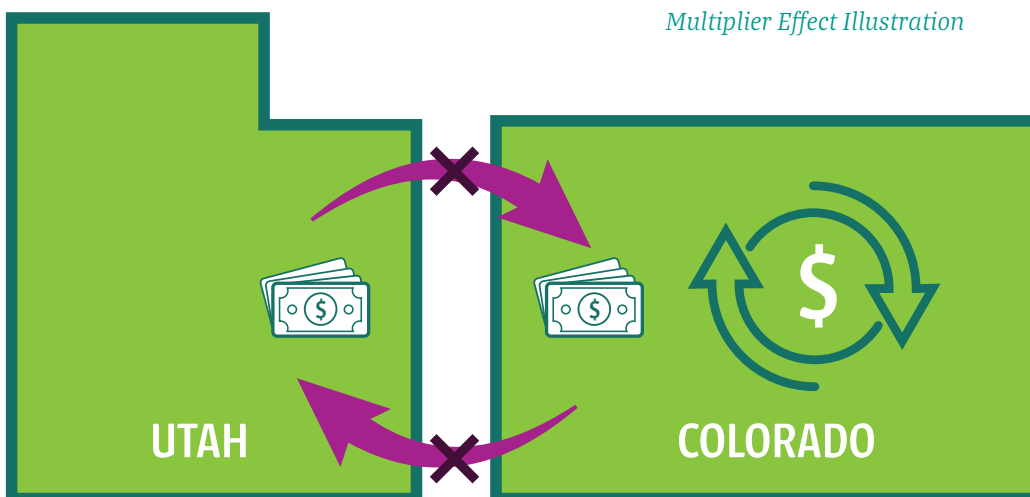
The total output multiplier can be derived by dividing the total economic output (\$6.80 billion) by the initial retirement distributions (\$4.35 billion) amounting to a multiplier of 1.56. This means that for every dollar spent by a PERA recipient an additional 56 cents are generated in the economy through additional rounds of spending. The slight downturn from earlier studies may well be due to the pandemic where local purchase opportunities were limited (e.g., an increase in out-of-state online sales).

As discussed previously, the economic impact of PERA retirement distributions is larger than just the initial retirement distribution because of the “multiplier” effect. The multiplier effect occurs when a PERA retiree spends some of his/her retirement distribution on food, for example, which creates income for grocery store employees who, in turn, spend it on clothing, and so on and so on. Hence, the PERA dollars ripple throughout the economy, and the size of the ripple is known as the multiplier.

The multiplier effect arises when individuals spend their dollars in specific stores. Consequently, the size of the multiplier is influenced by the particular geographic region being studied, which will include some stores and exclude others. This idea is illustrated in Figure 9 which shows the flow of PERA dollars within Colorado and between Colorado and Utah. When measuring the multiplier using the state of Colorado as the

Figure 9

Multiplier Effect Illustration



geographic region, only income and purchases within the state are included. If a retiree lives in Colorado but buys in Utah, or lives in Utah and buys in Colorado, those dollars are not included in the multiplier for the state of Colorado. The dollars spent across state lines still generate economic activity, they are just not included in the computation of the state multiplier. Similarly, the multiplier for the Northern region does not include purchases made in the Metro Denver region, and the multiplier for Jefferson County does not include purchases made in Denver County. Consequently, the full multiplier effect to the state, and its regions and localities is even greater than identified in this report.

The multiplier for PERA retirement distributions for the state of Colorado in this study is 1.56. Of note, the Pensionomics 2021 study, authored by National Institute on Retirement Security (NIRS) utilizes the same IMPLAN software as this analysis (as do numerous other academic and government institutions) and finds a similar multiplier of 1.57 for the State of Colorado.

A larger geographic region gives a larger multiplier because a larger region will include more stores. Similarly, smaller geographic regions give smaller multipliers. The simple average (not weighted average) multiplier for the nine legislative regions is 1.27, and the simple average multiplier for the 64 counties is 1.15. However, the multipliers in the larger regions and counties are significantly higher than the average. It should be emphasized that the smaller county multiplier doesn't imply that PERA dollars spent in, say, Conejos County somehow have less of an impact. Rather, it is simply a reflection that, by necessity of purchase opportunities, some of the Conejos dollars are spent in Alamosa County, and those dollars are included in the multiplier for Colorado, but not in the multiplier for Conejos, nor in the multiplier for Alamosa. As

a result, the county-by-county impacts presented in Appendix B should not be added to derive state or regional totals; state and regional impact measures are identified elsewhere in this report.

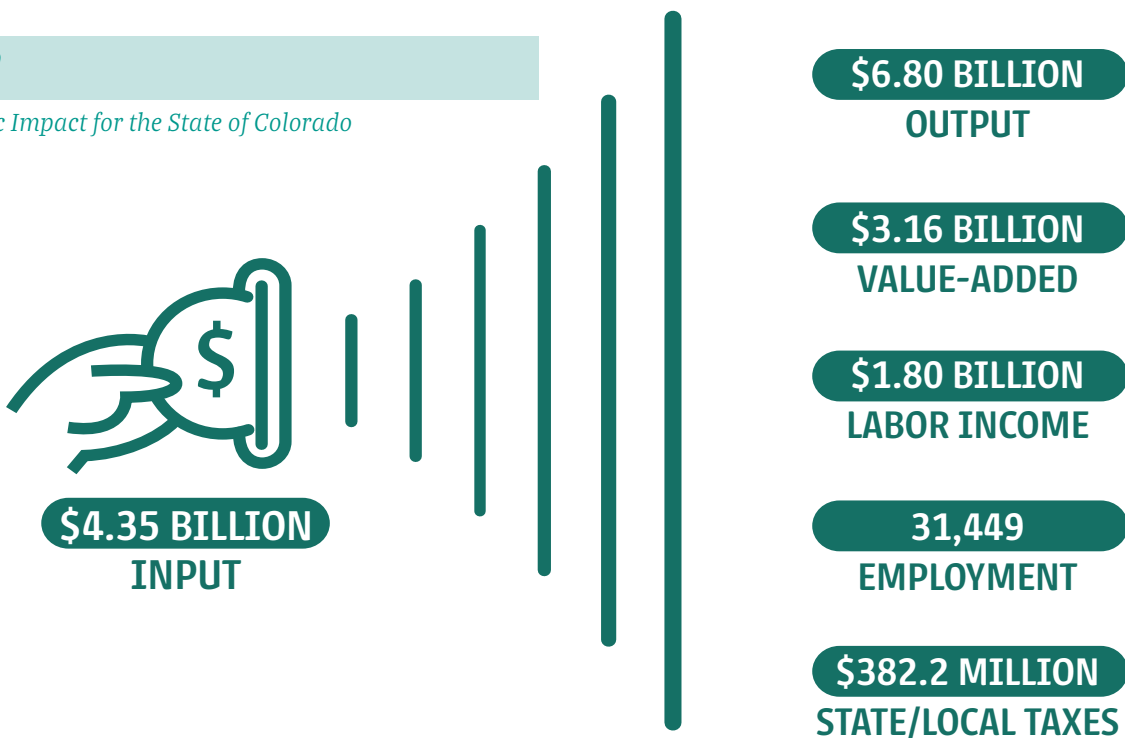
Of note, this analysis is limited to the disbursement of retirement payments to the households, the largest benefit provided by PERA. The economic activity related to other benefits provided by PERA (such as the PERACare subsidy, 401(k) and other voluntary benefit programs) has not been incorporated into this analysis but would obviously increase the overall economic and fiscal impacts provided by PERA.

The salient information for the year-after-year economic impact by region is best demonstrated by the value-added and labor income measures, beyond the substantial direct payments of \$4.35 billion to recipients.

Total impact at the state and regional levels is largely driven by population and the respective wage levels of that population and, therefore, the impact figures are further refined by adjusting for population. The following figures demonstrate the impact on a per person basis in the region. (That is, per capita impacts are obtained by dividing total impact by the relevant population base for the state, regions, and counties.) The magnitude of the results varies across regions as each region has different industries and economic infrastructure and, as such, the multiplier effect for each region will differ.

Figure 10

Economic Impact for the State of Colorado

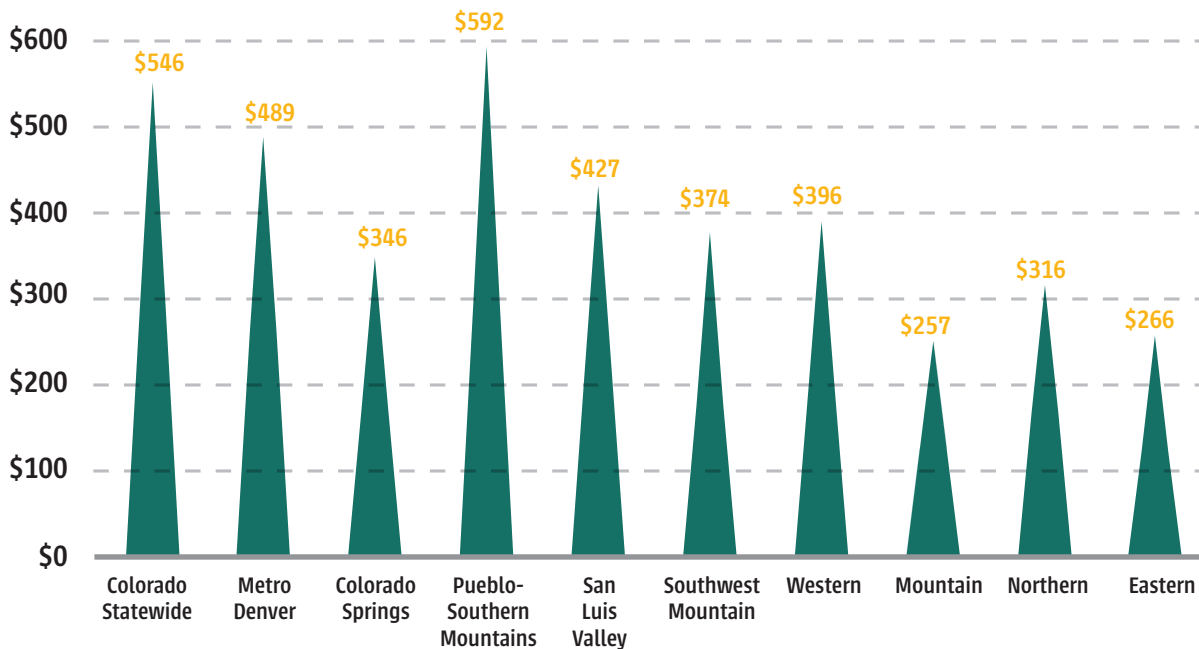


Figures 11 and 12 identify value-added and labor income for the per capita impacts for the state and regions while Table C provides their respective total dollars for output, value-added, and labor income and also notes the employment impact and the economic multiplier. County-level impacts are provided by displaying economic output per-capita in a map marked Figure 13. Findings from these four demonstratives are described below:

- ▶ Naturally, total impacts are greater in the more populated regions; thus, the impacts on a per-capita basis are the more interesting measure.
 - ▶ The value-added and labor income impacts follow the same distribution patterns across regions as retirement distributions. Further, the distribution patterns across regions have all experienced similar growth and output changes over the past 13 years.
 - ▶ Output and employment impacts attributable to PERA recipient spending exhibit similar patterns at both the state and regional levels.
 - ▶ The per capita impacts are fairly constant between regions with the exception of the Pueblo-Southern Mountains region where the per capita impact is substantially greater.
- ▶ Not surprisingly, the per capita impacts are smaller in the Mountain region where the prevalence of the resort communities likely contribute to a large in-flow of non-resident spending that overshadows the spending of PERA recipients.
 - ▶ The per capita value-added has declined for many regions over the past two years, except for Pueblo-Southern Mountains, San Luis Valley, Western, and Eastern regions, which have grown since the 2020 study. Nearly all regions experienced an increase in per capita Labor Income when compared to the 2020 study, with the exception of San Luis Valley and Northern regions. These changes are consistent with demographics of rural areas, particularly east of the Front Range, which are losing population and experiencing either slow or even negative economic growth.
 - ▶ The per capita output is the highest in Pueblo County at approximately \$1,829 person.

Figure 11

Per Capita Value-Added for State and Regions



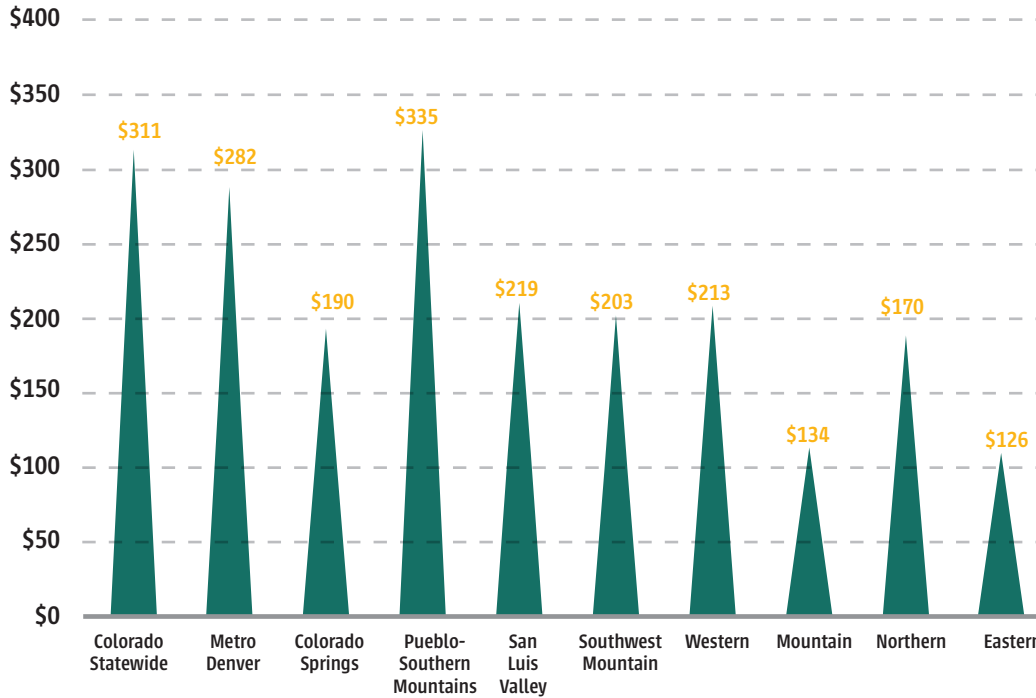


Figure 12

Per Capita Labor Income
for State and Regions

Table C²

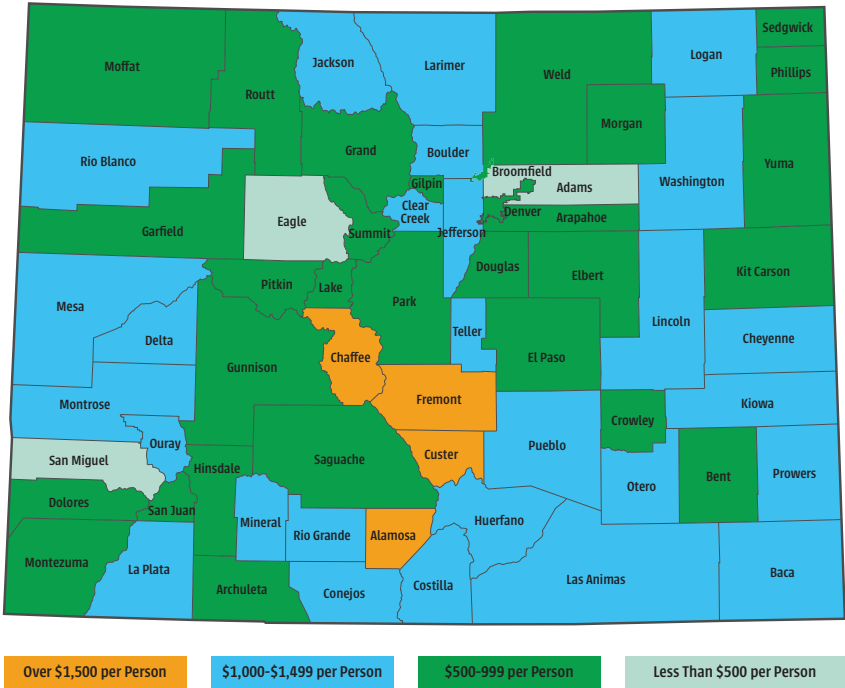
Total Economic Benefit to the State and Regions of PERA Retirement Distributions
(Dollars in millions, except employment and multiplier)

State/Region	2021 Retirement Distributions	Output	Value-Added	Labor Income	Employment	Multiplier
State of Colorado	\$4,350	\$6,801	\$3,158	\$1,798	31,449	1.56
Metro Denver	2,204	3,380	1,584	913	14,792	1.53
Colorado Springs	516	673	253	139	2,860	1.30
Pueblo-Southern Mountains	368	438	144	82	1,774	1.19
San Luis Valley	52	64	20	10	272	1.22
Southwest Mountain	75	100	37	20	464	1.33
Western	286	374	135	73	1,679	1.31
Mountain	146	175	59	31	616	1.20
Northern	554	679	219	118	2,618	1.23
Eastern	148	169	43	20	553	1.14

²Notably, and importantly, state impacts are not the sum of the impacts of individual regions/counties. That is, because households make some of their purchases for goods and services outside a certain region/county and, as such, those expenditures are not counted in the economic activity of the region/county where the retirement distribution recipient resides. Given that the state encompasses a larger geographic and, therefore, larger economic area, it will include more economic activity and, hence, the economic impact for the state will be larger than the sum of the counties/regions.

Figure 13

Total Economic Output Per Capita (from PERA Retirement Distributions) by County



FISCAL IMPACT

Fiscal impact is a component of total economic impact but measures only the government tax revenues generated by PERA retirement distributions. PERA recipients pay a portion of the PERA retirement distribution in income taxes and pay additional taxes on goods and services which are subject to sales, use, or property taxes as well as fees for licenses or permits. There are additional taxes and fees paid on the subsequent rounds of spending generated by the multiplier effect. Fiscal impact recognizes expenditures made by state and local governments to hire additional workers, make purchases in the local community for equipment needs, etc. Fiscal impact measures include the income and property taxes paid on the first round of spending plus other taxes and fees paid on subsequent rounds of spending which generates revenues for state and local government budgets.

The fiscal impacts from PERA retirement distributions as measured via the IMPLAN model are noted in Table D. The total annual impact to state/local governments amounts to \$382.2 million with regions ranging from \$3.5 million in San Luis Valley to \$188.8 million in Metro Denver.

Table D

Fiscal Impact to the State and Regions (Dollars in millions)

State/Region	Sales Tax	Property Tax	Other Tax (including Income Tax)	Total State/Local Tax Impact
State of Colorado	\$137.5	\$133.3	\$111.4	\$382.2
Metro Denver	67.0	66.0	55.7	188.8
Colorado Springs	15.5	8.9	10.5	35.0
Pueblo-Southern Mountains	8.5	6.8	6.1	21.4
San Luis Valley	1.6	1.1	0.9	3.5
Southwest Mountain	2.1	1.9	1.5	5.5
Western	8.1	7.6	5.0	20.8
Mountain	3.0	3.1	2.6	8.7
Northern	11.0	14.6	11.1	36.7
Eastern	2.6	3.0	1.9	7.5

Interestingly, the trend in fiscal impact over the past 13 years (since the 2009 study) finds the Metro Denver region capturing a greater share of this impact, with the Mountain, Southwest Mountain, Eastern and San Luis Valley regions maintaining their shares and other regions falling slightly behind since 2009.

ECONOMIC IMPACT BY INDUSTRY SECTOR

The economic impact measures vary depending on the composition of industry sectors across the state, regional, and local economies. This research first identifies state Gross Domestic Product (GDP) and annual payroll by industry sector in millions of dollars to provide an overall understanding the Colorado economy, noted in Table E below. Also included on Table E are the PPP monies each sector received in 2020, as the pandemic plagued all sectors, albeit to lesser and greater degrees. The addition of the PPP monies provides additional insight as to the impact on the different sectors.

Colorado has three industry sectors that stand out—Real Estate and Rental; Professional, Scientific, and Tech; plus Government—comprising a third of the state's GDP but, importantly, the state has substantial diversity in its economy as noted by the strength of seven other industry sectors that account for another 40% of Colorado GDP.

Table E

Industry Sectors of the Colorado Economy
(Dollars in millions)

Source: GDP data is from the Regional Economic Accounts, Bureau of Economic Analysis. Payroll data is from the Bureau of Census - 2020 County Business Patterns (publicly released April 2022). PPP data is from the Payroll Protection Program Freedom of Information Act, Small Business Administration. For purposes of comparison, the payroll and PPP data are adjusted to 2021 dollars.

Sector	2021 Gross Domestic Product	Annual Payroll (Adjusted to 2021\$)	Payroll Protection Program (Adjusted to 2021\$)
Finance and Insurance	\$26,539	\$11,724	\$263
Health Care and Social Assistance	26,098	18,099	1,312
Government	44,220	n/a ³	154
Real Estate and Rental	50,761	2,882	411
Retail Trade	24,511	9,536	773
Accommodation and Food Services	13,855	7,328	1,126
Information	25,918	10,353	221
Wholesale Trade	25,903	8,794	429
Manufacturing	27,750	8,586	764
Professional, Scientific, and Tech	43,853	19,800	1,523
Transportation and Warehousing	10,033	5,130	269
Administrative and Waste Services	13,388	14,920	511
Utilities	5,774	1,057	37
Arts, Entertainment, and Recreation	5,694	2,285	210
Management of Companies	9,075	7,298	23
Educational Services	3,356	2,007	221
Construction	24,642	12,073	1,515
Agriculture, Forestry, Fishing, and Hunting ⁴	3,077	84	119
Mining	10,846	3,048	213
Other	9,043	4,427	694
Unknown	n/a	11	97
All Industry Total	\$421,941	\$149,442	\$10,884

³ Data from the Bureau of Census - County Business Patterns excludes most government employees.

⁴ Data from the Bureau of Census - County Business Patterns excludes agricultural production employees, explaining why PPP monies are greater than payroll for this sector. <https://www.census.gov/programs-surveys/cbp/technical-documentation/methodology.html>

Table F

Top Industry Sectors in the Colorado Economy

Source: Bureau of Economic Analysis

A notable downturn in the Transportation and Warehousing and Mining sectors occurred between the 2020 study and this study. Also, Colorado is noted for attracting clean energy industries as represented by the Information sector and the Professional, Scientific, and Tech sector being substantially greater than the national average. Another observation finds the Manufacturing sector is less prominent in the Colorado economy than for the United States economy.

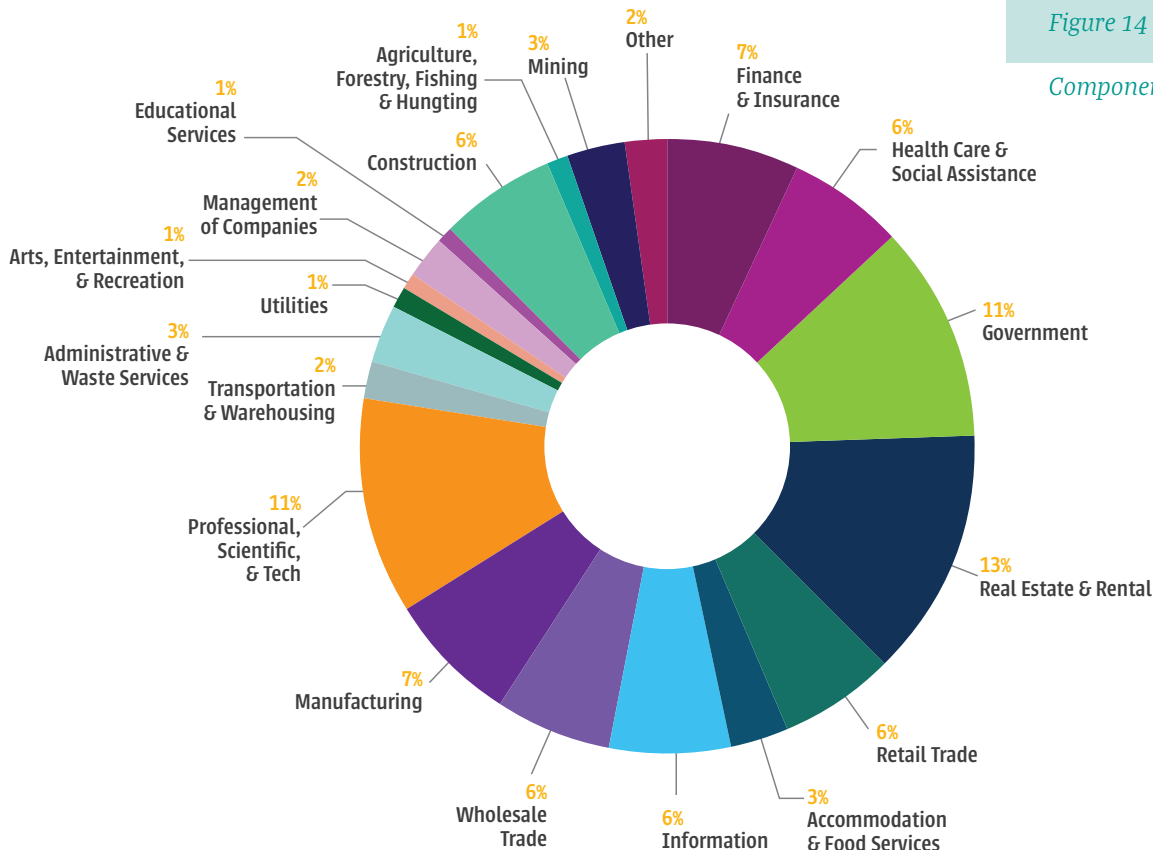
Government is a large sector due, in part, to Denver being a “branch” for several federal government and government-related agencies (e.g., the Denver Federal Center in Lakewood, U.S. Mint in Denver, etc.).

An additional 30 plus percent of the state’s GDP is provided by the Information, Health Care and Social Services, Wholesale Trade, Retail trade, and Construction. The remaining industry sectors account for approximately 24% of state GDP. This distribution is illustrated in Figure 14.

TOP INDUSTRIES Sector	2020 STUDY PERCENT OF GDP		2022 STUDY PERCENT OF GDP	
	Colorado	United States	Colorado	United States
Real Estate and Rental and Leasing	14.8%	13.3%	12.0%	12.8%
Government	11.9%	12.4%	10.5%	12.1%
Professional, Scientific, and Tech	9.6%	7.5%	10.4%	7.7%
Manufacturing	6.9%	11.3%	6.6%	11.1%
Finance and Insurance	5.9%	7.6%	6.3%	8.5%
Health Care and Social Assistance	6.3%	7.5%	6.2%	7.3%
Information	5.4%	5.2%	6.1%	5.7%
Wholesale Trade	5.5%	5.9%	6.1%	6.0%
Construction	5.7%	4.1%	5.8%	4.2%
Retail Trade	5.1%	5.5%	5.8%	6.0%

Figure 14

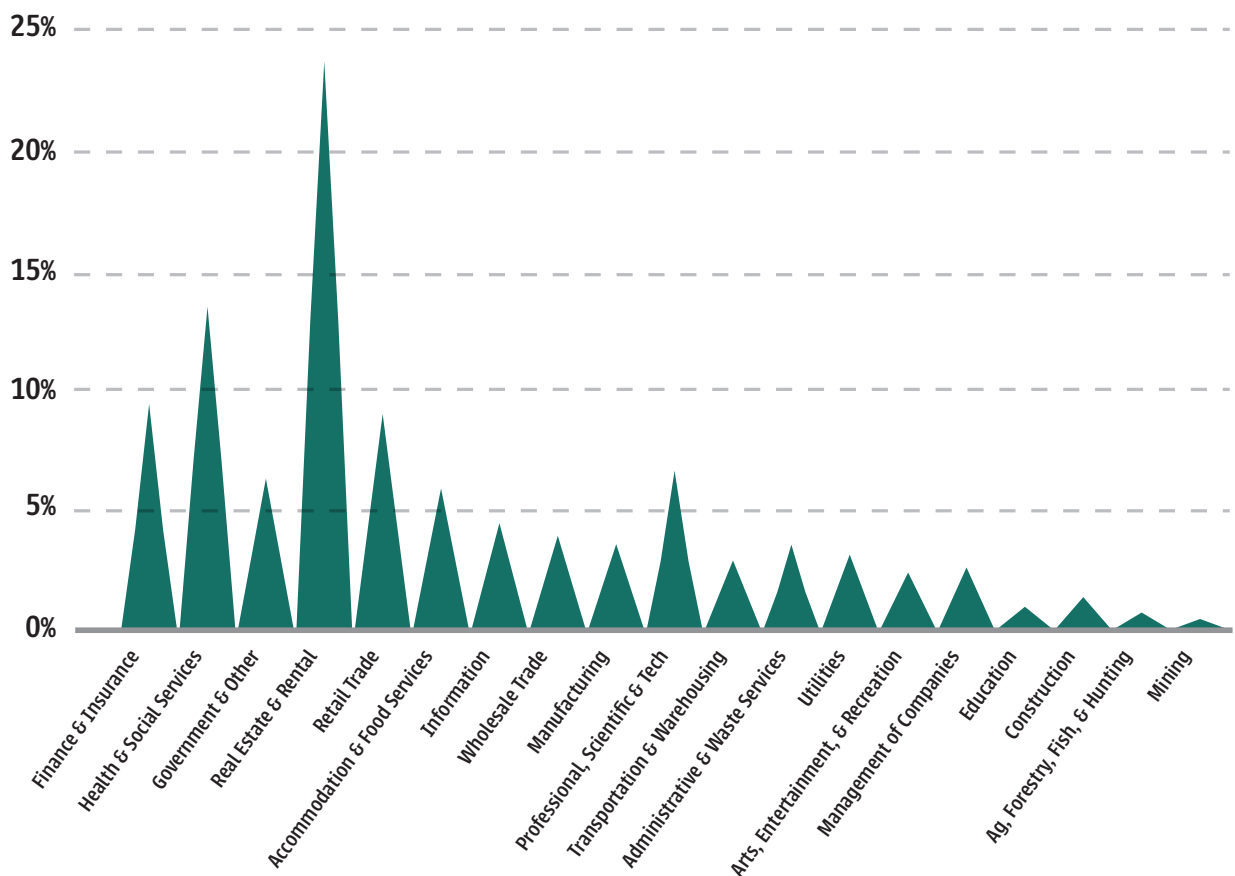
Components of the Colorado Economy



Figures 15 through 17 demonstrate the statewide impacts by industry sector. (The data used for these figures are found in Appendix C.) The economic impact by industry sector for Value-Added (i.e., state GDP) is illustrated in Figure 17 below. Although Real Estate and Rental and Leasing, Government, Professional, Scientific, and Tech, and Manufacturing account for approximately 40% of the 2021 state GDP, the economic impact as measured by value-added is greatest in the Real Estate and Rental and Leasing, Health Care and Social Services, Finance and Insurance, Retail Trade, and Professional, Scientific, and Tech sectors. In fact, only these five sectors account for approximately 61% of the Value-Added impact (i.e., contribution to GDP). (The output impact is not illustrated although it has a somewhat broader distribution.) Note, impacts are likely concentrated in the health care sector given that PERA retirement distributions drive household final demand while other sectors of state GDP (Real Estate, Professional Services, etc.) are largely driven by business-to-business transactions.

Figure 15

Value-Added by Industry Sector for the State of Colorado



Real Estate and Rental have surged to the top of the value-added roster of industry significance since 2009 and the Great Recession.

Figure 16 demonstrates the economic impact on labor income at the state level from PERA recipients, highlighting that spending is heavily concentrated in Health Care and Social Services (20%), with Retail Trade, Finance and Insurance, and Professional, Scientific, and Tech generating an additional 29% of labor income.

As in 2009, Health and Social Services continue to be a leading industry sector for the provision of labor income and employment for the state.

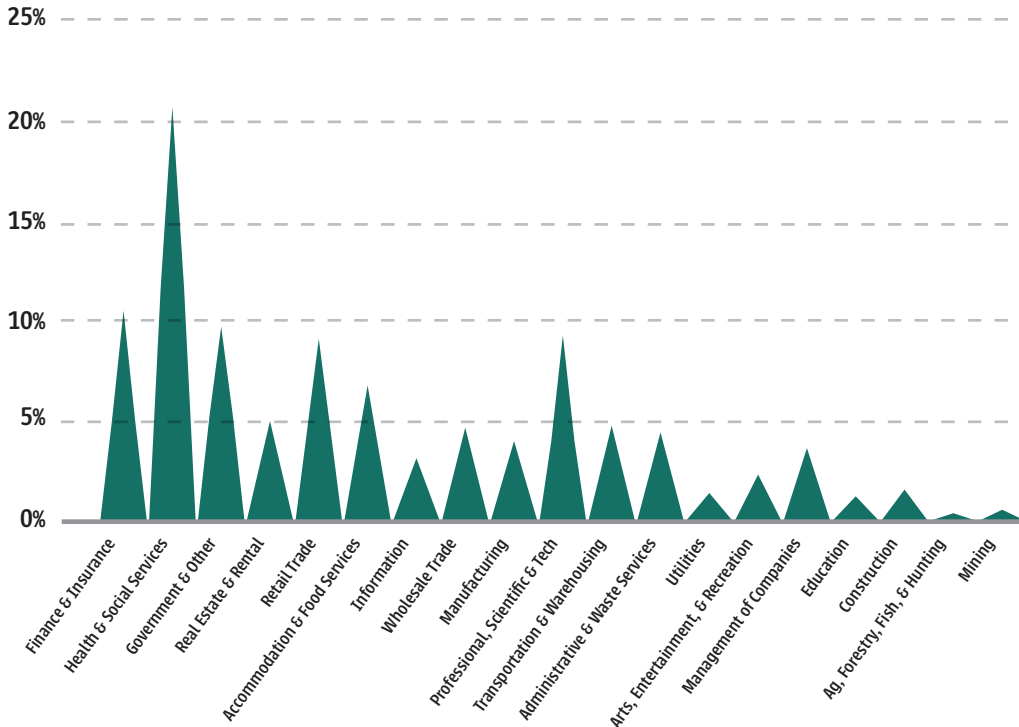


Figure 16

Labor Income by Industry Sector for the State of Colorado

Figure 17 identifies the employment impact by sector and shows that three sectors, Health and Social Services, Retail Trade, and Accommodation and Food Services account for more than 43% of total employment impacts, a slight decrease over the last two studies due to a greater increase in other sectors such as Real Estate and Rental and Leasing and Finance and Insurance. This is consistent with these sectors' importance to the value-added component. Together, Government and Other Services, Real Estate and Rental, and Finance and Insurance account for an additional 28% of employment impacts.

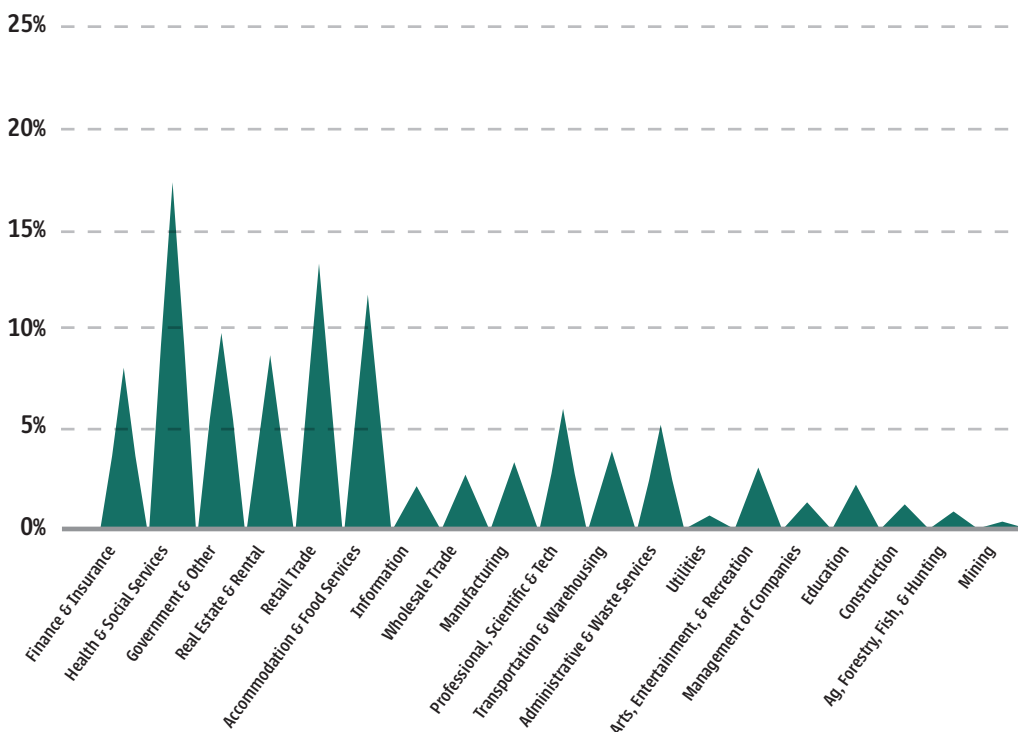


Figure 17

Employment by Industry Sector for the State of Colorado

ABOUT THE RESEARCHERS

Pacey Economics, Inc., located in Boulder, Colorado, has over 25 years of providing consulting services and analyses on an array of economic and public policy issues. We are a small boutique firm, focused on providing economic analyses for state agencies and private or publicly held companies plus offering economic reports or opinions and expert witness testimony in legal matters. Over the past 13 years, Pacey Economics, Inc. has been awarded many state/federal government contracts through a number of different agencies to forecast, analyze, and evaluate programs and legislative changes. Recently, we completed a project for the Arkansas River Conservation Cooperative (ARCC) demonstrating the economic value of the commercial whitewater activities to their local communities. Further, Pacey Economics, Inc. was awarded a year-long contract with Corporation for Public Broadcasting (CPB) to analyze and evaluate components critical to their community service grants (CSG) and was recently renewed to provide additional analyses. The staff contributing to this report are described below.



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Dr. Pacey is President of Pacey Economics, Inc. and Principal Investigator on the PERA project. She received her PhD in economics and BA in mathematics from the University of Florida and held positions with the Congressional Budget Office and the University of Colorado before forming her own firm, Pacey Economics, Inc.



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Mr. Nehls has been with Pacey Economics, Inc. since 2009. Mr. Nehls obtained a bachelor's degree in 2007 from University of Puget Sound, Tacoma, with a major in economics and minor in mathematics and a master's degree in economics from University of Colorado Denver in May 2015.



Anna C.V. Flores, MS, MA

Ms. Flores began working at Pacey Economics, Inc. as an analyst in 2015 shortly after she received her bachelor's degrees in economics and political science from University of Colorado Boulder. She has since completed her master's degrees in economics and finance in December 2018. She was a key contributor to the impact analysis.



Matthew S. Kaiser, JD, BA

Mr. Kaiser has been with Pacey Economics, Inc. since 2015, and also worked for the firm in the late 1990s for approximately five years. Mr. Kaiser obtained a bachelor's degree in economics in 1996 from Colorado State University and a Juris Doctorate from University of Colorado School of Law in 2004.



Hannah J. Suarez, MS

Ms. Suarez commenced working at Pacey Economics, Inc. as an analyst in May 2018 after she received her bachelor's degree in quantitative economics from the University of Colorado Boulder. She has since completed her master's degree in data analytics in July 2021.



APPENDICES

APPENDIX A—PERA Retirement Distributions as a Percentage of Payroll by County

APPENDIX B—Economic and Fiscal Impacts by County

APPENDIX C—PERA Economic Benefits by Industry Sector – State of Colorado

APPENDIX D—Statewide Comparisons to Previous Studies

APPENDIX E—Economic and Fiscal Impact Analysis Detailed Methodology

APPENDIX A—PERA RETIREMENT DISTRIBUTIONS AS A PERCENTAGE OF PAYROLL BY COUNTY

(sorted by percentage of payroll)

COUNTY	REGION	RETIREMENT DISTRIBUTIONS ANNUALIZED (IN THOUSANDS)	ANNUAL PAYROLL (ADJUSTED TO 2021 DOLLARS) (IN THOUSANDS)	PERA RETIREMENT DISTRIBUTIONS AS PERCENTAGE OF PAYROLL
Custer	Pueblo-Southern	\$7,111	\$19,022	37.38%
Conejos	San Luis Valley	9,759	32,378	30.14%
Costilla	San Luis Valley	3,619	12,246	29.55%
Fremont	Pueblo-Southern	77,073	323,778	23.80%
Washington	Eastern	4,573	23,067	19.82%
Crowley	Eastern	4,249	24,577	17.29%
Baca	Eastern	3,503	21,880	16.01%
Park	Mountain	11,457	72,052	15.90%
Huerfano	Pueblo-Southern	7,607	50,305	15.12%
Sedgwick	Eastern	2,179	14,452	15.08%
Bent	Eastern	3,774	26,657	14.16%
Elbert	Eastern	20,725	146,904	14.11%
Dolores	Southwest Mountain	1,785	12,815	13.93%
Otero	Eastern	22,673	169,628	13.37%
Hinsdale	Western	685	5,132	13.34%
Las Animas	Pueblo-Southern	16,790	127,571	13.16%
Kiowa	Eastern	1,526	11,784	12.95%
Delta	Western	30,377	253,991	11.96%
Logan	Eastern	25,308	213,152	11.87%
Jackson	Mountain	1,387	11,895	11.66%
Rio Grande	San Luis Valley	12,489	109,564	11.40%
Lincoln	Eastern	6,689	59,118	11.31%
Chaffee	Mountain	29,865	269,214	11.09%
Pueblo	Pueblo-Southern	258,989	2,466,323	10.50%
Prowers	Eastern	10,918	104,656	10.43%
Saguache	San Luis Valley	3,572	35,681	10.01%
Mineral	San Luis Valley	872	8,728	9.99%
Lake	Mountain	4,848	51,890	9.34%
Teller	Mountain	24,394	261,381	9.33%
Alamosa	San Luis Valley	21,969	257,633	8.53%
Ouray	Western	5,019	62,241	8.06%
Phillips	Eastern	4,086	52,619	7.77%
Clear Creek	Mountain	8,774	114,482	7.66%
Montezuma	Southwest Mountain	20,131	269,498	7.47%
Kit Carson	Eastern	6,017	85,903	7.00%
Montrose	Western	40,289	579,012	6.96%
Yuma	Eastern	6,978	115,457	6.04%
San Juan	Southwest Mountain	453	7,590	5.96%
Cheyenne	Eastern	1,828	31,950	5.72%
Mesa	Western	145,022	2,646,773	5.48%
Jefferson	Metro Denver	596,116	11,579,427	5.15%
Rio Blanco	Western	6,159	123,931	4.97%
Archuleta	Southwest Mountain	6,834	140,819	4.85%
Morgan	Eastern	23,254	489,935	4.75%
Moffat	Western	8,541	180,461	4.73%
Gunnison	Western	13,068	284,454	4.59%
Larimer	Northern	329,015	7,305,208	4.50%
Weld	Northern	225,183	5,443,750	4.14%
Grand	Mountain	11,297	299,879	3.77%
La Plata	Southwest Mountain	46,130	1,227,158	3.76%
El Paso	Colorado Springs	516,236	14,018,827	3.68%
Garfield	Western	33,911	1,135,279	2.99%
Routt	Mountain	16,180	587,259	2.76%
Gilpin	Mountain	4,184	153,735	2.72%
Douglas	Metro Denver	218,365	8,274,568	2.64%
Boulder	Metro Denver	304,267	11,892,607	2.56%
Adams	Metro Denver	227,350	10,703,106	2.12%
Arapahoe	Metro Denver	420,571	21,942,301	1.92%
Summit	Mountain	12,641	802,616	1.57%
San Miguel	Western	3,203	205,806	1.56%
Broomfield	Metro Denver	54,490	4,126,965	1.32%
Denver	Metro Denver	383,118	36,126,114	1.06%
Eagle	Mountain	15,861	1,647,586	0.96%
Pitkin	Mountain	5,098	841,106	0.61%

APPENDIX B—ECONOMIC AND FISCAL IMPACTS BY COUNTY⁴

(actual dollars)

COUNTY	REGION	LABOR INCOME	VALUE-ADDED	INDIRECT EFFECT	INDUCED EFFECT
Adams	Metro Denver	\$38,304,053	\$75,287,341	\$15,377,182	\$7,287,601
Alamosa	San Luis Valley	5,010,267	9,393,713	3,443,557	1,902,189
Arapahoe	Metro Denver	126,711,295	226,290,901	80,869,704	33,484,150
Archuleta	Southwest Mountain	914,826	2,299,995	748,573	375,744
Baca	Eastern	223,446	633,459	263,396	60,334
Bent	Eastern	251,416	886,151	163,752	57,709
Boulder	Metro Denver	89,674,618	161,188,998	58,673,090	32,509,513
Broomfield	Metro Denver	10,791,593	22,257,678	7,682,212	1,696,097
Chaffee	Mountain	4,847,577	9,811,491	3,413,978	2,097,831
Cheyenne	Eastern	123,317	344,978	101,050	25,678
Clear Creek	Mountain	1,561,618	3,863,903	992,062	317,596
Conejos	San Luis Valley	947,799	2,106,436	624,033	243,673
Costilla	San Luis Valley	233,375	587,731	175,549	52,504
Crowley	Eastern	306,412	867,730	161,480	41,955
Custer	Pueblo-Southern	444,908	1,258,201	486,585	124,449
Delta	Western	3,423,232	9,374,818	2,845,272	1,197,325
Denver	Metro Denver	135,133,531	242,905,126	99,310,399	35,093,771
Dolores	Southwest Mountain	155,632	364,637	117,933	37,707
Douglas	Metro Denver	49,541,659	87,653,552	28,248,718	13,894,506
Eagle	Mountain	4,820,554	8,574,848	2,435,149	1,825,858
El Paso	Colorado Springs	138,691,925	252,932,727	86,489,722	70,601,951
Elbert	Eastern	988,007	3,111,352	890,393	194,056
Fremont	Pueblo-Southern	11,187,026	21,919,318	6,580,044	3,976,979
Garfield	Western	6,888,091	12,527,979	3,906,243	2,208,317
Gilpin	Mountain	269,038	833,960	128,997	34,684
Grand	Mountain	1,444,520	3,428,478	1,097,640	568,783
Gunnison	Western	2,039,288	4,148,112	1,636,012	814,125
Hinsdale	Western	37,818	114,868	63,389	11,381
Huerfano	Pueblo-Southern	840,341	1,922,053	486,233	253,922
Jackson	Mountain	116,259	270,095	83,268	30,500
Jefferson	Metro Denver	131,115,150	238,998,917	67,681,452	36,036,951
Kiowa	Eastern	115,639	286,180	73,518	22,771
Kit Carson	Eastern	710,210	1,657,961	562,549	224,225
La Plata	Southwest Mountain	14,037,977	23,944,530	9,585,192	7,632,501
Lake	Mountain	671,302	1,379,233	304,734	236,163
Larimer	Northern	81,813,400	150,342,347	55,715,895	38,323,381
Las Animas	Pueblo-Southern	2,715,841	4,994,193	1,411,526	987,589
Lincoln	Eastern	821,162	2,047,028	463,084	193,000
Logan	Eastern	4,587,942	8,311,309	2,545,160	1,689,624
Mesa	Western	41,728,913	71,555,460	25,961,058	23,344,580
Mineral	San Luis Valley	67,032	167,254	56,212	14,939
Moffat	Western	1,657,709	2,996,624	802,871	619,106
Montezuma	Southwest Mountain	3,978,027	7,152,211	2,488,575	1,746,310
Montrose	Western	9,158,054	16,685,787	6,202,449	4,086,800
Morgan	Eastern	3,540,666	6,887,620	1,888,405	1,105,939
Otero	Eastern	3,824,820	7,358,936	1,851,958	1,270,704
Ouray	Western	598,912	1,210,620	514,333	172,799
Park	Mountain	682,975	2,004,435	639,960	165,274
Phillips	Eastern	412,328	911,087	247,417	102,639
Pitkin	Mountain	1,025,422	2,022,378	649,272	164,090
Prowers	Eastern	1,753,720	3,508,956	1,336,281	609,216
Pueblo	Pueblo-Southern	59,372,532	103,731,763	24,174,564	24,981,033
Rio Blanco	Western	518,369	1,171,241	419,831	126,179
Rio Grande	San Luis Valley	1,863,509	3,885,752	1,221,212	509,644
Routt	Mountain	3,272,412	6,586,082	2,050,826	1,183,718
Saguache	San Luis Valley	168,354	669,940	149,320	38,302
San Juan	Southwest Mountain	38,826	96,449	41,477	13,709
San Miguel	Western	511,753	1,153,767	363,745	145,567
Sedgwick	Eastern	186,142	423,533	140,260	45,556
Summit	Mountain	3,035,004	5,680,712	1,647,222	1,212,789
Teller	Mountain	2,669,599	5,994,031	2,308,747	840,518
Washington	Eastern	324,504	815,713	246,187	82,246
Weld	Northern	32,739,708	65,003,190	15,183,726	8,940,775
Yuma	Eastern	38,304,053	75,287,341	15,377,182	7,287,601

⁴As noted previously, county-level impacts do not include inter-county economic activity, so the county-by-county impacts presented here should not be added to derive state or regional totals; state and regional impact measures are identified elsewhere in this report.

APPENDIX B—ECONOMIC AND FISCAL IMPACTS BY COUNTY⁵ (CONTINUED)

(actual dollars)

COUNTY	REGION	SALES TAX	PROPERTY TAX	OTHER TAXES (INCLUDING INCOME TAX)	TOTAL STATE AND LOCAL TAX
Adams	Metro Denver	\$4,916,508	\$5,109,759	\$3,261,714	\$13,287,981
Alamosa	San Luis Valley	752,667	420,796	337,682	1,511,145
Arapahoe	Metro Denver	9,331,218	10,319,202	7,363,532	27,013,951
Archuleta	Southwest Mountain	206,388	178,680	85,117	470,185
Baca	Eastern	9,489	29,120	29,931	68,540
Bent	Eastern	59,827	136,079	37,613	233,518
Boulder	Metro Denver	7,897,354	9,108,013	5,933,727	22,939,093
Broomfield	Metro Denver	1,538,359	703,228	922,529	3,164,115
Chaffee	Mountain	639,329	407,552	417,881	1,464,761
Cheyenne	Eastern	3,078	9,458	17,741	30,278
Clear Creek	Mountain	157,054	520,380	132,500	809,934
Conejos	San Luis Valley	259,469	177,450	104,895	541,813
Costilla	San Luis Valley	15,495	119,842	34,487	169,824
Crowley	Eastern	42,544	58,757	49,500	150,801
Custer	Pueblo-Southern	102,535	151,728	92,602	346,866
Delta	Western	825,076	449,294	447,188	1,721,557
Denver	Metro Denver	11,579,454	8,129,758	7,806,409	27,515,620
Dolores	Southwest Mountain	2,439	113,162	18,635	134,236
Douglas	Metro Denver	4,143,192	4,917,472	4,006,785	13,067,449
Eagle	Mountain	378,241	452,383	317,538	1,148,162
El Paso	Colorado Springs	15,504,309	8,941,808	10,549,683	34,995,800
Elbert	Eastern	244,583	380,649	264,347	889,579
Fremont	Pueblo-Southern	1,426,958	1,533,347	1,010,646	3,970,951
Garfield	Western	520,196	774,909	484,605	1,779,709
Gilpin	Mountain	43,029	27,252	75,305	145,586
Grand	Mountain	204,131	296,939	171,452	672,522
Gunnison	Western	252,067	288,704	197,485	738,256
Hinsdale	Western	10,472	23,653	9,946	44,072
Huerfano	Pueblo-Southern	113,958	202,240	110,856	427,053
Jackson	Mountain	22,952	30,560	15,589	69,101
Jefferson	Metro Denver	11,639,894	14,760,663	10,227,040	36,627,597
Kiowa	Eastern	4,764	8,963	13,473	27,200
Kit Carson	Eastern	28,342	56,920	60,750	146,013
La Plata	Southwest Mountain	1,138,901	1,048,217	950,198	3,137,316
Lake	Mountain	21,525	231,772	57,397	310,693
Larimer	Northern	8,170,816	8,150,486	6,667,316	22,988,619
Las Animas	Pueblo-Southern	329,546	216,645	230,012	776,203
Lincoln	Eastern	209,950	249,968	73,857	533,776
Logan	Eastern	644,855	672,422	350,009	1,667,286
Mesa	Western	4,726,682	3,092,414	2,730,205	10,549,301
Mineral	San Luis Valley	12,601	17,472	7,059	37,131
Moffat	Western	164,216	185,293	115,675	465,185
Montezuma	Southwest Mountain	458,894	428,298	379,686	1,266,877
Montrose	Western	1,327,996	688,844	642,222	2,659,062
Morgan	Eastern	358,810	592,072	308,451	1,259,334
Otero	Eastern	385,208	291,810	296,573	973,591
Ouray	Western	76,388	94,647	61,124	232,159
Park	Mountain	135,049	206,483	128,925	470,457
Phillips	Eastern	24,888	26,024	40,602	91,513
Pitkin	Mountain	107,355	88,679	85,295	281,329
Prowers	Eastern	388,462	239,441	153,212	781,115
Pueblo	Pueblo-Southern	6,108,214	4,725,859	4,325,892	15,159,966
Rio Blanco	Western	49,427	267,359	56,776	373,562
Rio Grande	San Luis Valley	314,478	212,527	195,339	722,344
Routt	Mountain	357,524	339,776	311,648	1,008,948
Saguache	San Luis Valley	53,077	90,493	39,009	182,578
San Juan	Southwest Mountain	9,498	7,701	5,295	22,494
San Miguel	Western	73,320	83,119	43,117	199,556
Sedgwick	Eastern	3,630	19,619	17,580	40,829
Summit	Mountain	353,617	268,179	271,628	893,424
Teller	Mountain	426,753	432,800	324,312	1,183,866
Washington	Eastern	9,297	26,040	41,340	76,677
Weld	Northern	3,235,974	5,865,690	3,955,462	13,057,126
Yuma	Eastern	31,624	60,652	67,108	159,384

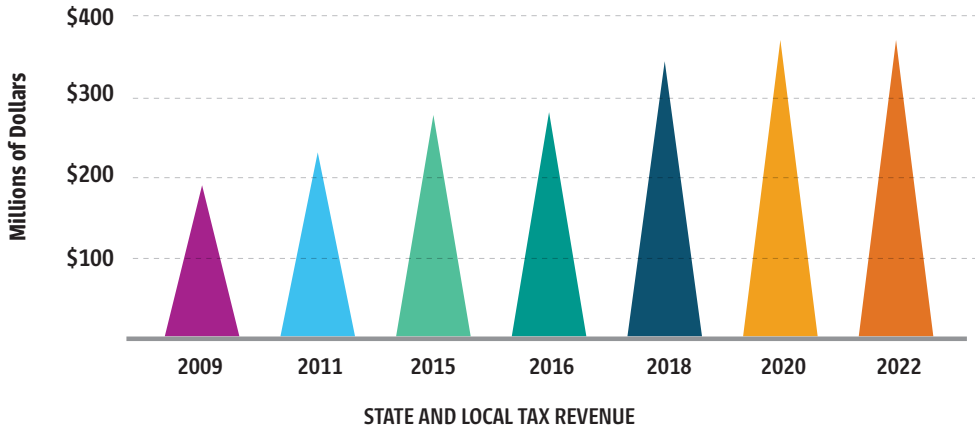
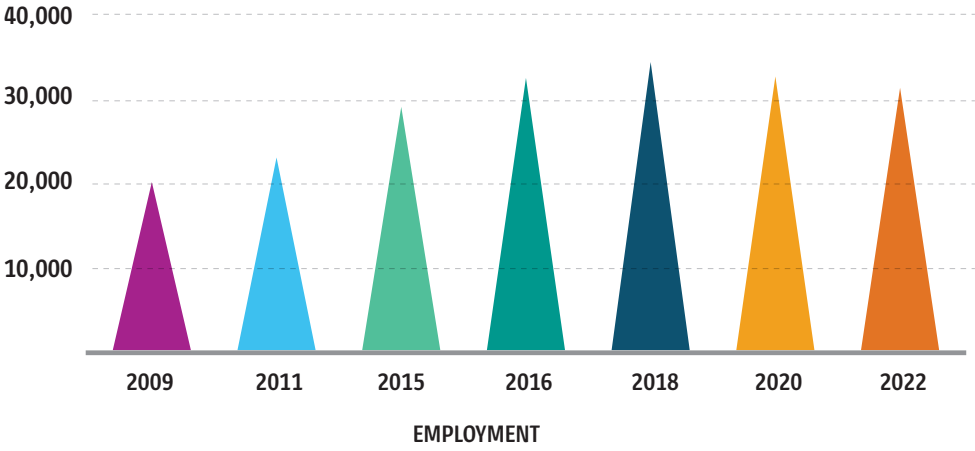
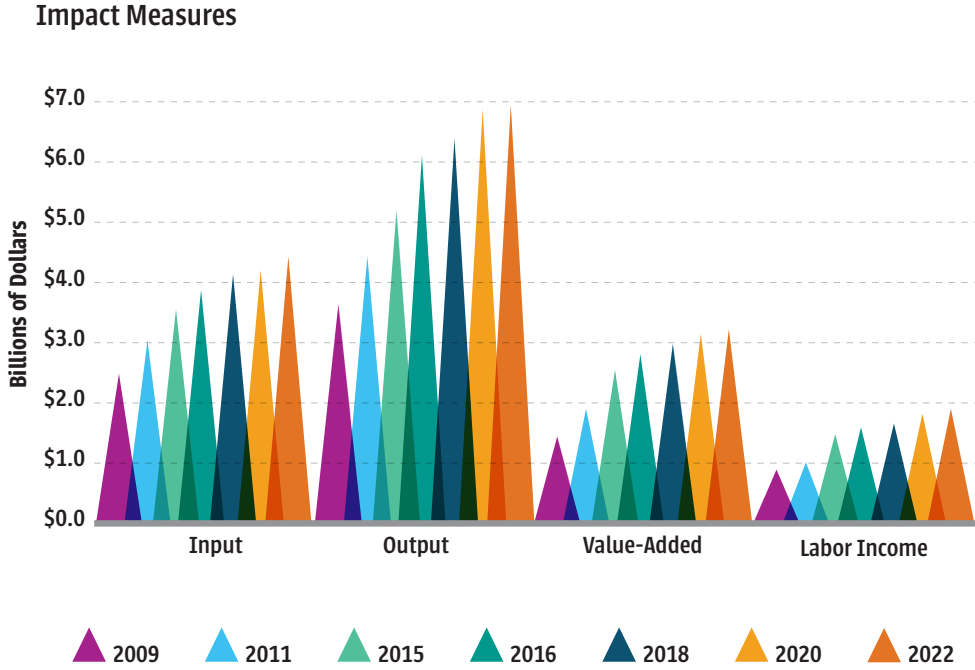
⁵As noted previously, county-level impacts do not include inter-county economic activity, so the county-by-county impacts presented here should not be added to derive state or regional totals; state and regional impact measures are identified elsewhere in this report.

APPENDIX C—PERA ECONOMIC BENEFITS BY INDUSTRY SECTOR—STATE OF COLORADO

(dollars in millions, except for employment)

SECTOR	VALUE-ADDED	LABOR INCOME	EMPLOYMENT
Finance and Insurance	\$339.6	\$222.7	3,072
Health and Social Services	468.8	441.7	6,455
Government and Other	226.0	210.9	3,681
Real Estate and Rental	829.5	109.3	3,474
Retail Trade	323.5	200.0	5,100
Accommodation and Food Services	220.8	142.7	4,618
Information	158.5	70.7	624
Wholesale Trade	147.9	83.4	767
Manufacturing	123.9	73.3	823
Professional, Scientific, and Tech	237.1	205.1	2,125
Transportation and Warehousing	97.7	101.9	1,446
Administrative and Waste Services	113.4	96.2	1,896
Utilities	80.0	24.9	147
Arts, Entertainment, and Recreation	53.4	38.7	1,080
Management of Companies	73.8	64.6	425
Education	26.2	24.8	557
Construction	36.8	27.8	397
Ag, Forestry, Fish, and Hunting	16.0	10.9	345
Mining	7.8	13.7	43

APPENDIX D—STATEWIDE COMPARISONS TO PREVIOUS STUDIES



APPENDIX E—ECONOMIC AND FISCAL IMPACT ANALYSIS DETAILED METHODOLOGY

PERA retirement distribution information as of December 2021 was used in the input-output modeling software, IMPLAN, to determine the economic impact of the retirement distributions by county, region, and the State of Colorado. IMPLAN was initially developed in the 1970's for use by the US Forest Service, in cooperation with other federal agencies, to assist in land and resource management planning. The University of Minnesota was also involved in the development of the model in the 1980's and, in 1993, the Minnesota IMPLAN Group, Inc. (MIG) was formed to privatize the development of the data and software. IMPLAN is widely used by federal, state, and local governments as well as academic institutions and businesses to assess the economic and fiscal impacts of a variety of developments, including numerous analyses of the retirement distributions of publicly funded pension plans.

An input-output model, such as IMPLAN, accounts for the relationships in the economy of a certain geographic area (for example, the State of Colorado, a region, or a county). This is accomplished through a Social Accounting Matrix (SAM) framework which captures all industry and institution (including household and government) transactions in a local economy. The SAM traces the flow of dollars from purchasers to producers while also accounting for taxes paid by households and business.

The IMPLAN model measures the impact of the flow of dollars through a regional economy by estimating the direct effect, indirect effect, induced effect, and total effect. The distinction between these effects is best illustrated by applying them to the task at hand although only the total effect is reported in the results section of this report.

- ▶ The **direct effect**, the initial event, is the spending of PERA benefits by households at businesses or taxes paid to the state and local governments.
- ▶ The **indirect effect** identifies the impact on the economy when the businesses and government purchase inventory and hire employees.
- ▶ When employees of the businesses and government spend their wages and profits, this impact is considered to be an **induced effect**.
- ▶ The **total effect** is the sum of the direct, indirect, and induced effects.

It should be noted that state impacts are not the sum of the impacts of individual regions/counties. This is because households make some of their purchases for goods and services outside a certain region/county and, as such, those expenditures are not counted in the economic activity of the region/county where the retirement distribution recipient resides. Given that the state encompasses a larger geographic and, therefore, larger economic area, it will include more economic activity and, hence, the economic impact for the state will be larger than the sum of the counties/regions.

Of note, since the August 2009 study, MIG has incorporated modifications to the methodology used to calculate the

proportion of each dollar of local demand that is purchased from local producers and the proportion purchased from producers in other regions. Version 2.0 of IMPLAN, used in the August 2009 study, utilizes an econometric approach to calculate these proportions. Since that time, IMPLAN began using a trade flow methodology believed to be superior to the prior methodology. Notably, IMPLAN recently transitioned to an online platform and discontinued all of its desktop platforms. IMPLAN continues to make improvements to its software over time.

RETIREMENT DISTRIBUTIONS

This analysis recognizes that not all PERA beneficiaries continue to reside in Colorado. Those recipients that are no longer in the state are likely spending their retirement distributions in their new locale. As such, payments for recipients who reside out-of-state were not included in this analysis. By not including any out-of-state PERA recipients, we assume that the expenditures by these recipients have no effect on economic impacts within the state.

For the county/regional analyses, only recipients residing in the respective county/region are included.

HOUSEHOLD EXPENDITURE PATTERN

The typical expenditure pattern of a household will vary, in part, due to their income level. For example, a higher income household may spend more on entertainment than a lower income household. IMPLAN recognizes this and has several different household expenditure groups.

Regional and County impacts were analyzed using the expenditure patterns for four household income groups: \$15,000–\$30,000, \$30,000–\$40,000, \$40,000–\$50,000, \$50,000–\$70,000, and \$70,000–\$100,000. These income ranges were chosen after reviewing average PERA benefit payment information and median household income data from the U.S. Census Bureau (2020 American Community Survey conducted by U.S. Census Bureau).

The household expenditure pattern of the income range \$30,000–\$40,000 was used for the Eastern and San Luis Valley regions. The household expenditure pattern of the income range \$40,000–\$50,000 was used for the Southwest Mountain, Western, and Pueblo-Southern regions, and the State of Colorado. For the Colorado Springs, Metro Denver, Mountain, and Northern regions the \$50,000–\$70,000 household spending pattern was used.

For the counties, the income range for the household expenditure pattern, slightly differed from the respective region. For the counties in the Eastern and Pueblo-Southern Mountains regions, the income range for household expenditure was between \$29,500 and \$49,300 with Elbert County as the outlier with a median income of \$67,500. The household expenditure pattern of the income range \$48,600–\$85,200 was used for counties in the Metro Denver, Colorado Springs, and Mountain regions. The household expenditure pattern of the income range \$27,600–\$39,800 was used for

APPENDIX E—ECONOMIC AND FISCAL IMPACT ANALYSIS DETAILED METHODOLOGY

counties in the San Luis Valley region, with the outlier of Mineral County at an average income of 56,800. For counties in the Northern region, the \$47,600–\$58,200 household spending pattern was used. A range of \$27,900–\$63,700 was used for counties in the Southwest Mountain and Western districts for the household expenditure pattern. Notably, due to a lack of observations there was no income data available for San Juan County (in the Southwest Mountain region), therefore an income was imputed which fell within the range noted above.

The actual expenditure pattern of the PERA households may differ somewhat from the IMPLAN average as more than 98% of the PERA recipients are age 55 and older. Data from the Consumer Expenditure Survey showed that households with older individuals spend proportionately more on certain items (e.g., health care) and less on other items (e.g., education) than the average household although total spending dollars were relatively comparable within income levels.

TAXES AND SAVINGS

Households spend out of their disposable income. That is, purchases of goods and services are made once adjusted for income taxes and savings. Therefore, subtracting income taxes and savings from gross retirement distributions is important to accurately estimate the local economic impacts. (IMPLAN assumes the dollars inputted are to be spent.) The income taxes do not go unspent and the impacts on state and local governments are included in this analysis.

Of note, data from the Colorado Department of Revenue regarding average federal and Colorado taxes paid in 2018 (based on the most recently available data published November 2021) by income classes for residents 65 and older is utilized. This data provides the effective tax rate, recognizing the amount of tax an individual actually pays includes tax deductions and exemptions, credits, etc. For the household income \$30,000–\$40,000, taxes paid as a percentage of federal adjusted gross income were 5.1% for federal taxes. For the household income \$40,000–\$50,000, the rate is 6.7% for federal taxes. Because state income taxes more directly affect the fiscal impact to the state Colorado, 10 effective tax brackets were applied to individual disbursements. All tax rates are likely low as they do not consider likely spousal or other income which would result in increased tax rates.

Information from the Consumer Expenditure Survey was evaluated to derive the savings rate. For individuals over age 55 in the lower household expenditure pattern (\$30,000–\$40,000), essentially no monies were devoted to savings and, as such, a 0.0% rate was incorporated into the analysis; however, for the higher household expenditure pattern (\$40,000–\$50,000), a 5.0% rate is used given the expenditure data.

STATE AND LOCAL TAX GENERATION

To calculate state and local tax generation, state income taxes paid by recipients on retirement distributions are added to taxes paid in all subsequent rounds of spending. For the first, the state taxes are included as described above while IMPLAN calculates corporate, personal income, sales, property, etc. taxes generated from each subsequent round of spending.

ADJUSTMENTS

Retirement distributions data provided by PERA is in 2021 dollars while IMPLAN's data is in 2020 dollars. IMPLAN incorporates the producer price index (PPI) to adjust 2020 dollars to 2021 dollars.

NOTES ON IMPACTS

As described above, a number of assumptions were made regarding household expenditures, taxes, and savings. As such, a range of outcomes is likely appropriate, and an exact dollar figure is not feasible although results provided here reflect a reasonable measure of the economic and fiscal impacts of the PERA retirement distributions.

Also of note, an economic impact study can never capture the exact benefit as economies are always in a state of flux.

