

Colorado-based Business and Economic Research Prepared April 20, 2016

Overview of Economic Review

This chartbook provides a series of graphs, tables, and discussions that review changes in the global, U.S. and Colorado economies. Based on data through Q1, the state is on track to add 67,000 to 73,000 jobs in 2016. This review is divided into the sections listed below.

Global and U.S. Economy

- Global and U.S. GDP
- U.S. Economy
 - Labor
 - Risks and Reasons to Feel Optimistic

The Colorado Economy

- Overview
- Population and Labor
- Employment Forecast for 2016
- 2016 Colorado Employment by Performance Category
- Summary of Outlook for 2016
- Appendix

Between March 15 and April 14, the Bureau of Labor Statistics released benchmarked wage and salary employment data for 2015, jobs data through February 2016, and employment data through Q1 2016. As a result, cber.co has produced analyses for each of these BLS releases over the past month. For the remainder of the year BLS will release data around the 20th of each month. That means there will be only one analysis produced each month for the remainder of the year.

U.S. Economy

Summary of Key Data Global and United States Economy

Global GDP

2016 Global and Category Real GDP Growth

The current IMF forecast calls for slightly stronger growth in 2016 than in 2015; however, the rate of growth for 2016 was revised downward in January and April.

- •↑Global 3.2%
- •→Mature 1.9%
- •↑Emerging 4.1%

2016 Real GDP Growth in Advanced Economies

- LEuro Area 1.5%
- ↓Germany 1.5%
- → France 1.1%
- ↑Italy 1.1%
- ↓Spain 1.0%
- →Japan 0.5%
- JU.K. 1.9%

2016 Real GDP Growth in Emerging Economies.

- ↑Former CIS States -1.1%
- ↑India 7.5%
- →Emerging and Developing Europe 3.5%
- →Brazil -3.8%
- ↑Middle East 3.1%
- \Sub-Saharan Africa 1.2%

United States

Real GDP – Annual Real GDP growth will be in the 2.3% to 2.7% range for 2016, similar to 2015. Most likely it will be below the midpoint of that range.

Real Personal Consumption – Annual consumption growth will be in the 2.6% to 3.0% range for 2016, i.e. the consumer will continue to drive the economy.

U.S. Employment – The U.S. will add 2.7 million jobs in 2016. Job growth is currently on target to reach that level of growth.

Unemployment Rate – Average unemployment for 2016 will be 4.6% to 4.8%.

Consumer Price Index – The CPI is estimated to increase by 1.7% in 2016. Through Q1 the U.S. CPI is close to 1.2%.

Price of a Barrel of Oil (WTI) – Oil closed the year at \$36 per barrel. In 2016 the price has varied from \$26 to \$41 per barrel.

Case Shiller Housing Prices – In 2015 U.S. housing prices increased by 5.3%, but will appreciate at a slower rate in 2016.

Standard and Poor's 500 – The S&P 500 posted a loss of 0.7% in 2015. It remained volatile through most of Q1 2016.

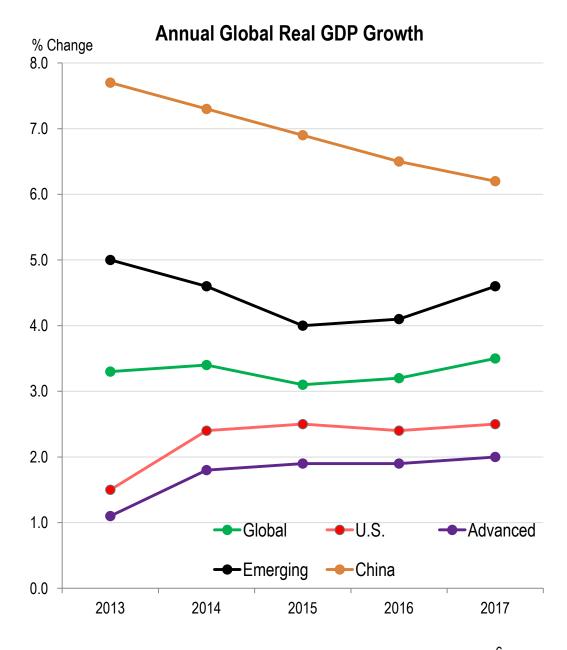
The U.S. economy will post solid growth in 2016.

Global and U.S. GDP

Global Real GDP Growth

In April the International Monetary Fund updated its global forecasts. The IMF forecasts for global, advanced economies, emerging countries, and U.S. GDP growth rates were lowered. Global GDP growth in 2017 will be slightly higher.

The IMF projected that global GDP growth (green) in 2016 would increase at a lower than anticipated rate because of slower GDP growth in China (gold), market volatility, and political developments throughout the world. The IMF expressed concerns about secular stagnation and deflation.



Source: IMF, January 2016.

Real US GDP GrowthQuarterly

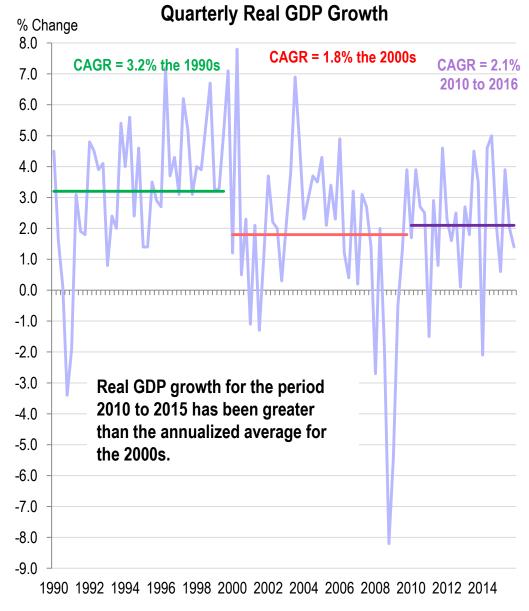
Annualized real GDP growth for the 1990s was 3.2% (green line). It was 1.8% for the 2000s (red line) and 2.1% from 2010 to 2015 (purple line).

Real GDP growth for Q4 2015 was revised upward to 1.4% and the total for the year was 2.4%.

Real GDP growth for recent years was:

- 2010 2.5%
- 2011 1.6%
- 2012 2.2%
- 2013 1.5%
- 2014 2.4%
- 2015 2.4%

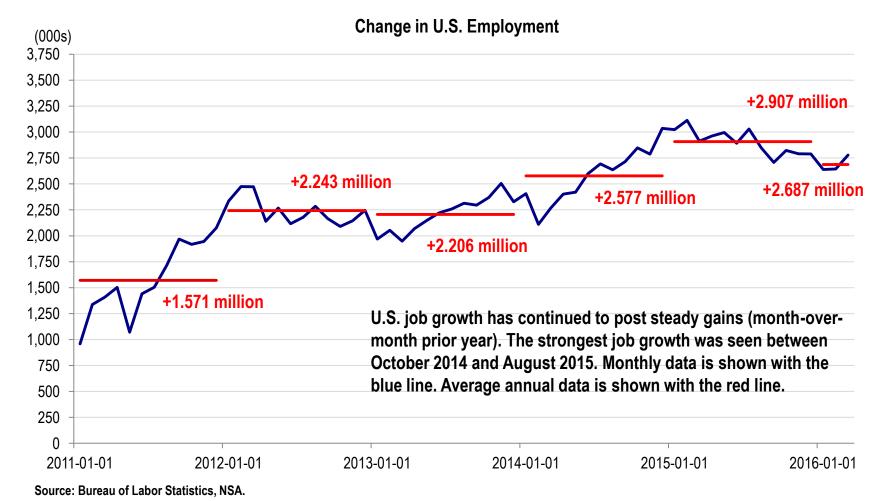
The Conference board is calling for Real GDP growth of 0.3% in Q1 2016. Consumer spending will increase by 1.7%.



Source: Bureau of Economic Analysis, cber.co, Note GDP chained on 2009.

The United States Economy Labor

Change in U.S. Employment Year-Over-Year Job Growth



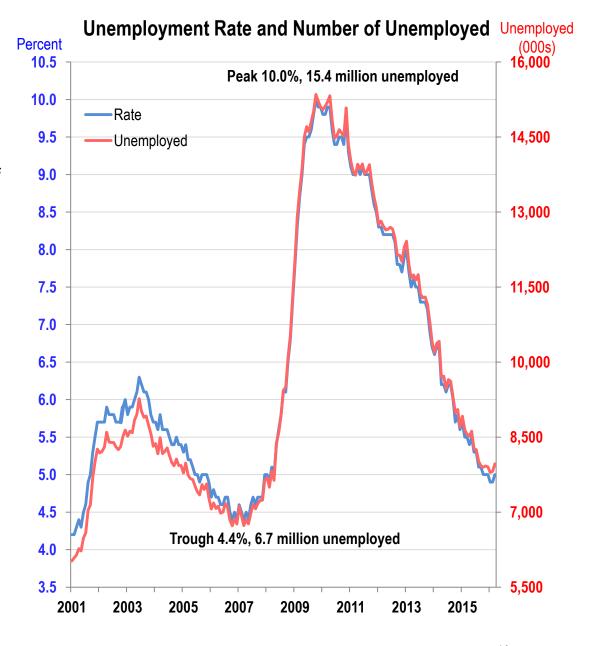
OU.S. Unemployment Rate and Number of Unemployed

Both the unemployment rate and number of unemployed have slowly trended downward since peaking in late 2010. They are similar to levels in 2005.

The total number of unemployed (red) was 7.97 million at the end of March. This is 1.2 million above the low point in 2006 and 7.4 million below the high point in 2009.

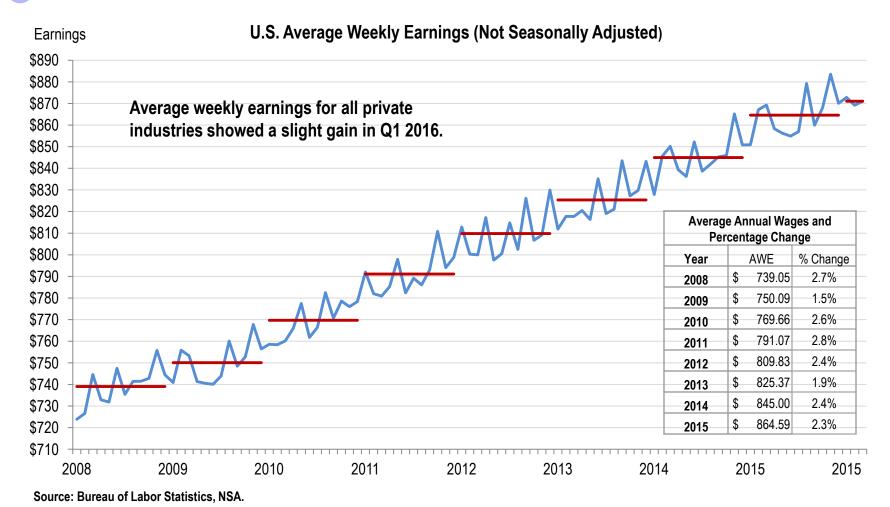
The unemployment rate for March was 5.0%, unchanged from the end of 2015.

Average unemployment for 2015 was 5.3%, down from 6.2% in 2014 and 7.4% in 2013.



Source: Bureau of Labor Statistics, SA, cber.co.

U.S. Average Weekly Earnings of All Employees (Private Sector)



The United States Economy Risks and Reasons to Feel Optimistic

Risks

Global and United States Economy

Global GDP

Fundamentals - The global economy is fragile. Real GDP growth for 2016 will be slightly greater than 2015, with a minimal increase in 2017. At the same time it should be noted that the rate of growth was revised downward in January and April by the IMF.

Risks

- Slower rate of growth in the Chinese economy.
- Continued financial market volatility.
- Geopolitical tensions in many countries.
- · Worries about secular stagnation.
- · Concerns about deflation.
- Fears of inadequate proactive economic policy decisions.
- · Failure to react sufficiently if risks materialize.

United States

Fundamentals – The U.S. economy is stronger than the global economy and some economists think it is keeping the global economy in positive territory.

Risks

- Manufacturing shipments are sluggish, in part because the U.S. dollar is strong.
- Low oil prices have affected oil-producing states.
- Regulations and low prices have negatively impacted segments of the mining industry.
- Low agriculture prices have negatively impacted parts of the country that are agriculture-dependent.

Reasons to Feel Good Global and United States Economy

Global GDP

GDP Growth – Currently projections show that GDP growth for 2016 will be greater than 2015 and that 2017 will be better than 2016.

Reasons to be Optimistic – Advanced Economies

- Improvement in the economies of France, Italy, and Spain.
- The economies of the U.K. and Germany are stronger and holding their own.

Reasons to be Optimistic – Emerging Economies

- At least two-thirds of the global growth is in emerging countries.
- •The former CIS states, most notably Russia, are coming out of a recession.
- •The economy in India will expand by 7.5% in 2016 and 2017.
- •The Mexican economy is stable.
- •Brazil will come out of a recession in 2017.
- •The Middle East will post solid growth.
- •The Sub-Saharan Africa region will also post solid growth.

United States

Real GDP – Annual Real GDP growth will be in the 2.3% to 2.7% range for 2016 and 2017.

Reasons to be Optimistic

- While there are weaknesses in agriculture and the extractive industries, there is broad-based job growth.
- Lower unemployment rates may indicate increased opportunities for unemployed workers.
- Increased demand for labor may result in higher wages, which will benefit workers and cause an increase in consumption or savings.
- Though the Fed is cautious, they are generally optimistic about the U.S. economy.
- The volatility in the equities market seems to have subsided at least for the moment.

The U.S. economy will post solid growth in employment, GDP, and personal income growth in 2016.

The Colorado Economy

Summary of Key Data United States and Colorado

United States

Real GDP – Annual Real GDP growth will be in the 2.3% to 2.7% range for 2016, similar to 2015.

Real Personal Consumption – Annual consumption growth will be in the 2.6% to 3.0% range for 2016, i.e. the consumer will continue to drive the economy.

U.S. Employment – The U.S. will add 2.7 million jobs in 2016. Job growth is currently on target to reach that level of growth.

Unemployment Rate – Average unemployment for 2016 will be 4.6% to 4.8%.

Consumer Price Index – The CPI is estimated to increase by 1.7% in 2016. Through Q1 the U.S. CPI is close to 1.2%.

Price of a Barrel of Oil (WTI) – Oil closed the year at \$36 per barrel. In 2016 the price has varied from \$26 to \$41 per barrel.

Case Shiller Housing Prices – In 2015 U.S. housing prices increased by 5.3%, but will appreciate at a slower rate in 2016.

Standard and Poor's 500 – The S&P 500 posted a loss of 0.7% in 2015. It remained volatile through most of Q1 2016.

The U.S. economy will post solid growth in 2016.

Colorado

Q3 2015 vs. Q3 2014 GDP (U.S. vs. CO) – For this period, the state Real GDP grew by 3.4% compared to 2.0% for the U.S.

Population - Colorado's population will increase by about 95,000 people in 2016.

Steady Wage and Salary Employment – Average employment for the past 8 months (<u>August through March</u>) is 68,200 jobs greater than the prior year. This is in line with the cber.co forecast.

Leading Sectors for Growth – In Q1 about 71% of the jobs were added in the Accommodations and Food Services; Health Care; Retail Trade, Construction, and Financial Activities.

Broad-Based Growth - There is broad-based growth in the state's employment, GDP, and personal income.

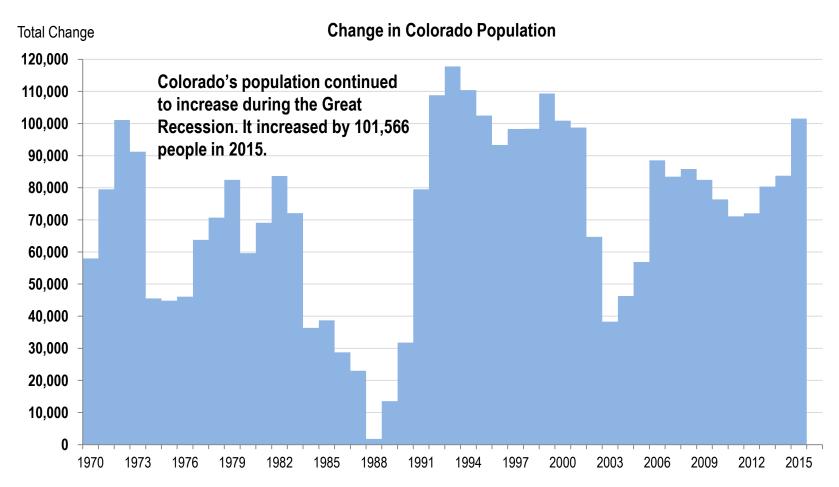
Wage Growth - Colorado wage growth in 2015 was weak and Q1 2016 has been down slightly compared to the 2015 total.

Unemployment Rate – The economy will operate inefficiently when the unemployment rate is 2.9%.

MSA Unemployment Rate – Boulder and Ft. Collins have the lowest rates at 2.7% and 2.9%, respectively. Grand Junction has the highest rate at 5.4%.

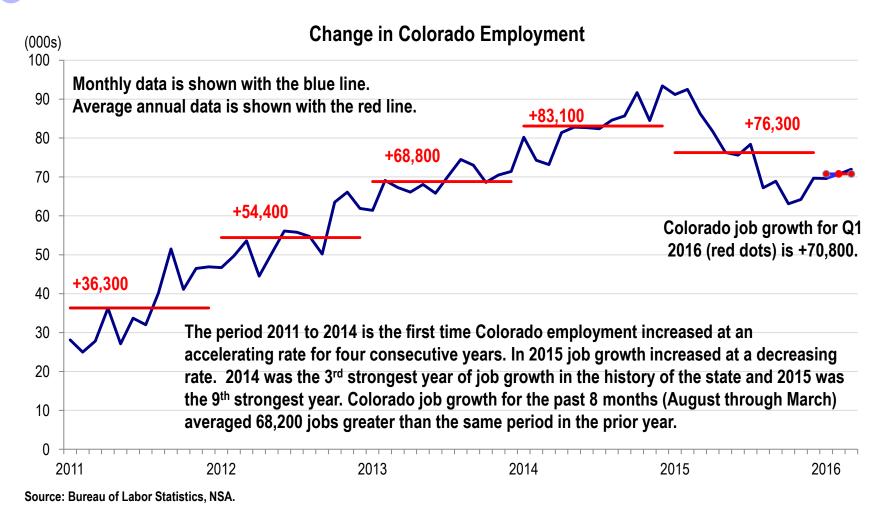
The Colorado Economy Population and Labor

Annual Change in Population



Source: Bureau of Economic Analysis, cber.co.

Change in Colorado Employment Year-Over-Year

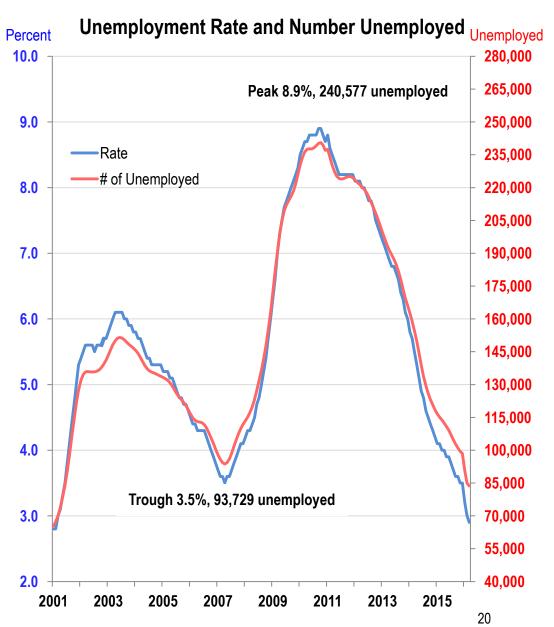


Colorado UnemploymentRate and Number ofUnemployed

The number of unemployed has slowly trended downward since peaking in late 2010.

The total number of unemployed workers (red) at the end of March 2016 was 83,661. The current total number of unemployed is 10,068 less than the trough in May 2007 and 156,916 less than the peak in October 2010.

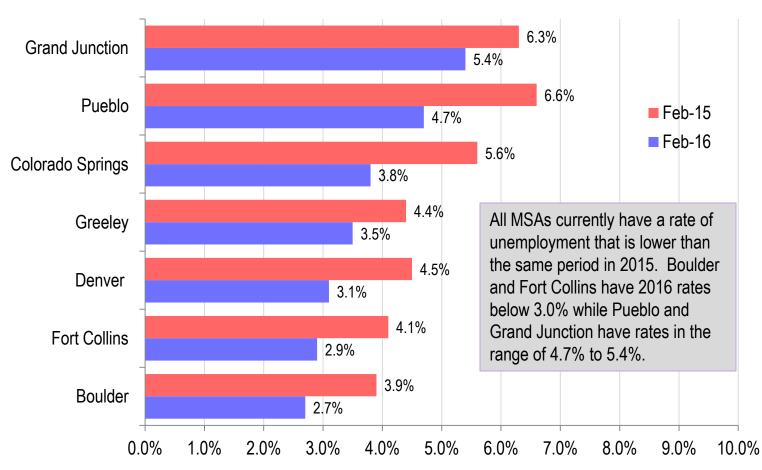
Lower unemployment rates have brought about shortages of trained workers in key sectors and occupations.



Source: Bureau of Labor Statistics, SA, cber.co.

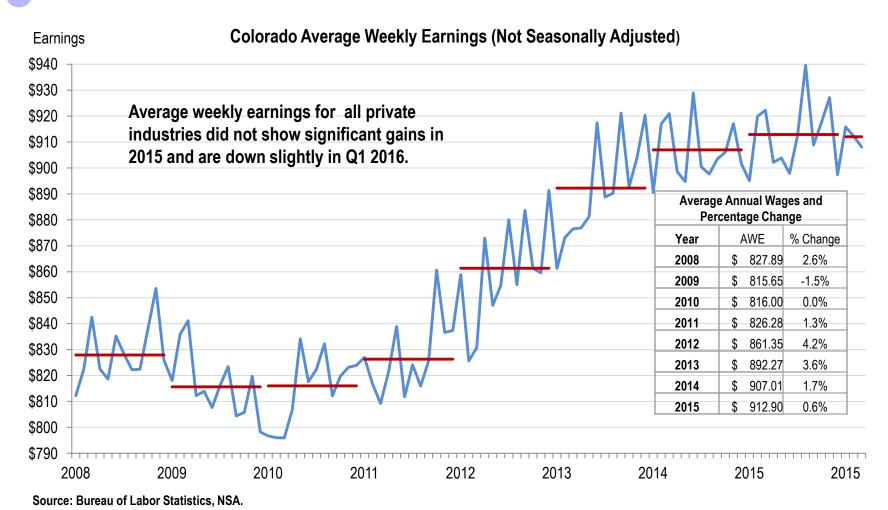
Unemployment by MSA 2015 vs. 2016

Unemployment by MSA



Source: Bureau of Labor Statistics, NSA. Note: MSA unemployment lags by one month and is reported only on a non-seasonally adjusted basis.

Colorado Average Weekly Earnings of All Employees (Private Sector)



The Colorado Economy Employment Forecast for 2016

Colorado Employment Category Portfolio Analysis

Strong Growth, Solid Growth, and Volatile Categories

This portfolio approach has made it easy to see that some categories consistently create jobs at a higher rate of growth, some show solid growth, and others are more volatile. Ultimately, the volatile category tends to have a greater influence on the amount of change in total job growth than the sectors with steady growth.

The Process of Establishing the Categories

In 2012, 2013, and 2014 cber.co evaluated the performance of 23 sectors/subsectors over the past two decades and grouped them into the three previously mentioned categories. The evaluation factors for grouping include the rate of growth, number of years with positive job growth, size of the sector, and volatility in job growth.

In the short period this process has been used, it has produced a high level of accuracy in the forecast.

More importantly, it has produced a better understanding of what is driving the Colorado economy.

Scenarios for the 2016 Colorado Economic Outlook

The recovery from the Great Recession has been less than robust, but it has been **steady**. While there are many potential risks to future growth, the U.S. and state have shown there is enough momentum to show solid, sustained job growth in 2016.

Overall Job Growth

In 2016 Colorado employment will increase by 2.7% to 2.9%. Average employment for 2016 will be 2,604,000 workers .

Strong Growth Category (About 32% of total employment) The rate of job growth for this category will be 2.9% to 3.2%.

Solid Growth Category (about 39% of total employment) In 2016, the rate of job growth will be 2.3% to 2.5%.

Volatile Growth Category (29% of total employment) In 2016, the rate of job growth will be 2.7% to 3.0%.

The performance of the Volatile Growth Category will most likely determine the accuracy of the cber.co 2016 forecast. There is more downward risk than upside risk to the forecast.

Source: cber.co.

2016 Economic Outlook

Optimistic Scenario

- U.S. Real GDP greater than 2.7%.
- Colorado will add more than 73,000 workers, growth greater than 2.9%.

Most Likely Scenario

- U.S. Real GDP 2.3% to 2.7%.
- The U.S. will add at least 2.7 million workers.
- Colorado employment will be 1.8% of U.S employment.
- Colorado will add 67,000 to 73,000 workers, job growth will be 2.7% to 2.9%.

Pessimistic Scenario

- U.S. Real GDP less than 2.3%.
- Less that 67,000 Colorado workers, growth less than 2.7%.

The probability of these scenarios follows:

- Most Likely 60%
- Optimistic 18%
- Pessimistic 22%.

There is slightly more downside risk than upside potential.



2016 cber.co Colorado Employment Forecast

Strong Growth Category

- + 24,000 to 26,000 Employees
- Professional and Scientific
- •Management of Companies and Enterprises
- •Business to Business (Not Employment Services)
- Private Education
- Health Care
- •Arts, Entertainment, and Recreation
- Other Services.

Solid Growth Category +23,000 to 25,000 Employees

- •Wholesale Trade
- •Retail Trade
- State (Not Higher Education)
- Higher Education
- Local (Not K-12 Education)
- •K-12 Education
- Accommodations and Food Services

In 2016 Colorado will add 67,000 to 73,000 jobs (2.7% to 2.9%).

Volatile Growth Category +20,000 to +22,000 Employees

Natural Resources and Mining

Twenty-two sectors and subsectors have been placed into three categories based on their growth patterns over the

past two decades. Projections for these categories are used

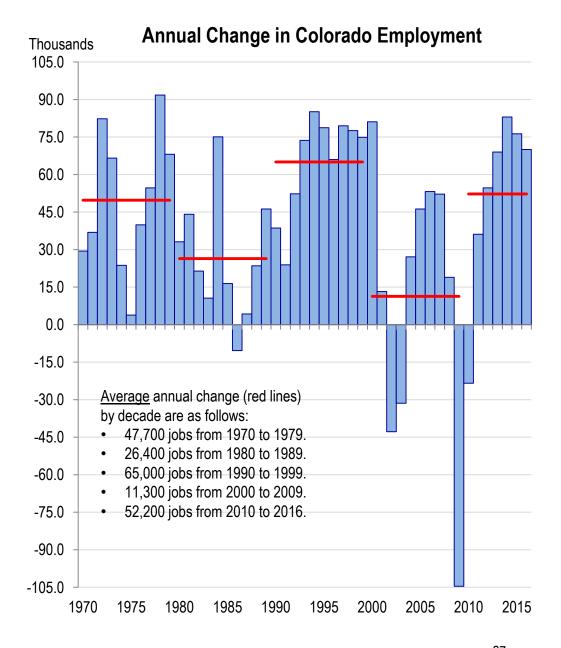
in the development of the 2016 employment forecast.

- Construction
- Manufacturing
- •Transportation, Warehousing, and Utilities
- Employment Services
- Financial Activities
- Information
- Federal Government

Source: cber.co.

OAnnual Employment
Change in Colorado
Employment

The state will add 67,000 to 73,000 jobs in 2016. Colorado employment will increase by 2.7% to 2.9%.

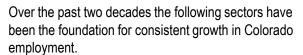


Source: Bureau of Labor Statistics, cber.co.

2016 Colorado Employment by Performance Category

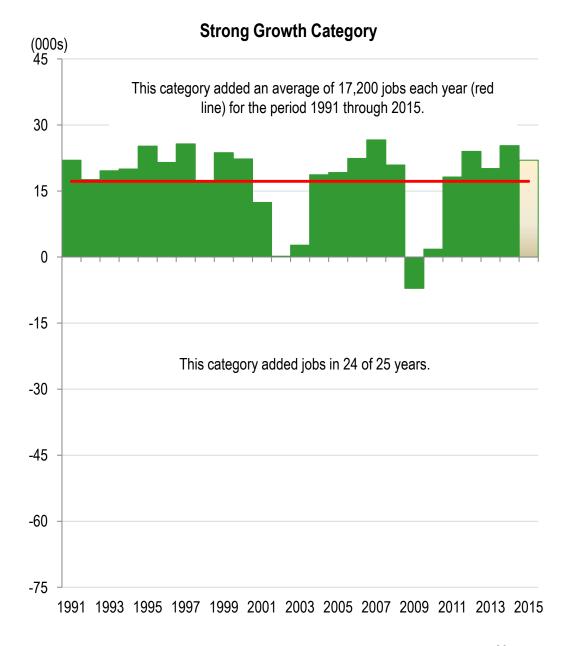
Average Employment Q1 2016

Annual EmploymentSituation for the StrongGrowth Category



- Professional, Scientific, and Technical Services
- Management of Companies and Enterprises
- Administrative Business to Business (Not Employment Services)
- Private Education
- Health Care
- · Arts, Entertainment, and Recreation
- Other Services.

Total employment for this category was: 1994 445,200 workers, 25.4% of total employment 2004 615,900 workers, 28.3% of total employment 2014 788,300 workers, 32.0% of total employment

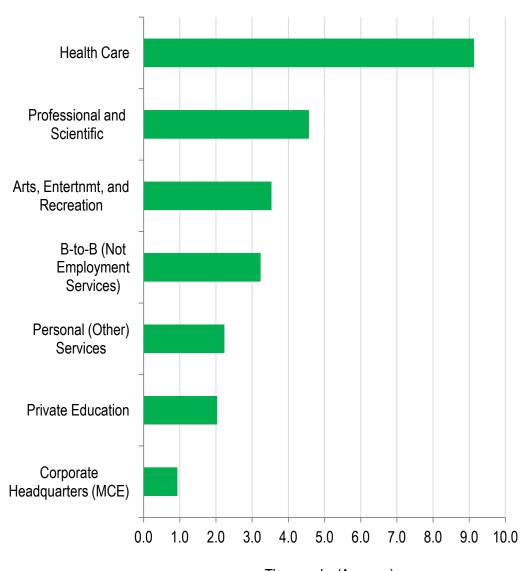


Source: Bureau of Labor Statistics, cber.co.

Solid Growth Sectors

Job Change

- •Average employment for Q1 shows this category of sectors added 25,700 jobs in 2016 compared to the same period last year.
- •The Health Care Sector led job growth, followed by the PST sector.
- •In 2014, these sectors accounted for 32.4% of total job gains and 32.0% of total employees.



Source: Bureau of Labor Statistics.

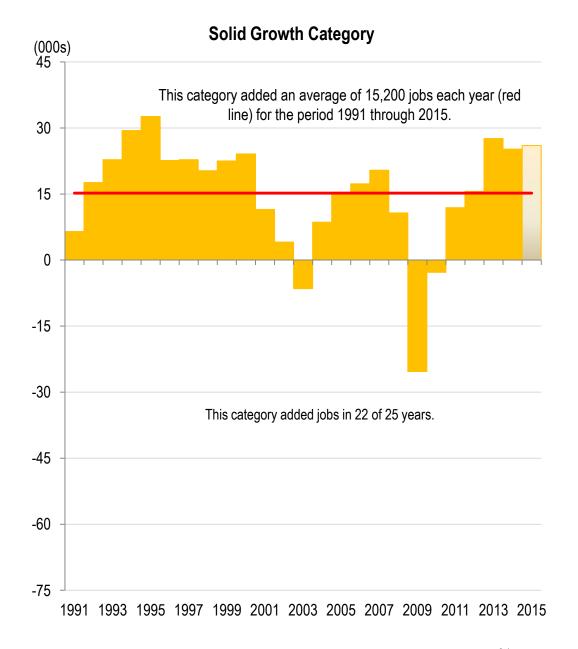
Thousands (Average)

Annual EmploymentSituation for the SolidGrowth Category

Over the past two decades the following sectors generally posted gains. The category posted stronger jobs gains during the 1990s than the 2000s.

- Wholesale Trade
- Retail Trade
- State (Not Higher Education)
- Higher Education
- Local (Not K-12 Education)
- K-12 Education
- Accommodations and Food Services

Total employment for this category was: 1994 685,400 workers, 39.0% of total employment. 2004 848,000 workers, 38.9% of total employment. 2014 962,500 workers, 39.0% of total employment.



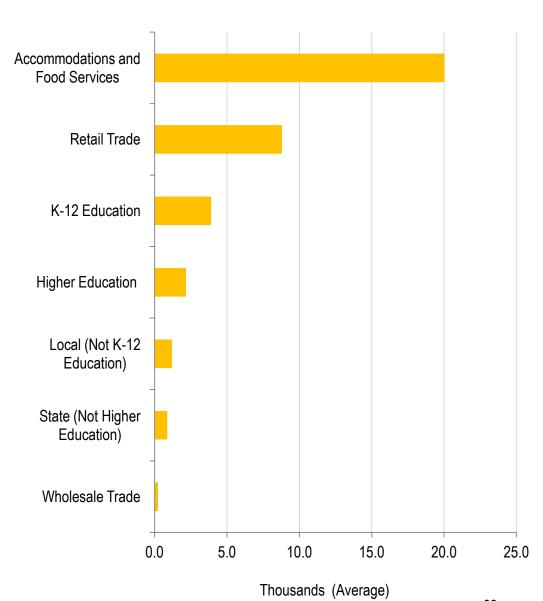
Source: Bureau of Labor Statistics, cber.co.

Limited Growth Sectors

Job Change

•Average employment for Q1 shows this category of sectors added 37,200 jobs in 2016 compared to the same period last year.

- •The tourism industry has had a strong year, but most likely the AFS sector is grossly overstated.
- •In 2014, these sectors accounted for 29.8% of total job gains and 39.0% of total employees.



Source: Bureau of Labor Statistics.

Annual Employment Situation for the Volatile Category

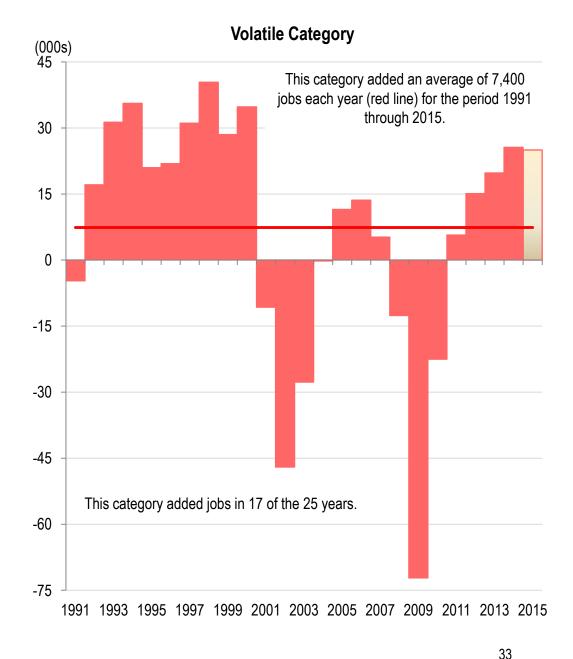
Over the past two decades the sectors listed below were the primary source of volatility in total employment.

The sectors are:

- •Natural Resources and Mining
- Construction
- Manufacturing
- •Transportation, Warehousing, and Utilities
- Employment Services
- Financial Activities
- Information
- Federal Government

Total employment for this category was:

1994 625,400 workers, 35.6% of total employment 2004 716,000 workers, 32.8% of total employment 2014 714,300 workers, 29.0% of total employment



Source: Bureau of Labor Statistics, cber.co.

Volatile Sectors

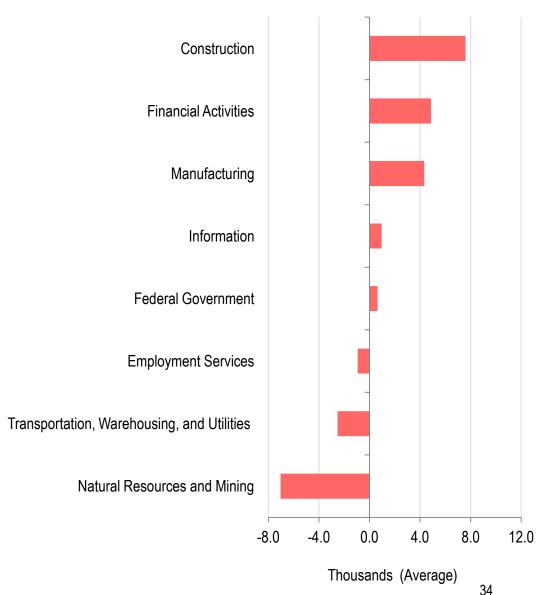
Job Change

 Average employment for Q1 2016 shows this category of sectors added 7,900 jobs in 2016 compared to the same period last year.

•For Q1, the Construction, Financial Activities, and Manufacturing Sectors led job growth.

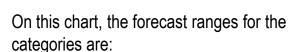
•It is possible the job data for the **Employment Services and TWU** sectors are understated. Unfortunately, the job losses in the extractive industries are not understated.

•In 2014, these sectors accounted for 38.3% of total job gains and 29.0% of total employees.



Source: Bureau of Labor Statistics.

Summary of Performance to cber.co 2016
Employment Forecast

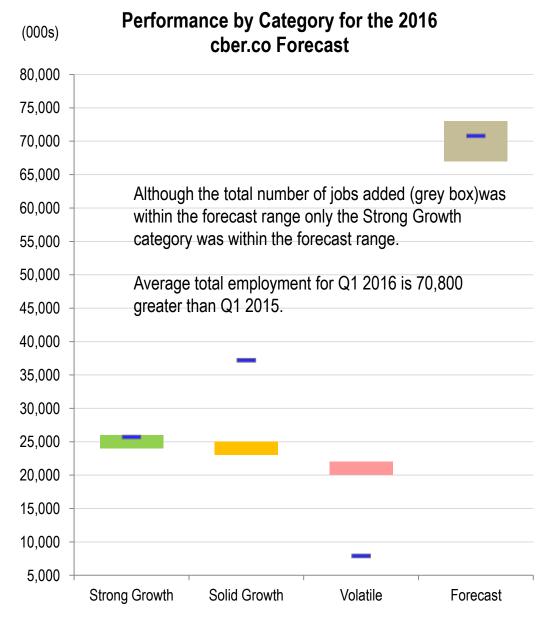


- •Strong Growth green box.
- •Solid Growth yellow box.
- •Volatile pink box.
- •Total Employment grey box.

The blue lines indicate the level of change in the average employment for Q1 2016.

The overall forecast was within the projected forecast range (grey box).

Average employment for Q1 2016 is 70,800 greater than Q1 2015.

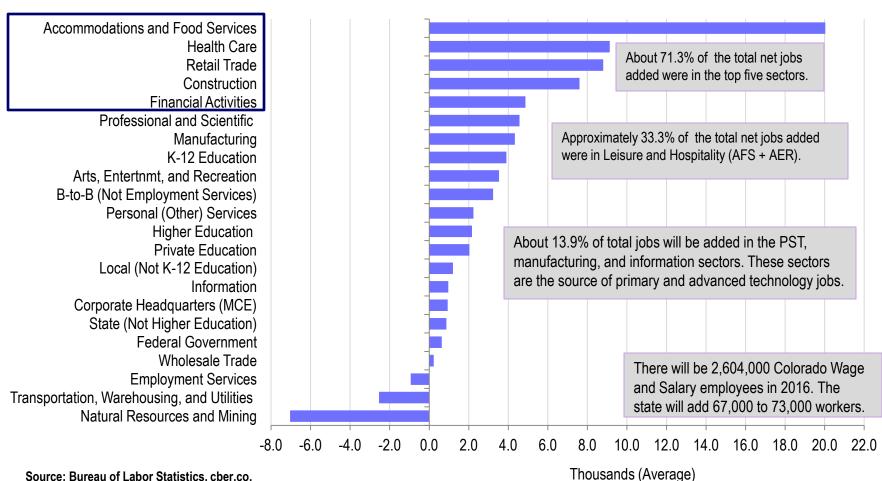


Source: Bureau of Labor Statistics, cber.co.

The Colorado Economy Summary of Outlook for 2016

Job Changes Q1 2016

Job Change All Sectors



Summary of the Colorado Economy

Reasons to be Optimistic

Momentum – Construction is strong, personal income and GDP growth is solid, and the state is outperforming the U.S.

New Car Registrations – Registrations are at record levels in 2016.

Job growth - The number of jobs added is less than 2015; however, there has been steady job growth for the past eight months.

Establishment growth – The growth in establishments is an indication of solid growth.

DIA – Passenger traffic is ahead of last year's record pace, the Westin is open, and the train is running from downtown to DIA.

Broad-based Growth – Despite declines in the extractive industries, there is broad-based growth in the state's employment, GDP, and personal income.

Tourism – The state is coming off a strong ski season.

Local Government Revenue – Local governments have benefitted from increased consumption (retail sales taxes) and increased property valuation (property taxes).

Risks

Low Unemployment Rate – Typically low unemployment is good for the economy. Lower unemployment rates will create inefficiencies in the state's economy.

Extractive Industries – The number of jobs in the extractive industries has declined because of lower prices, regulation, and changes in policy.

Agriculture Prices – Low prices for commodities will challenge Colorado farmers and ranchers.

Population – While the state as a whole is experiencing strong population growth, about half of the state's counties are struggling to retain their population.

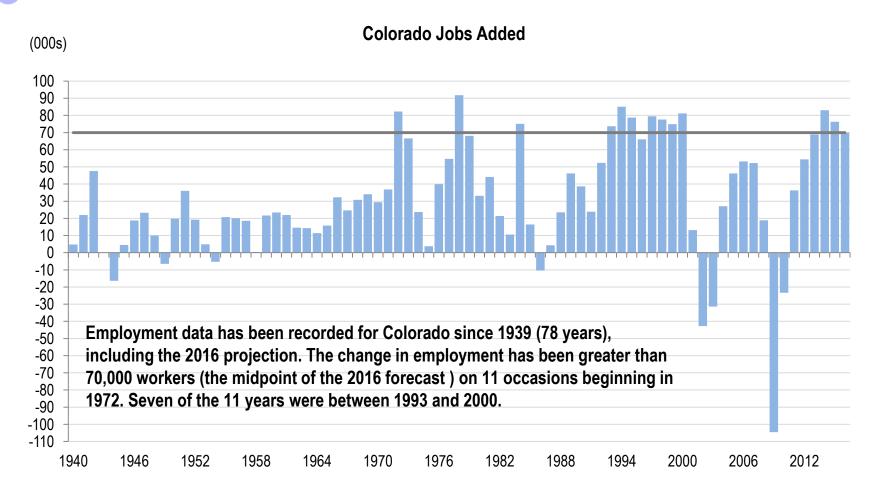
Price of Oil – The price of oil is critical to Colorado's oil and gas industry. The industry will benefit from higher prices.

State Government Revenue— Despite a strong economy the state government is struggling to provide funding for infrastructure and education.

Affordable Housing – Affordable housing is an issue in all counties. There is not evidence this has been detrimental to the state – yet.

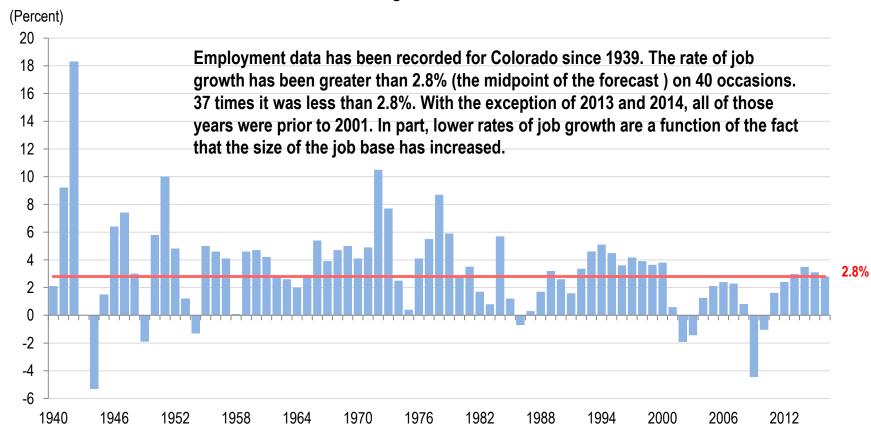
Appendix

The Projected Absolute Job Growth for 2016 (Total Jobs Added) will be the 12th Strongest since 1939.



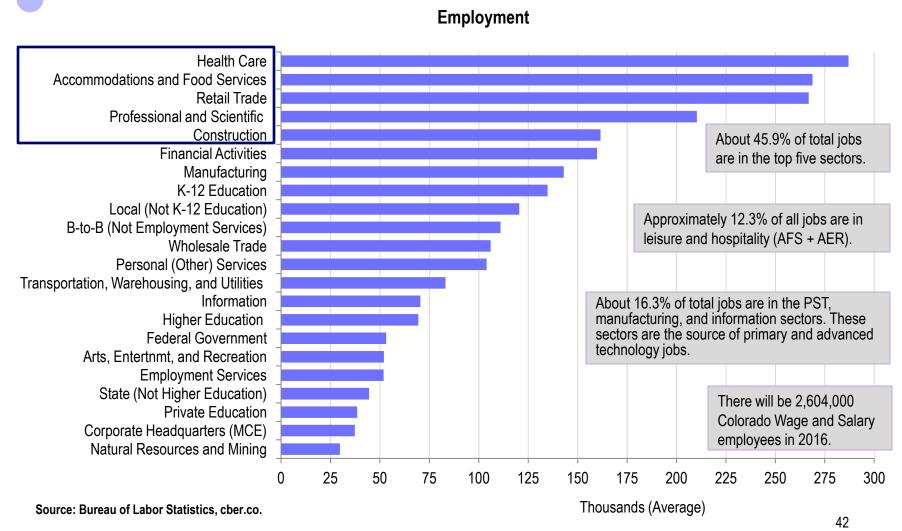
Source: Bureau of Labor Statistics, cber.co.

- The Projected Rate of Colorado Job Growth for 2016 will be the 41th Strongest in 77 Years
 - Percentage of Jobs Added



Source: Bureau of Labor Statistics, cber.co.

Colorado Wage and Salary Employment 2016 Forecast



Colorado Economic Forecast Sector Portfolio Analysis

Attempt to Improve Forecast Accuracy

The primary focus of most state economic forecasts is to project total employment.

Some economists also produce sector forecasts. They usually add projections for the sectors to derive the state total, an approach that introduces more variables for error.

cber.co feels the most accurate forecast is achieved by projecting total employment based on projections for categories of sectors. Sectors are grouped into three categories based on their past performance.

Projections for the categories and overall employment are based on trends, feedback from business leaders, economic developers, and other economists. The sum of these categories are then compared to the projections for overall total employment. Minor adjustments are made and the final forecast is produced for three scenarios. The most likely scenario is used as the final cber.co forecast. This final step helps create a better understanding of upside and downside risk.

Strong Growth, Solid Growth, and Volatile Categories

This portfolio approach has made it easy to see that some sectors consistently create jobs at a higher rate of growth, some show solid growth, and others are more volatile. Ultimately, the volatile category tends to have a greater influence on the amount of change in <u>total</u> job growth than the sectors with steady growth.

In 2012, 2013, and 2014 cber.co evaluated the performance of 23 sectors over the past two decades and refined the manner in which the sectors are grouped. The evaluation factors for grouping include the rate of growth, number of years with positive job growth, size of the sector, and volatility in job growth. The data used for classifying the sectors is available in the Appendix of the original forecast. In the short period this process has been used, it has produced a high level of accuracy in the final forecast. More importantly, it has produced a better understanding of what is driving the economy.

Measuring Change in Employment

Methods of Measuring Change in Employment

- •Month-over-prior-month This method can be used only with seasonally adjusted data.
- •Year-over-prior-year This method can be used with seasonally adjusted or non-seasonally adjusted data. The results are usually similar.
- •Rolling average Average employment for a period, such as 12-months, compared to average employment to the average for the prior period of "rolled" data

Measurement Used by cber.co

- •cber.co typically uses a derivative of a rolling average. For example, the average of the first quarter of 2015 will be compared to the average for the first quarter of 2014. It is also important to look for trends.
- •This methodology is preferred to seasonally adjusted month-over-prior month data, particularly with employment data. Advances in technology and the past two recessions have made it difficult to accurately adjust for seasonality.

BLS/LMI Data Revision Process

BLS and LMI Data Projections

In recent years, data-producing federal agencies have been asked to deliver more accurate data, in a shorter time frame, using fewer staff, with lower research budgets. The data used for most short-term forecasts is the Current Employment Survey, also called Nonfarm or Wage and Salary data. It is possible for the CES data to be revised up to four times.

BLS and LMI Data Revision Process

The CES projection process is outlined below:

- Around the 20th of a month, preliminary data for the prior month will be published and the month prior to that will be updated (For example, around June 20th preliminary data for May will be produced and April will be updated.) These revisions are usually minor. Most short-term forecasts use this data.
- 2. In March of the following year, the previous two years will be revised. (For example, the 2014 employment data will be revised in March 2015 and finalized in March 2016).
- 3. The initial March update is usually the most significant revision, and the two-year update is often minor (In the case of 2014, some of the monthly totals will see significant upward revisions when revised in March 2015.)
- Periodically, BLS updates the entire data series back to 1990. This usually occurs when they recalibrate their projection models or redefine NAICS codes.

cber.co Colorado Economic Review Through Q1 2016

This analysis is for informational purposes only. Any opinions or interpretations of data are those of the presenter. As such, they do not represent the viewpoints of any group or particular organization.

For further information contact Colorado-based Business and Economic Research (cber.co). ©Copyright 2016 by cber.co.

Data contained in the tables, charts, and text of this presentation is from sources in the public domain. With appropriate credit, it may be reproduced and shared without permission. Please reference, "Colorado-based Business and Economic Research" (cber.co). Additional presentations are available at http://cber.co.

For additional information contact cber.co at cber@cber.co.

ABOUT THE AUTHOR

Gary Horvath has produce annual employment forecasts of the state economy for over 25 years. They have been supplemented by monthly economic updates and indices that track economic performance over the short term. In addition he has directed three statewide analyses that included reviews of all 64 county economies.

In addition, Horvath was the principal investigator for a state and federally funded project to prepare a nanotechnology roadmap for Colorado. As well, he was a co-founder of the Colorado Photonics Industry Association, a trade group for Colorado's Photonics cluster. Horvath has been an active board member of the group since its inception.

Horvath has also served on the Board of Directors for the Economic Development Council of Colorado, Northwest Denver Business Partnership, Adams County Economic Development, and Broomfield Economic Development Corporation. Horvath has also been the lead for the photonics/electronics cluster, which is part of OEDIT's early stage and proof of concept programs.