



cber.co Colorado Economic Review Through October 2016

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

Overview of Economic Review

This chartbook provides a series of charts, tables, and discussions that analyze changes in the global, U.S. and Colorado economies. The emphasis of the chartbook is on the performance of the Colorado economy.

After 10 months, Colorado is on track to add 69,400 jobs in 2016, although that number may be revised downward in the BLS benchmark revisions next March.

This review is divided into the sections listed below.

Global and Economy

- Gross Domestic Product

United State Economy

- The Challenges and the Good News
- Labor
- Financial Markets and the Price of Oil
- Non-Manufacturing, Manufacturing, Construction, and Retail

The Colorado Economy

- Population
- Labor
- 2016 Colorado Employment by Performance Category
- Extractive Industries, Manufacturing, Housing Prices and Construction
- Summary



Global Economy

Gross Domestic Product

Global Real GDP Growth



In October, the IMF released its updated global GDP forecast. The overall rate of GDP growth (green) remains unchanged from the mid-year forecast.

The U.S. real GDP will be 1.5% to 1.8% for 2016.

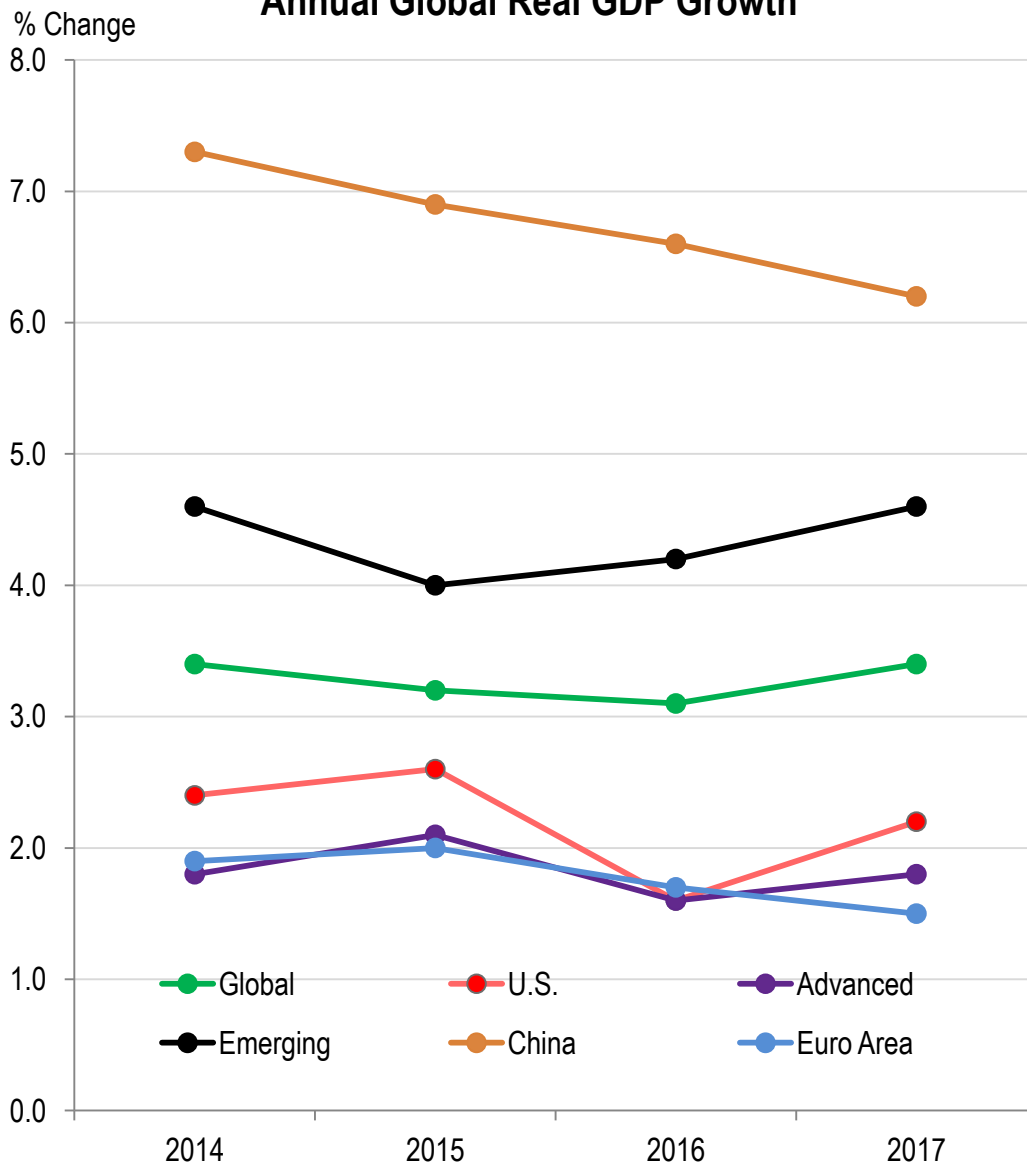
Looking ahead, the IMF foresees the following challenges:

- China's rebalancing process (this hasn't gone away).
- The struggles of commodity exporters.
- Uncertainty related to the decision by Great Britain to exit the European Union
- The Fed's second liftoff in interest rates.
- The slowdown in the growth of trade.
- Deflationary pressures.
- Backlash of globalization, particularly in the U.S.

Source: IMF, October 2016.

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Annual Global Real GDP Growth





U.S. Economy The Challenges and the Good News

The Challenges Facing the U.S. Economy

The national economy has been in a holding pattern for over a year. During that time the American public has been inundated by news stories about Russian hackers, James Comey, errant pollsters, deplorables, and the election of a president. The only thing missing was hanging chads! The bullets points listed below are factors other than the election that have caused the national economy to perform at a subpar level.

- As measured by real GDP growth, the global economy has been stagnant in 2016.
- The U.S. experienced weak real GDP growth in Q1 and Q2. Real GDP growth rose by 2.9% in Q3 and similar growth is expected in Q4. Real GDP growth for the year will be less than 2.0%.
- Business investment has been weak. Thank goodness consumers kept the economy afloat!
- A strong U.S. dollar is playing havoc with manufacturing shipments.
- Unemployment rates are too low in some occupations and geographic regions. In these cases the economy has not operated efficiently.
- The Federal Reserve will raise interest rates sooner rather than later. This may temporarily disrupt economic performance.
- Manufacturing is sluggish.
- Aerospace is an importance segment of manufacturing that is sluggish.
- Nationally, housing prices have increased by 5% annually for several years (and about 10% in Colorado). Affordable and attainable housing is becoming a greater challenge in some parts of the country.
- Oil prices have topped \$50 per barrel, but they are currently around \$45 per barrel.



The Good News

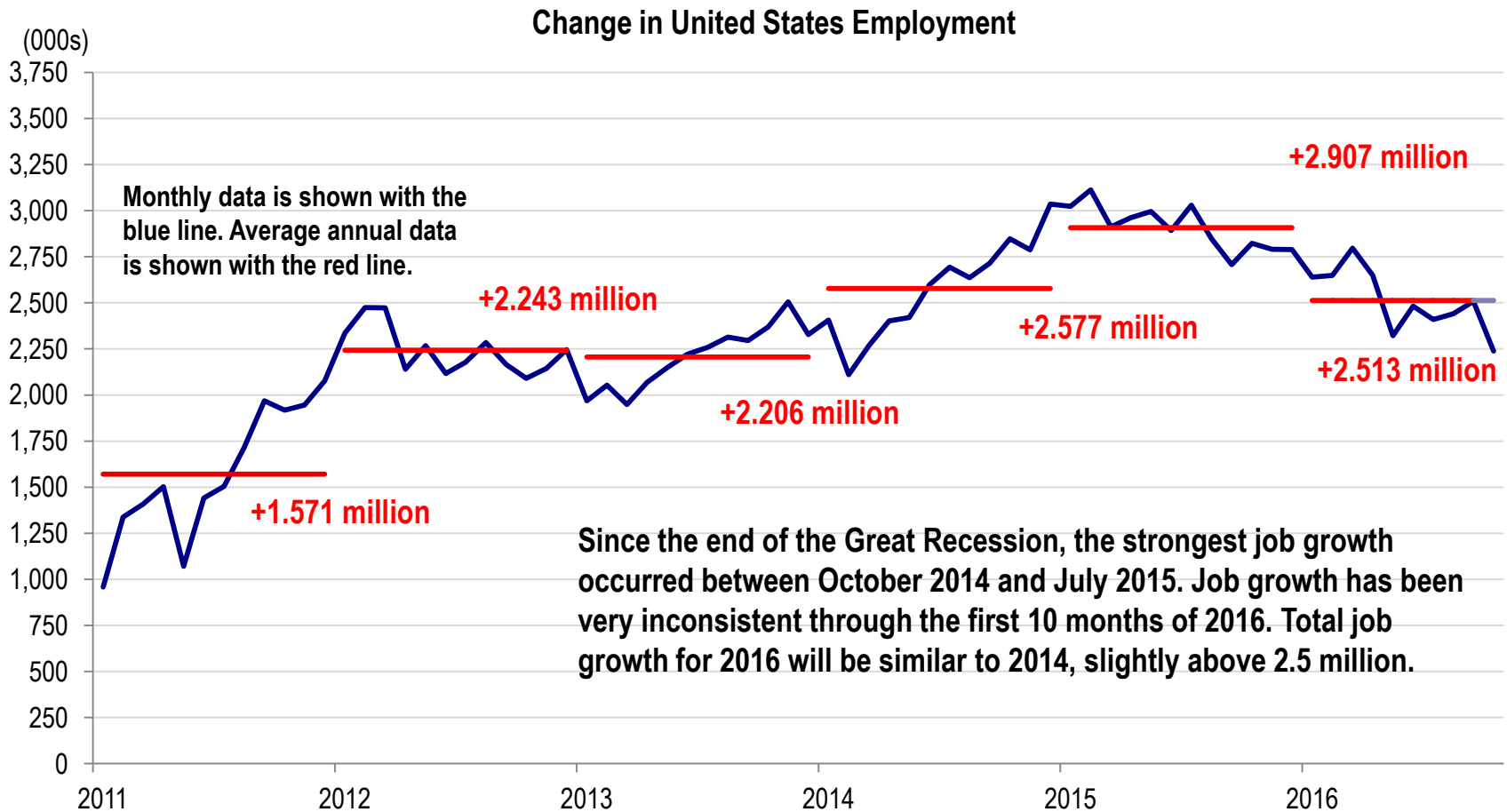
As is always the case, the challenges facing the economy are accompanied by plenty of good news.

- Global and U.S. real GDP growth are expected to improve in 2017.
- Consumers will continue to spend and save. Business investment will get stronger.
- The US is on track to add 2.5+ million jobs in 2016. This is well below the employment level for 2015 and slightly lower than 2014.
- Unemployment claims have been below 300,000 for almost two years.
- Job churn is caused by workers taking new jobs, rather than companies laying off workers.
- Prices at the pump will remain low, which is good news for consumers.
- The price for a barrel of oil may reach \$60 per barrel in 2016, which is good news for producers.
- The S&P 500 index has risen since the election.
- Volatility in the markets, as measured by the VIX index has declined since the election.
- 30 year fixed mortgage rates remain near record lows.
- U.S. inflation remains below 2%.
- The National Retail Federation expects holiday retail sales to be up 3.6% compared to last year. This includes spending in November and December, excluding autos, gas, and restaurants. NRF expects online sales to be up 7% to 10% compared to last year.



United States Economy Labor

Change in United States Employment Year-Over-Year



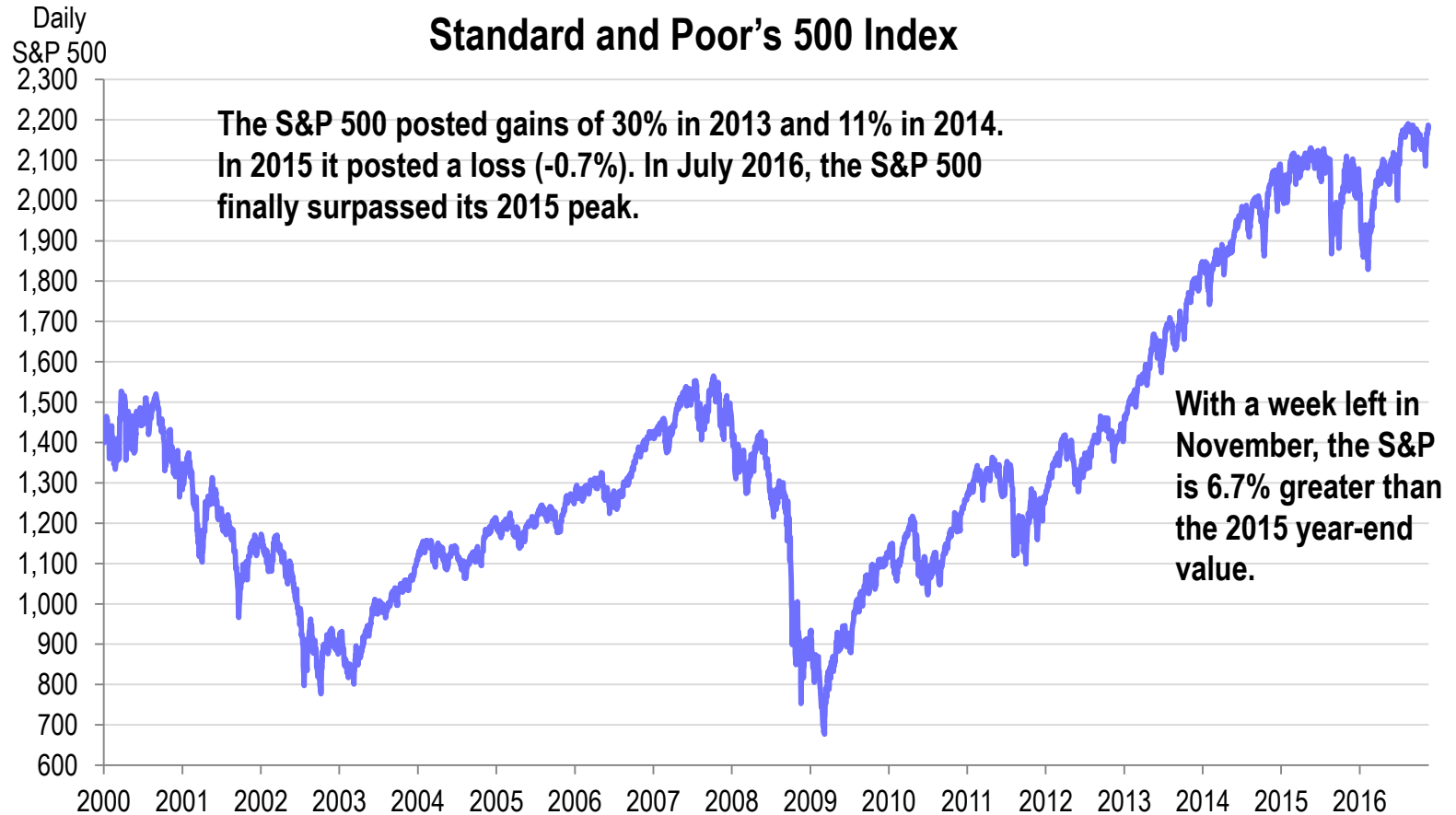
Source: Bureau of Labor Statistics, NSA; cber.co.



United States Economy

Financial Markets and the Price of Oil

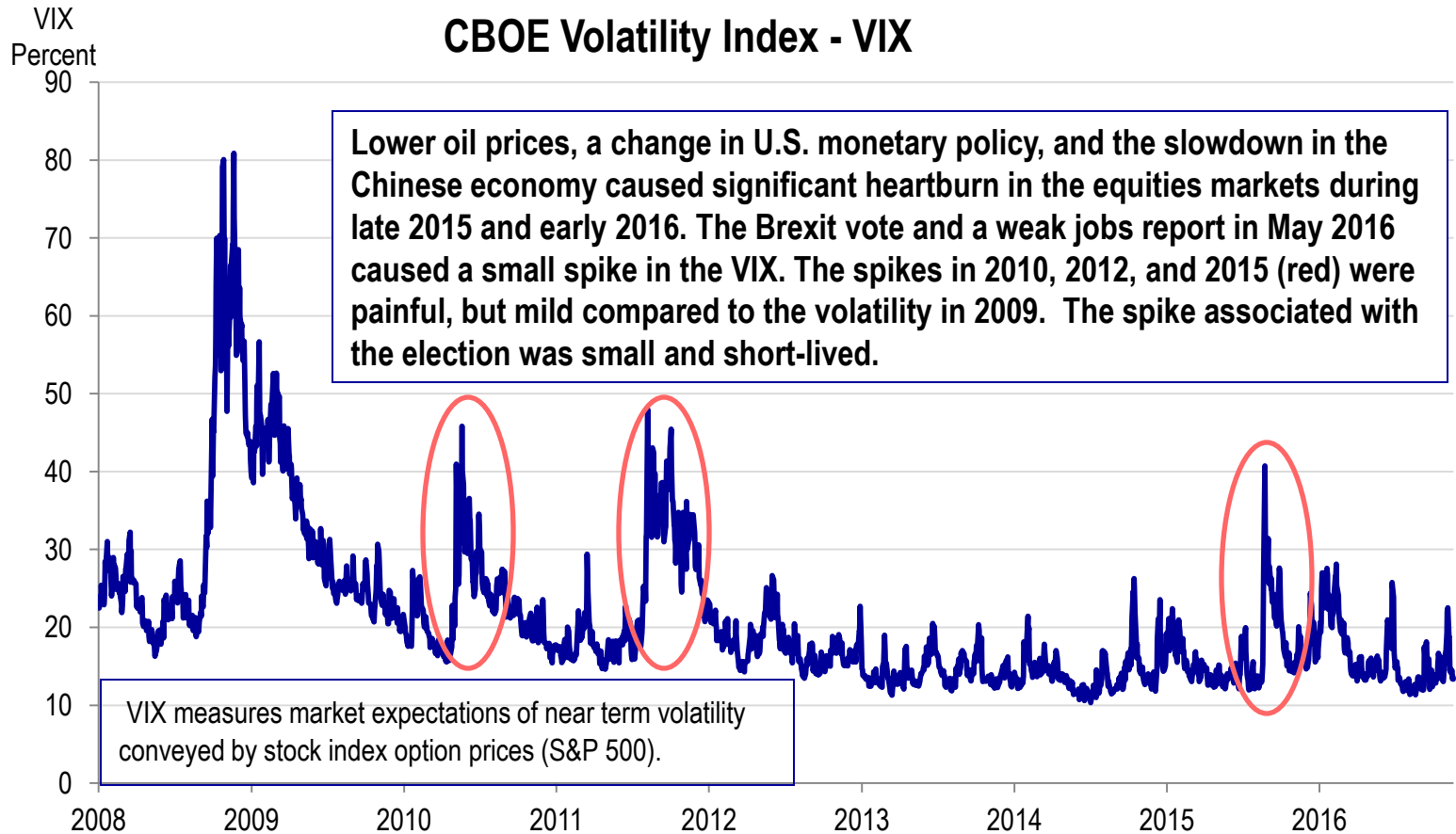
Standard and Poor's 500 Index



Source: FRED, S&P 500, cber.co.

● CBOE Volatility Index

● VIX (VIXCLS)



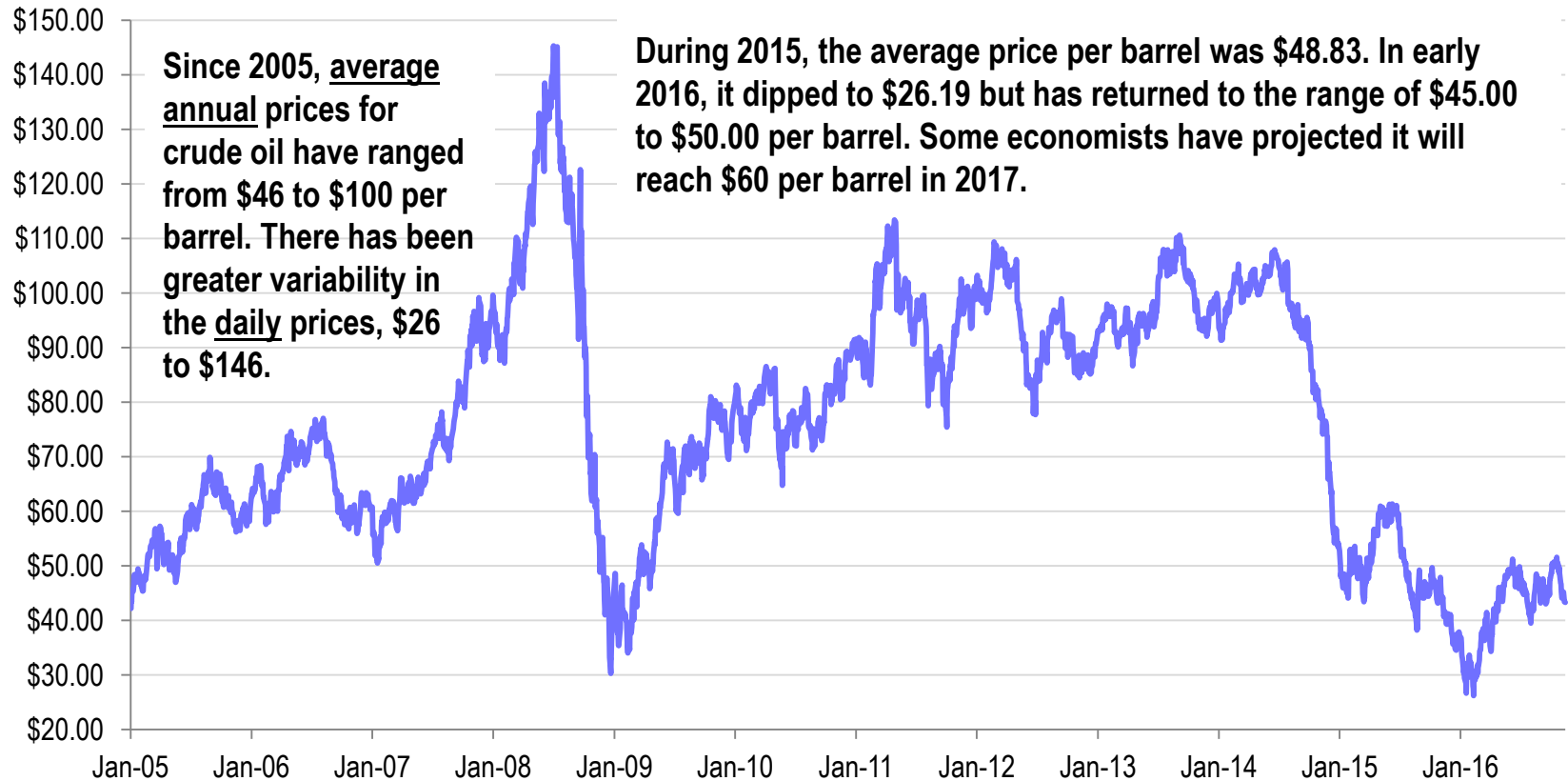
Source: FRED, Chicago Board Options Exchange, cber.co.

Crude Oil Prices

West Texas Intermediate

Dollars
per Barrel

Crude Oil Prices: West Texas Intermediate, Cushing, Oklahoma



Source: FRED, EIA, cber.co.

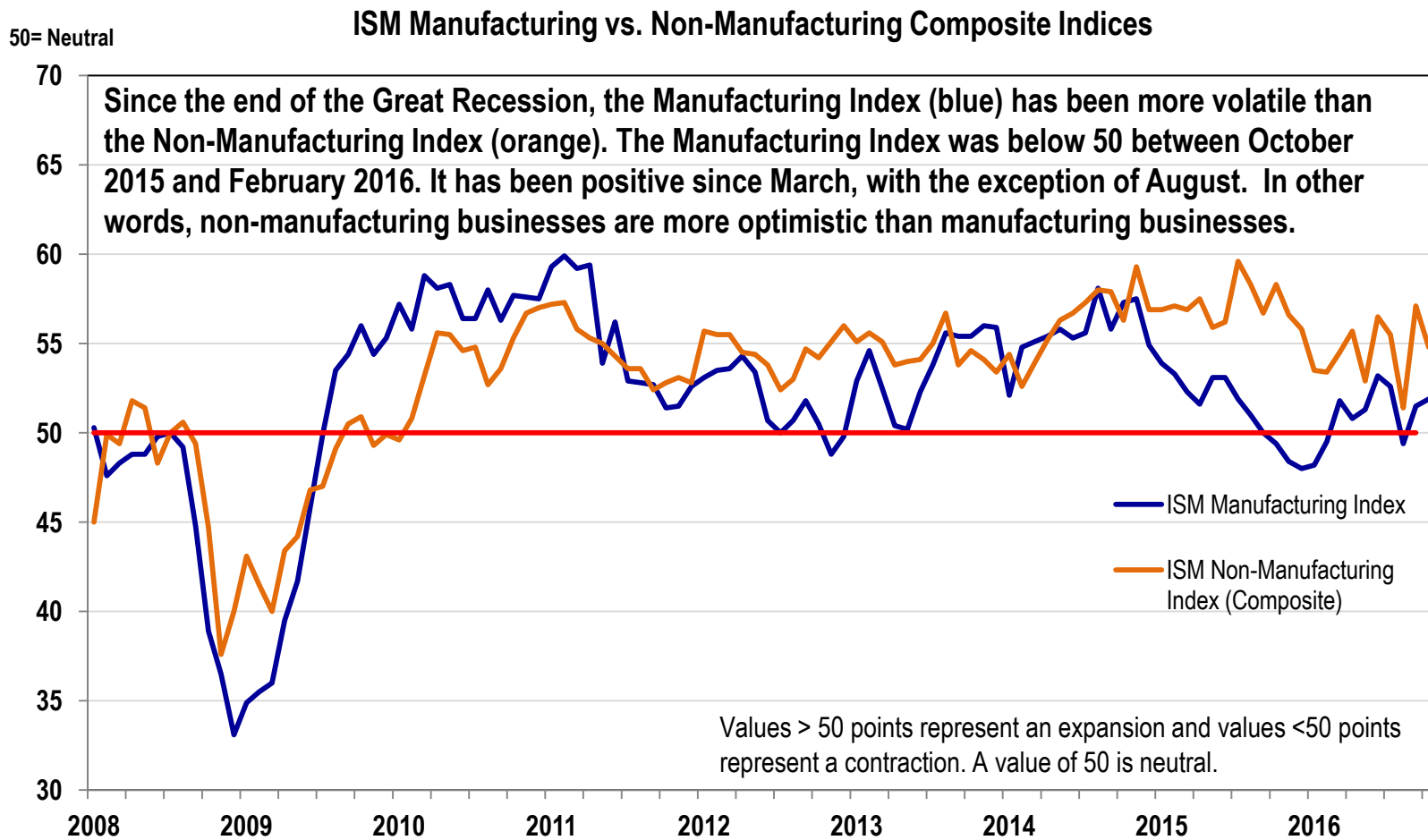


United States Economy

Non-Manufacturing, Manufacturing, Construction, and Retail

ISM PMI Composite Indices

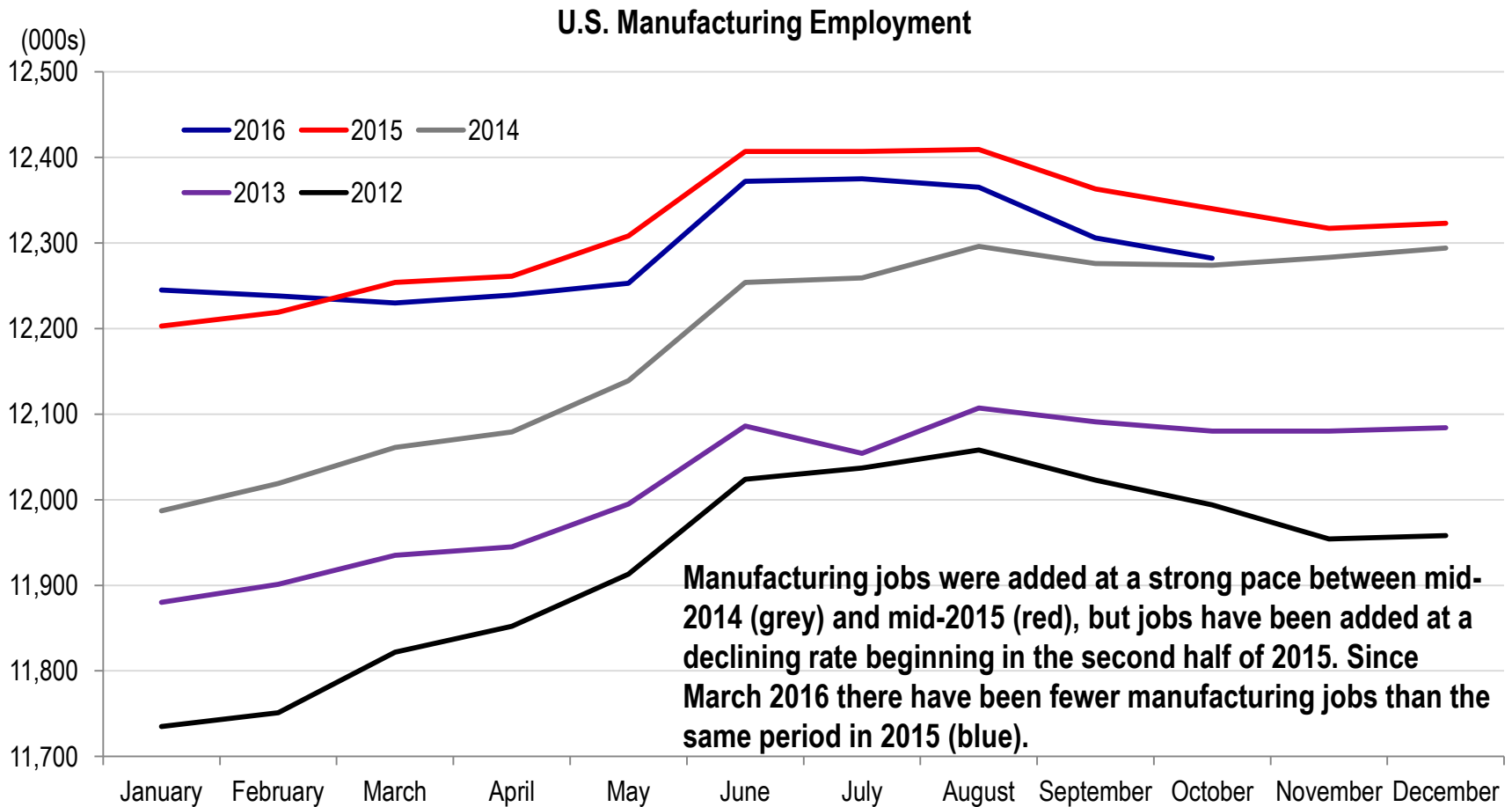
Manufacturing vs. Non-manufacturing



Sources: Institute for Supply Management (ISM), FRED, cber.co.

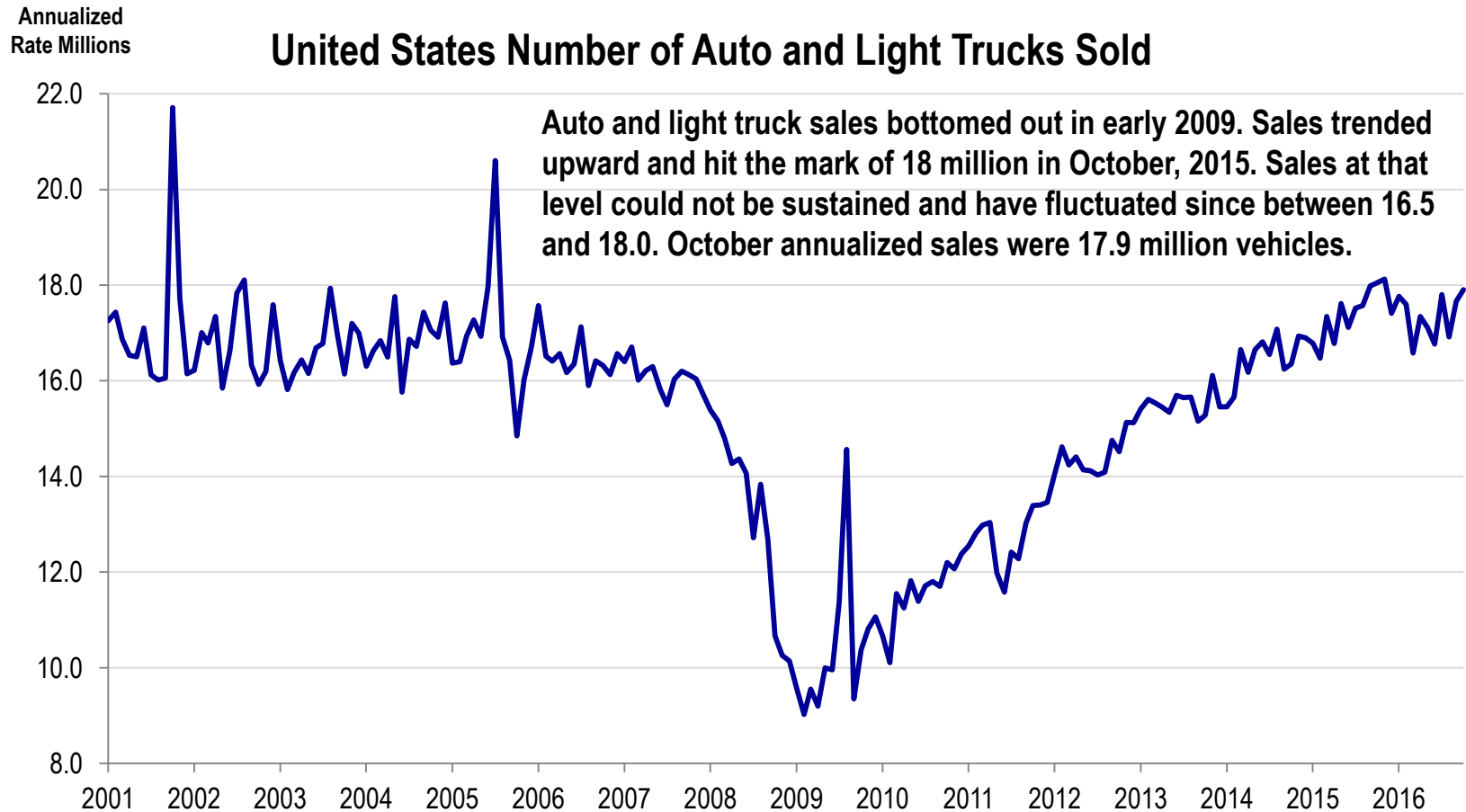
United States Manufacturing Employment

2012 to Current



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

U.S. Weekly Auto and Light Truck Sales



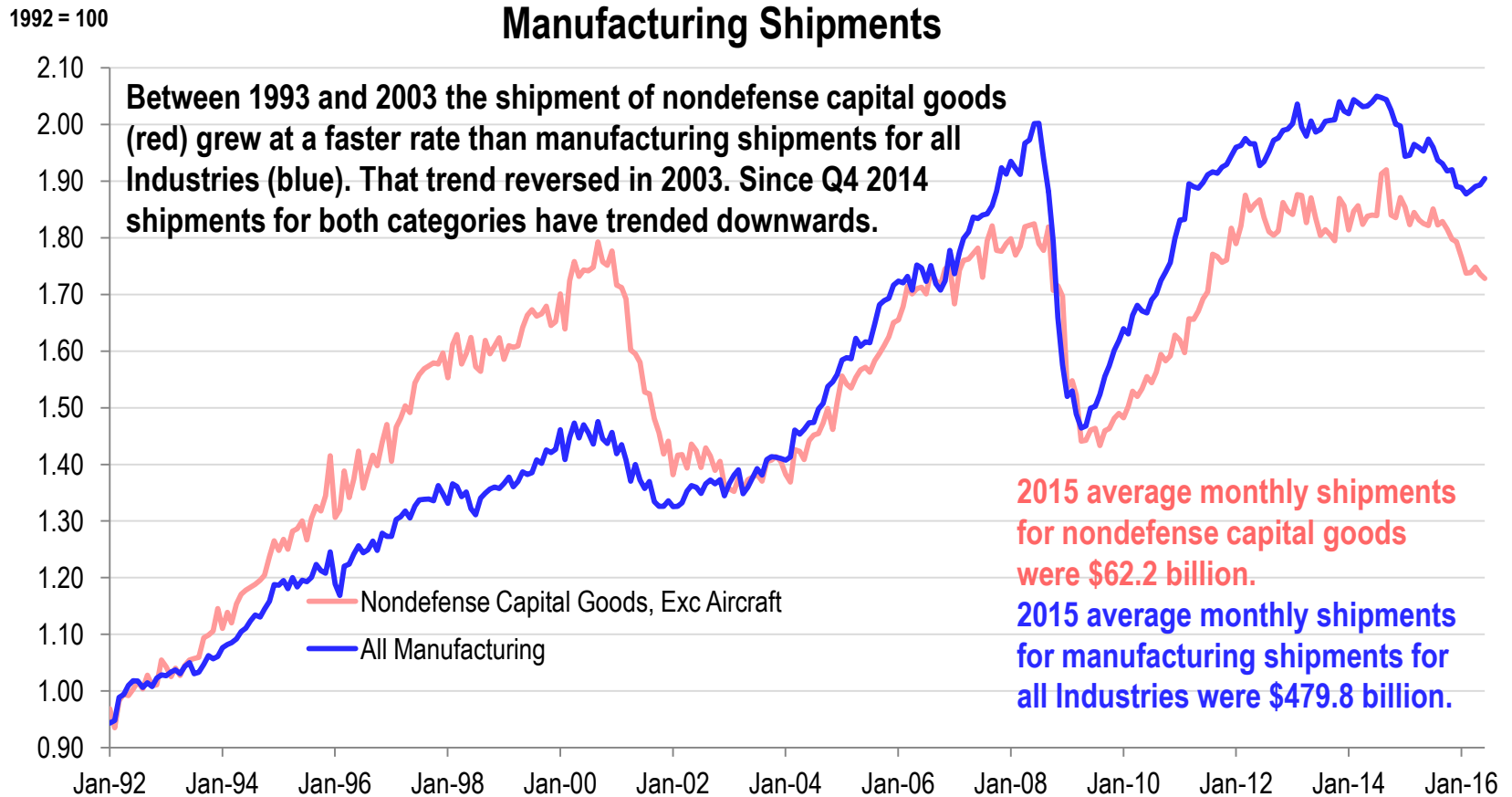
Source: FRED, BEA, cber.co.

Note: Seasonally Adjusted Annualized Rate.

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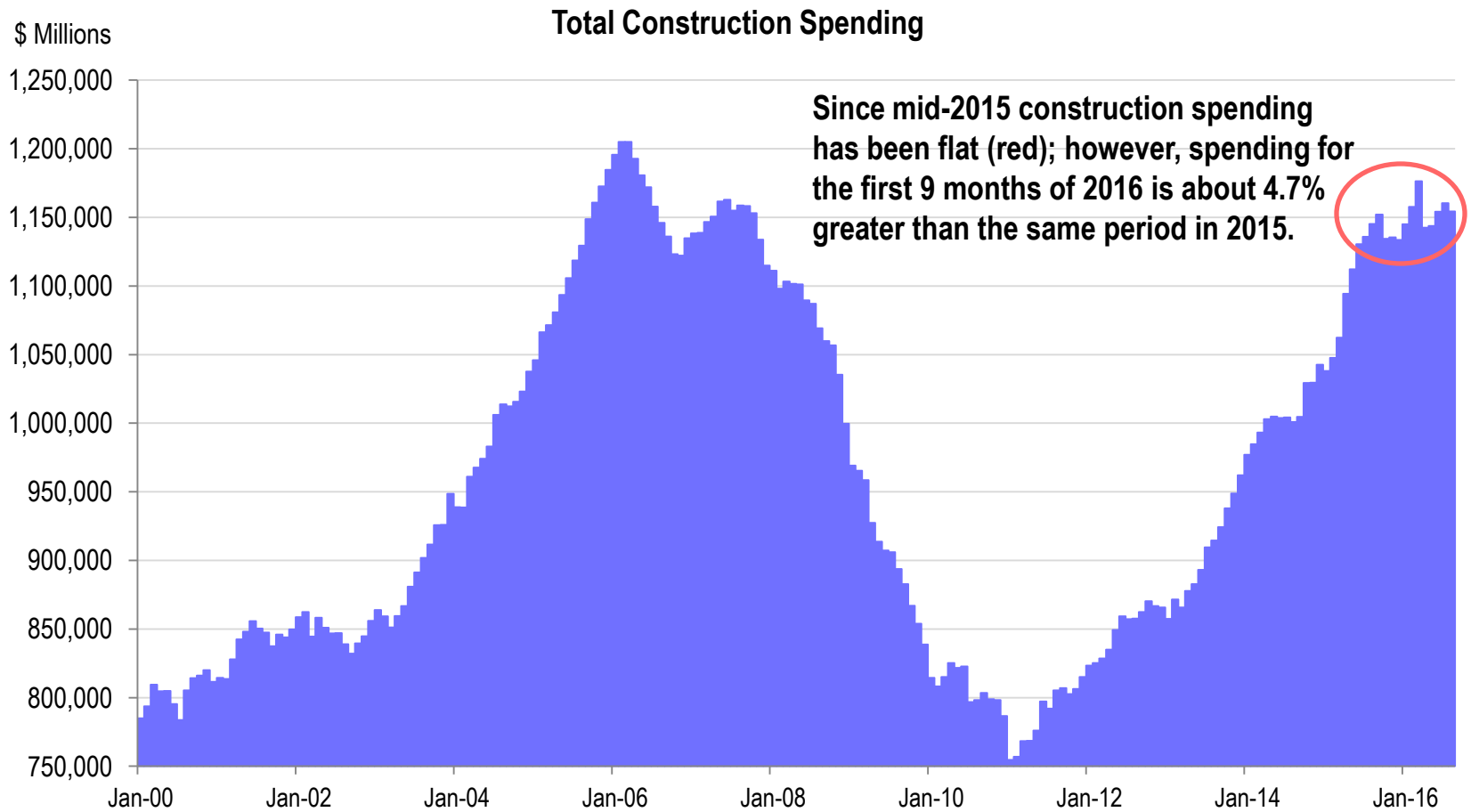
United States Manufacturing Shipments

All Industries vs. Nondefense Capital, Excluding Aircraft



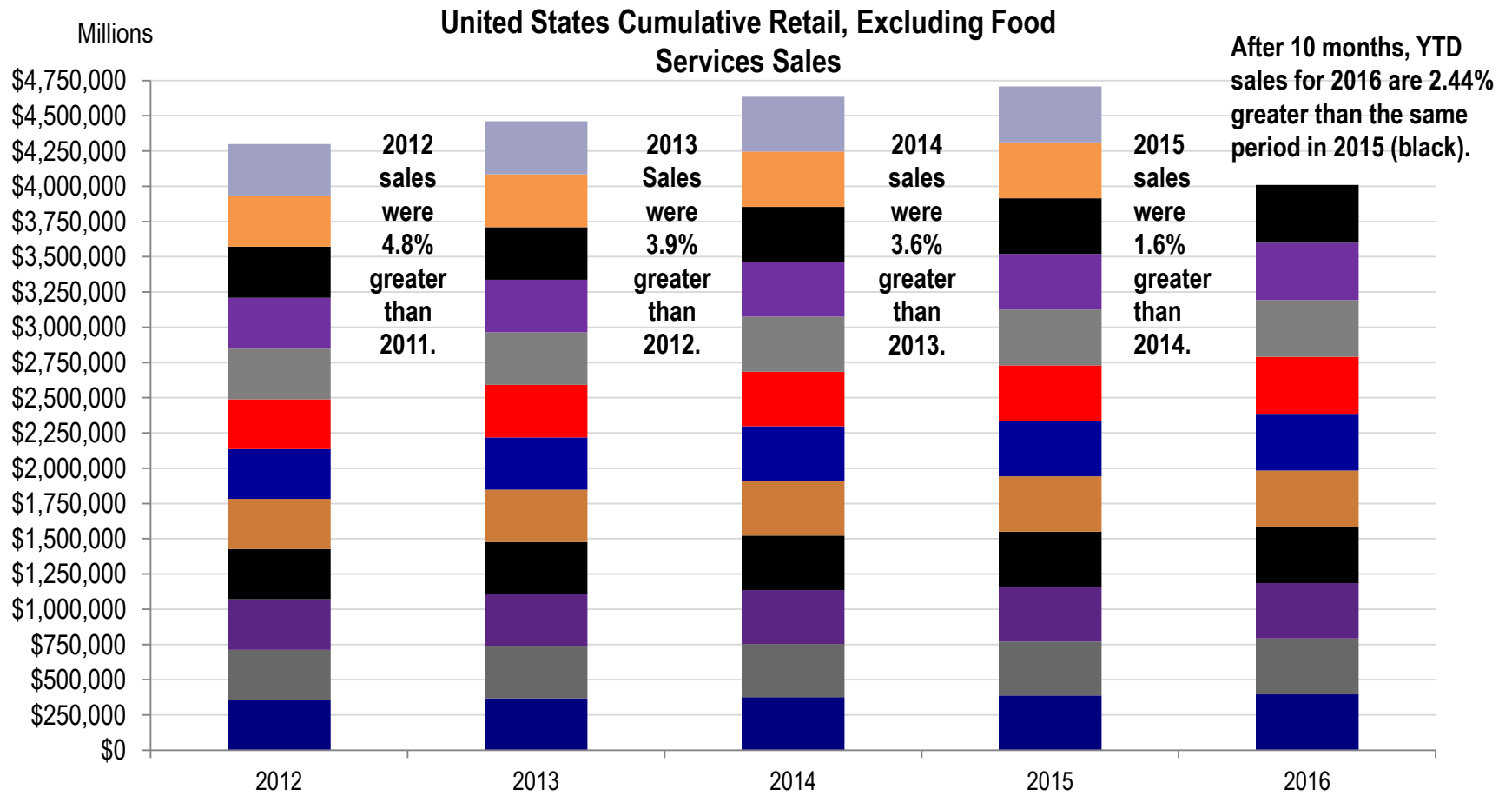
Source: FRED, SA. U.S. Bureau of the Census, cber.co. Note: Not adjusted for inflation.

Total United States Construction Spending



Source: FRED, Census Bureau, SAAR, cber.co. Data is not adjusted for inflation.

Cumulative Retail, Excluding Food Services Sales



Source: U.S. Census Bureau, FRED, cber.co .

Note: Data is in descending order with December at the top and January at the bottom, not adjusted for inflation.



The Colorado Economy Population

Change in Colorado Population

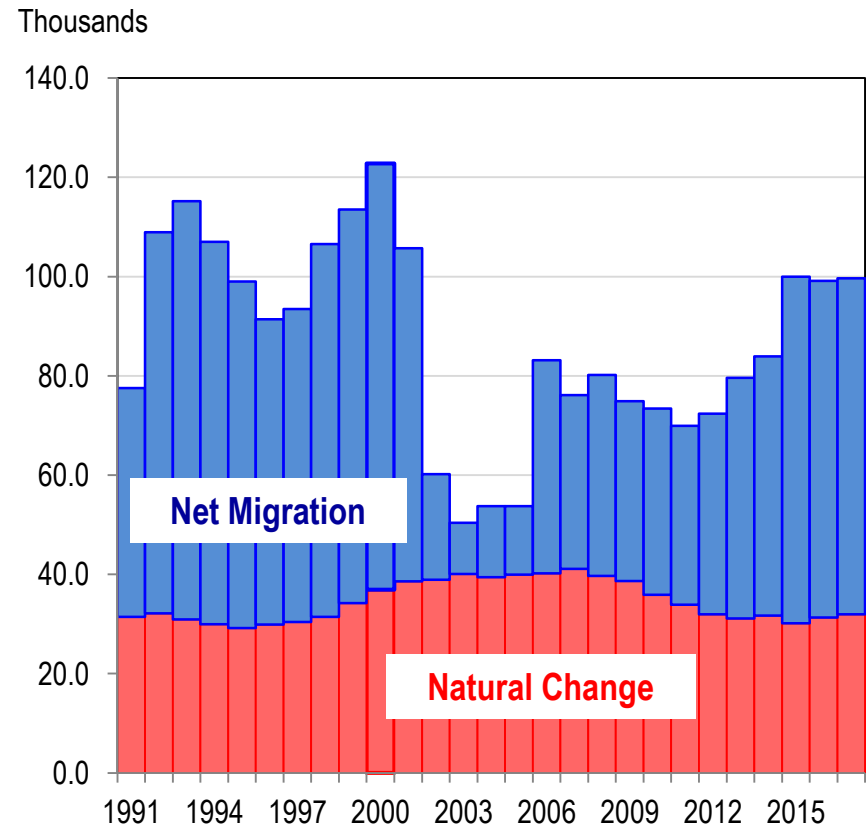
The population increases and decreases are a result of the natural rate of change (births minus deaths) and the change in net migration (people moving into the state minus people moving out of the state).

Over the past 2½ decades the natural rate of change (red bars) varied from a low of 29,145 in 1995 to a peak of 41,124 in 2007. For the past 10 years it has been slightly above 30,000.

Changes resulting from net migration (blue bars) are closely tied to the strength of the economy and the change in state employment. For example, there were five years, from 1986 to 1990, when net migration was negative (not shown on this chart). More people moved out of state than moved into the state to escape a regional recession. During the past two recessions, net migration declined, but did not turn negative because it was difficult for people to move - anywhere.

The Colorado population will increase by about 100,000 in 2015 through 2017. In 2017 the state's population will increase by 1.8% to 5,655,405.

Change in Colorado Population 1991 - 2016



Demographics

One Job = One Person

One of the key points made at the 2016 State Demography meeting held in early November was that there is one person tied to every job. This point is so obvious that it is often taken for granted.

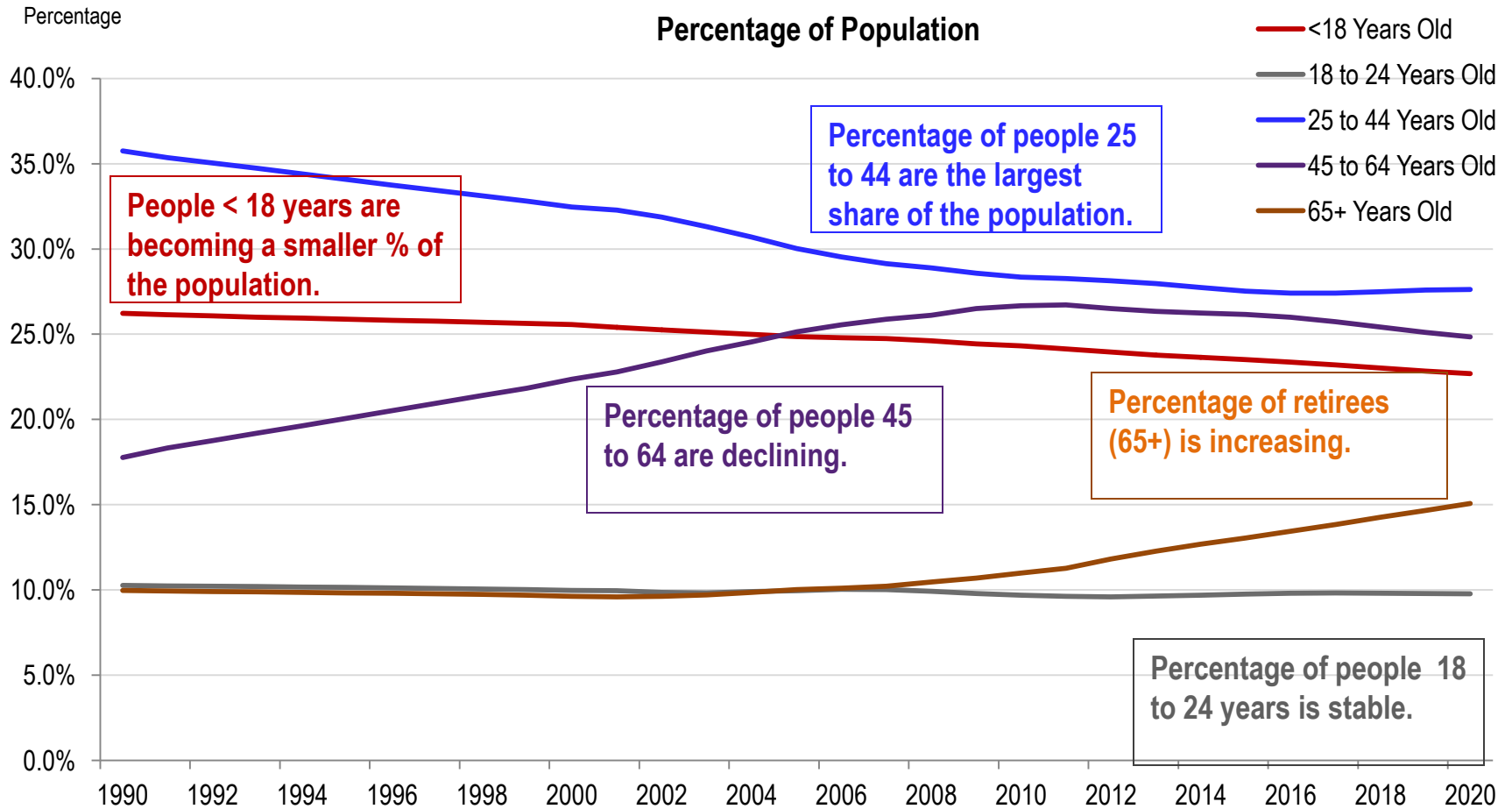
In economic speak, it should be as easy as pie to match supply and demand (an appropriate axiom given that Thanksgiving and pumpkin pie are right around the corner). Unfortunately, this is easier said than done.

At the meeting mentioned above, Cindy DeGroen addressed this issue in her presentation, the *Five Big Trends Transforming Colorado*. <https://demography.dola.colorado.gov/demography/publications-and-presentations/#past-conferences>.

The chart on the following page addresses one of those trends, the changes in the mix of population based on the age category.

In other words, baby boomers are retiring and millennials have the greatest “share” in the workforce. That concept is as easy as pie to understand, but it has numerous implications for the growth of the Colorado economy.

Percentage of Colorado Population by Age Group



Source: Colorado State Demography Office, cber.co.

● Percentage of Colorado Population by Age Group

● Impact of Changes

●

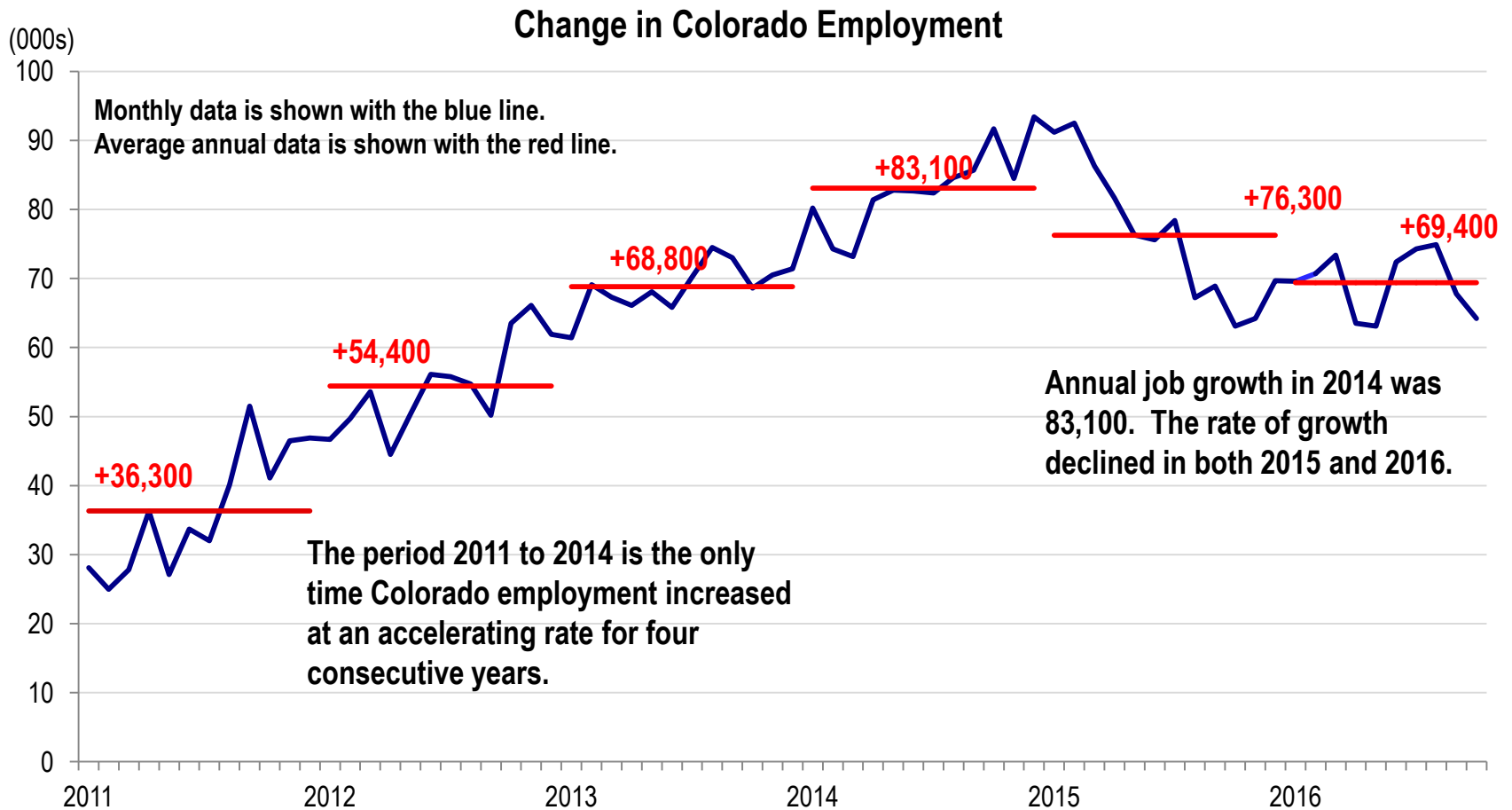
The major impacts of the change in the mix of the Colorado population based on age groups are:

- The retirement of baby boomers will cause tighter labor markets in some regions and industries. For example, retirement causes the loss of institutional knowledge which can be critical in industries such as aerospace.
- Metrics such as per capita income and average annual wages may be skewed by retiring baby boomers. Their high paying jobs are being replaced by younger workers whose salary is often significantly lower. This difference will drive average wages down.
- As baby boomers turn older their health care needs will increase. This will impact insurance rates and the manner in which health care is delivered.
- In some cases, baby boomers are mobile. For example, they may be snowbirds, they may choose to live near their kids, or they may simply downsize their housing.
- The spending pattern of retirees is different. Their consumption includes more services than goods.



The Colorado Economy Labor

Change in Colorado Employment Year-Over-Year

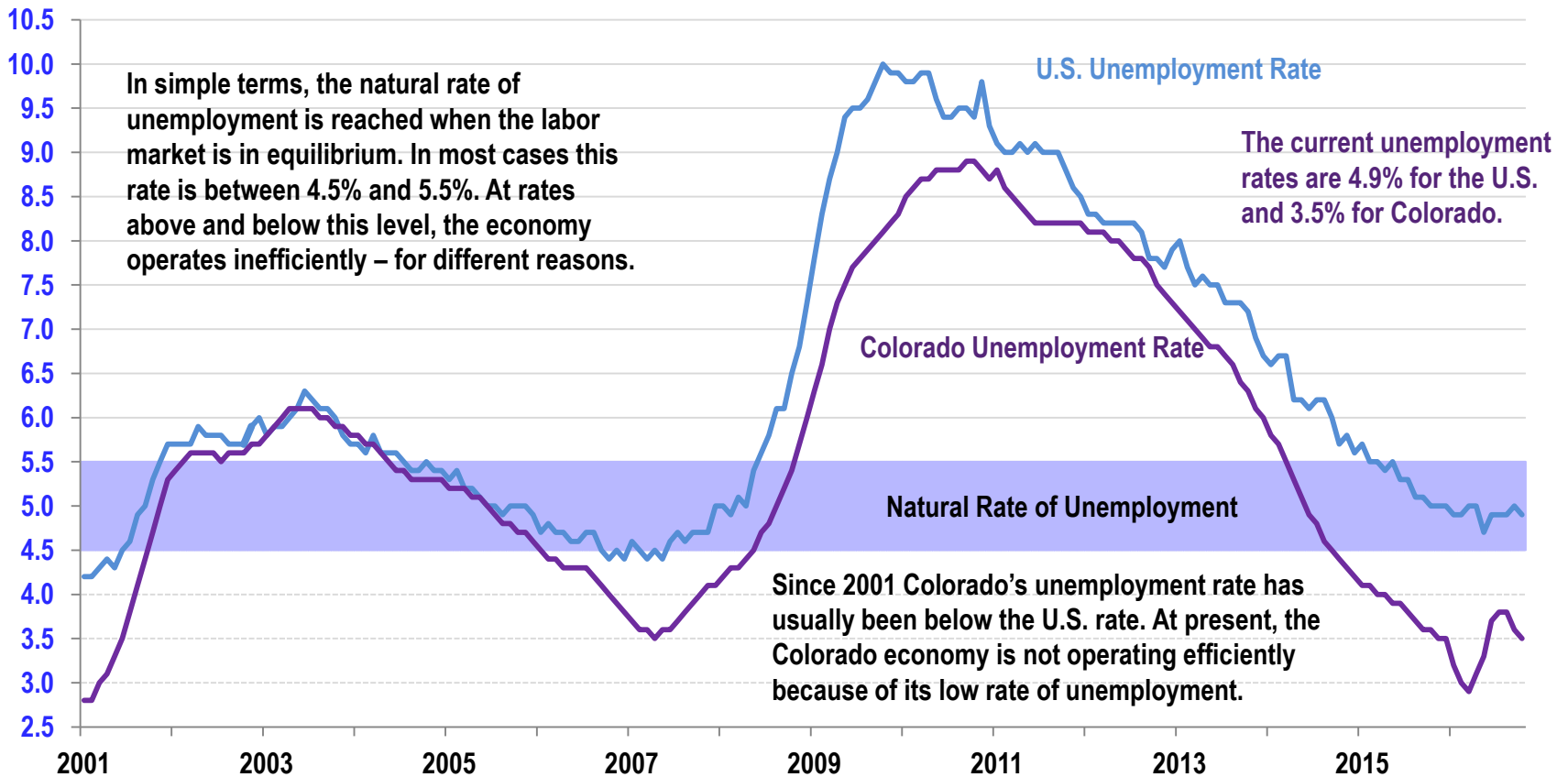


Source: Bureau of Labor Statistics, NSA, cber.co.

United States vs. Colorado Unemployment Rate

Percent

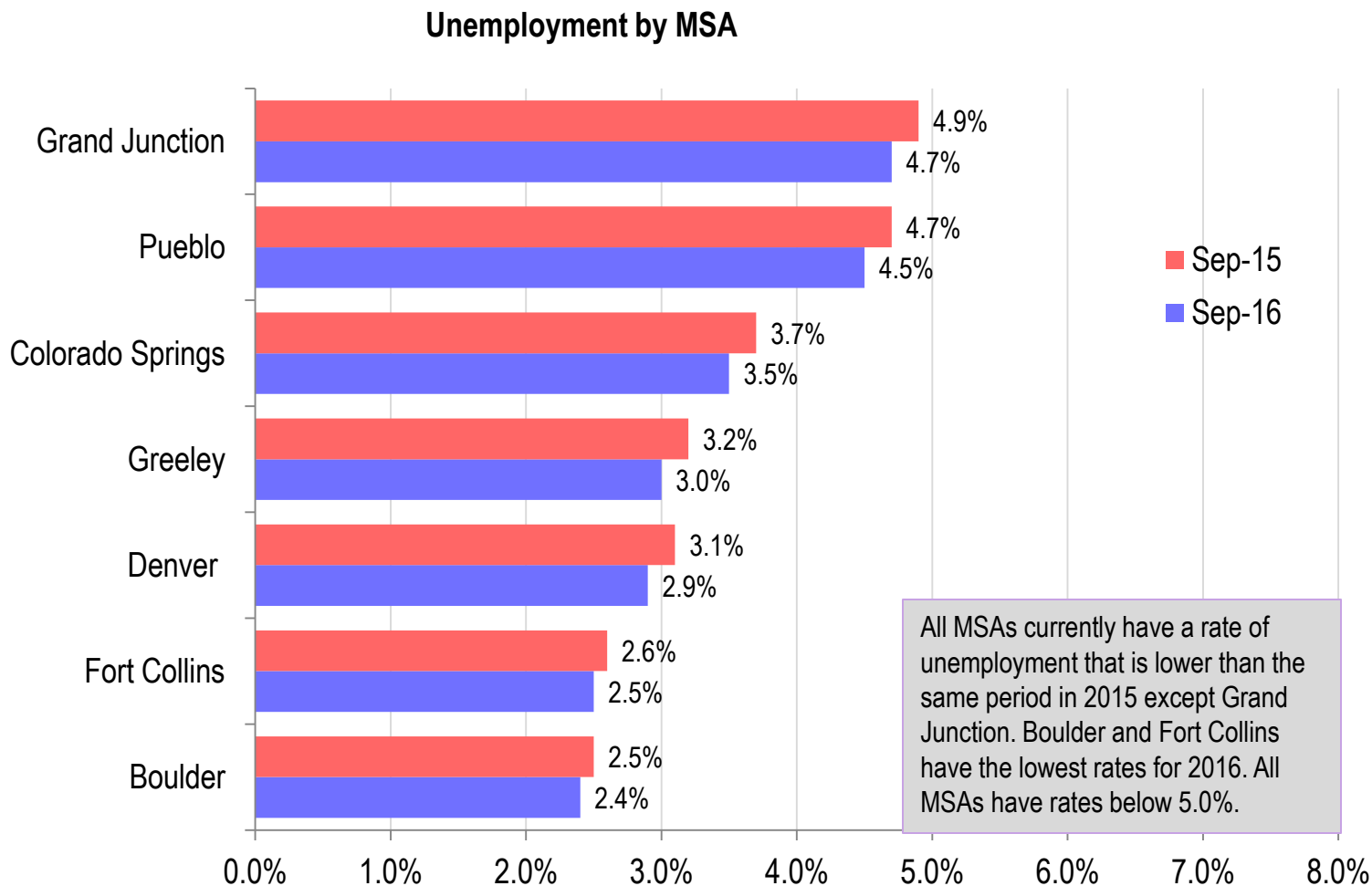
United States vs. Colorado Unemployment Rate



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

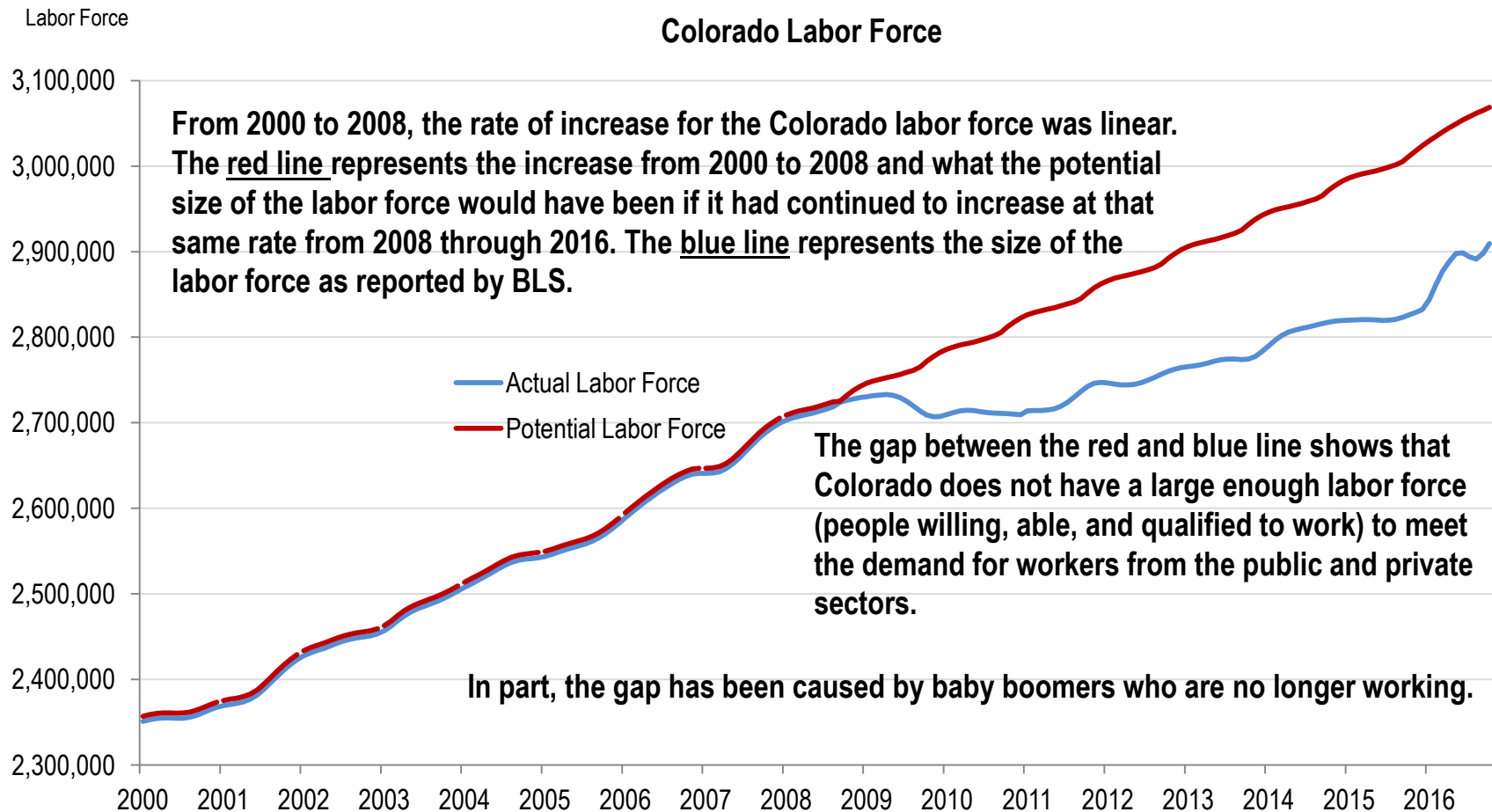
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Unemployment by MSA 2015 vs. 2016



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

Colorado Labor Force



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

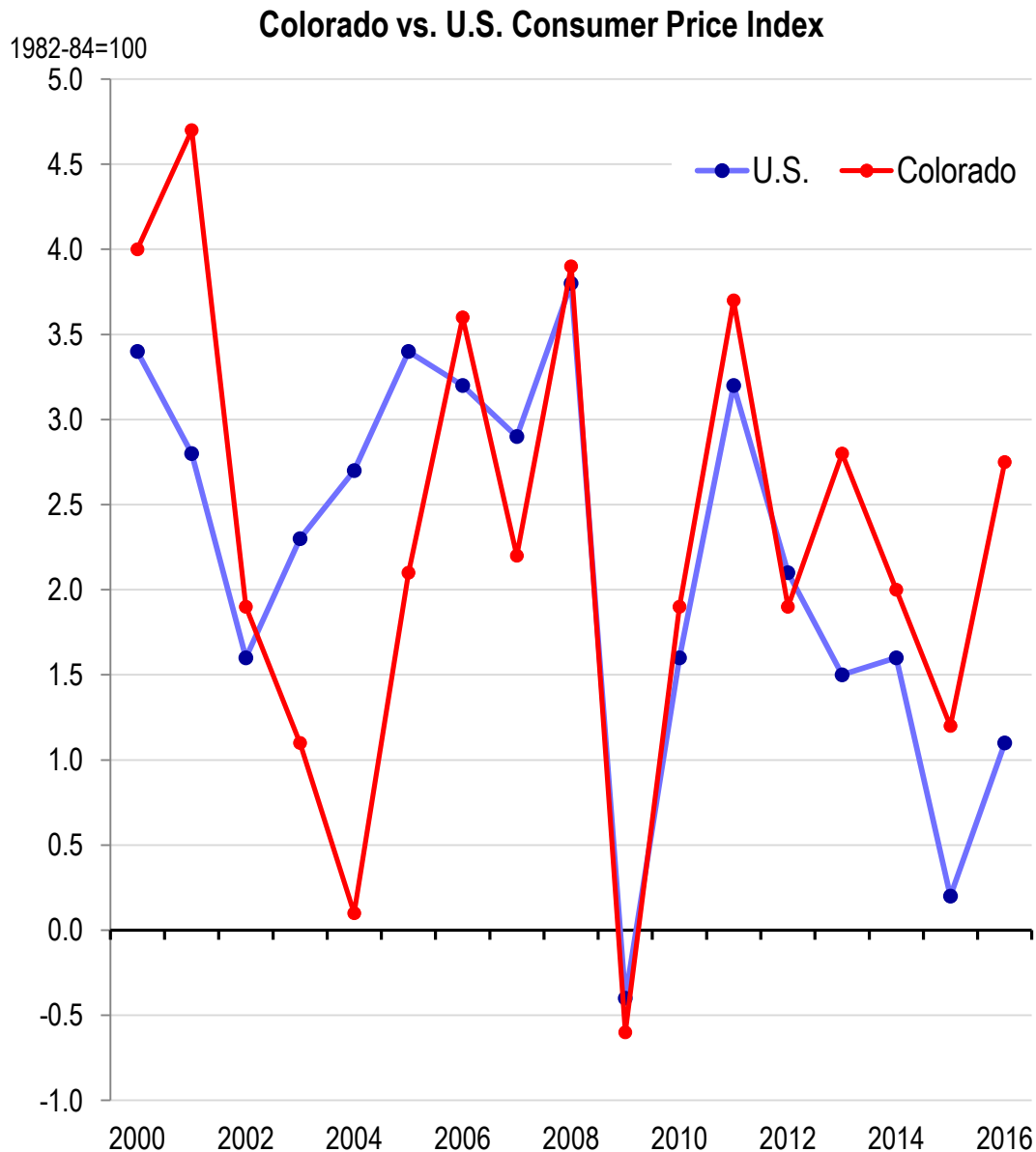
Consumer Price Index (CPI - Annual)

The Denver-Boulder-Greeley CPI (red bars) is used as a proxy for Colorado inflation.

The Colorado CPI has been greater than the U.S. CPI 11 of 17 times between 2000 and 2016. Five of the six years that Colorado inflation was lower were between 2003 and 2009 – the period between the 2001 and 2007 recessions.

Recently, higher housing prices have caused Colorado to be a more expensive place to live.

The Colorado CPI for 2016 is expected to be in the range of 2.5% to 3.0%. The rate of inflation for the U.S. is expected to be in the range of 0.8% to 1.3%.



Source: Bureau of Labor Statistics, cber.co.



Colorado Employment

2016 Colorado Employment by Performance Category
Average Employment First 10 Months



Colorado Employment Performance Category Portfolio Analysis

Strong Growth, Solid Growth, and Volatile Categories

This portfolio approach to evaluating job growth makes it easy to see that some categories of industries consistently create jobs at a higher rate of growth, some show solid growth, while 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 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.

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.

Annual Employment Situation for the Strong Growth Category

Over the past two decades the following sectors have been the foundation for consistent growth in Colorado employment.

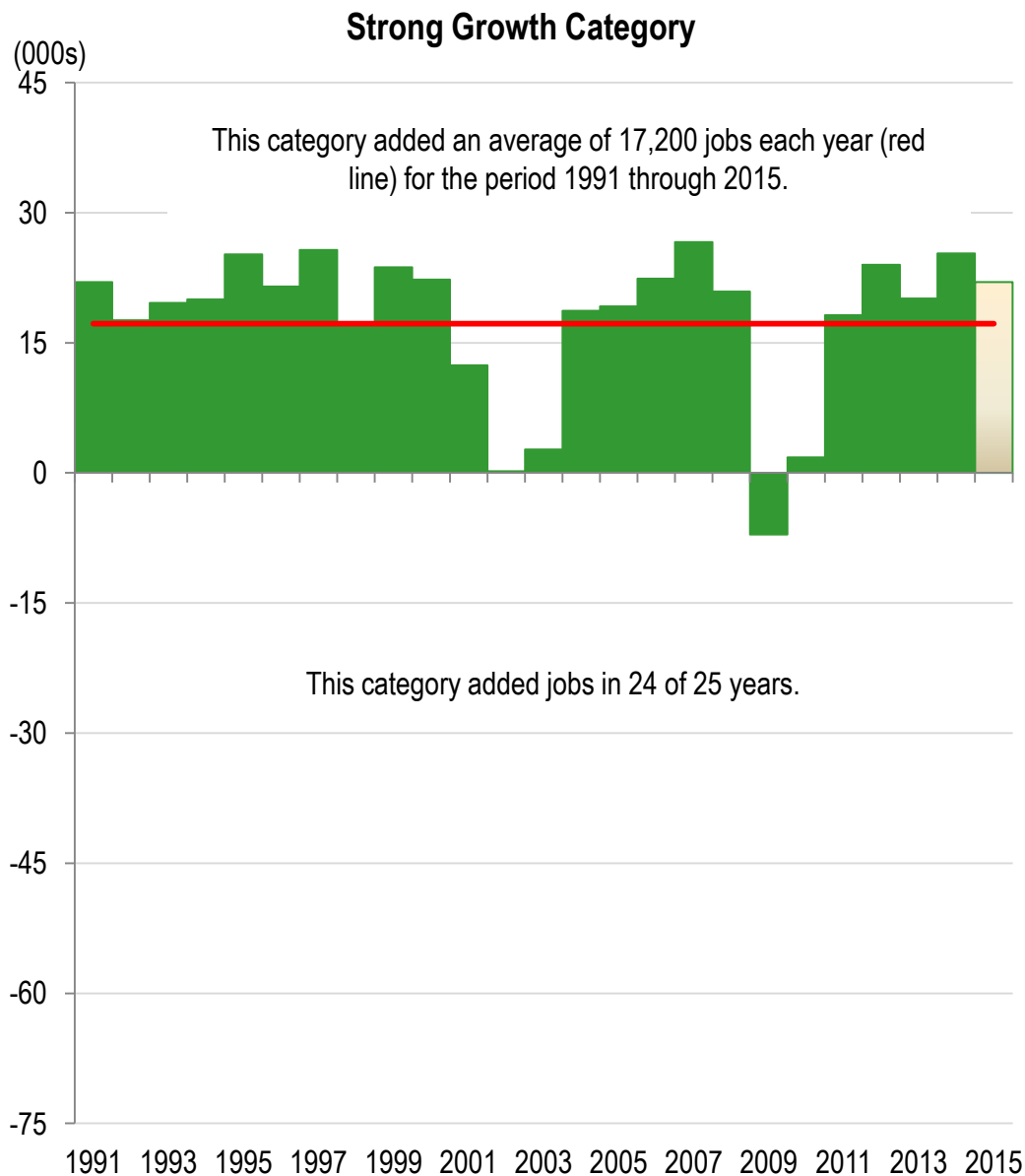
- Professional, Scientific, and Technical Services
- Management of Companies and Enterprises
- Administrative - Business to Business (Not Employment Services)
- Private Education
- Health Care
- Arts, Entertainment, and Recreation
- Other Services.

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

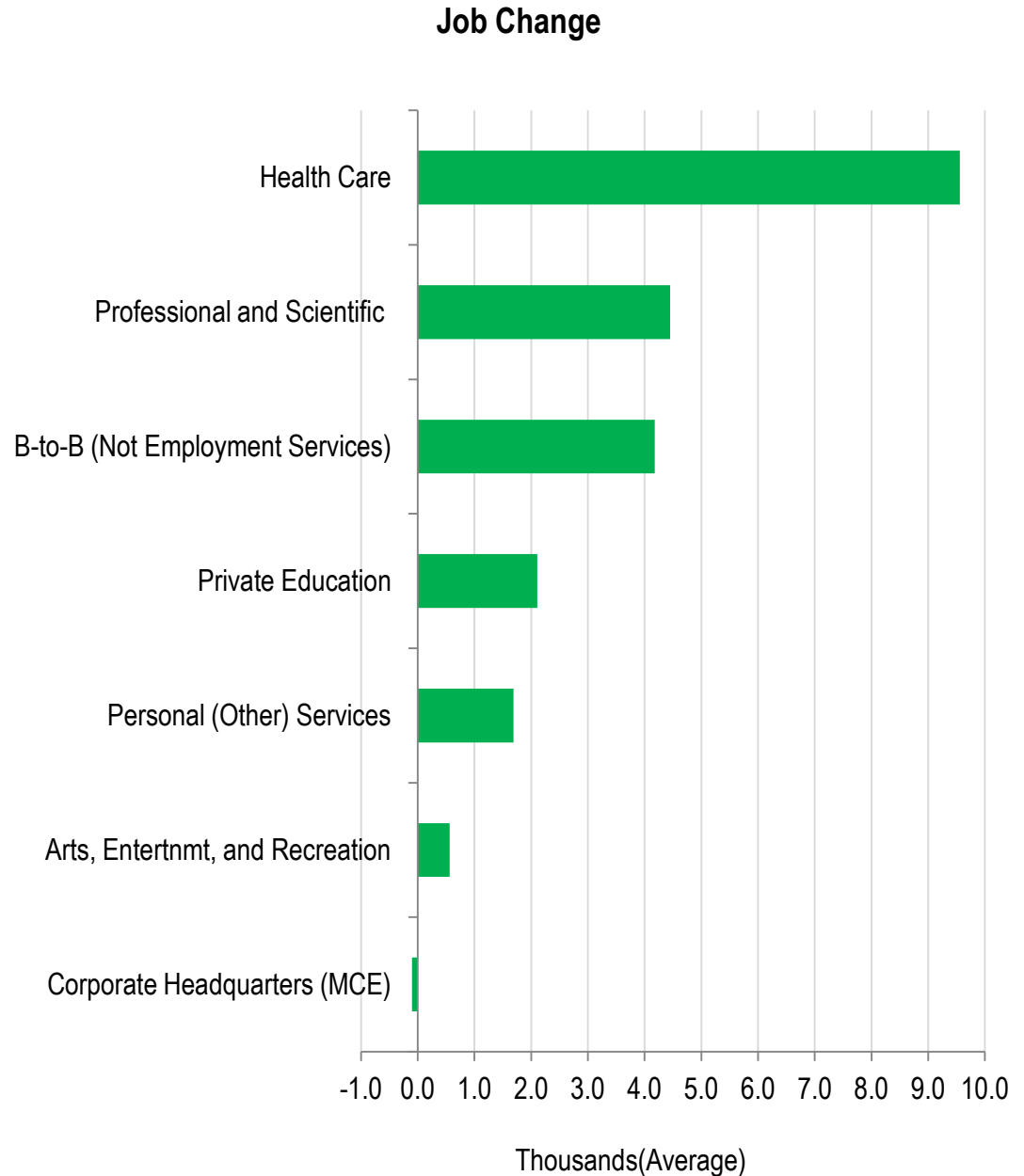


Solid Growth Sectors

- Average employment for the first 10 months of 2016 shows this category of sectors added 22,500 jobs compared to the same period last year.

- The Health Care Sector led job growth, followed by the PST sector. On the other hand, the Management of Corporations and Enterprises Sector showed a slight decline from last year.

- In 2014, this category accounted for 32.4% of total job gains and 32.0% of total employees.



Source: Bureau of Labor Statistics, cber.co.

Annual Employment Situation for the Solid Growth Category

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

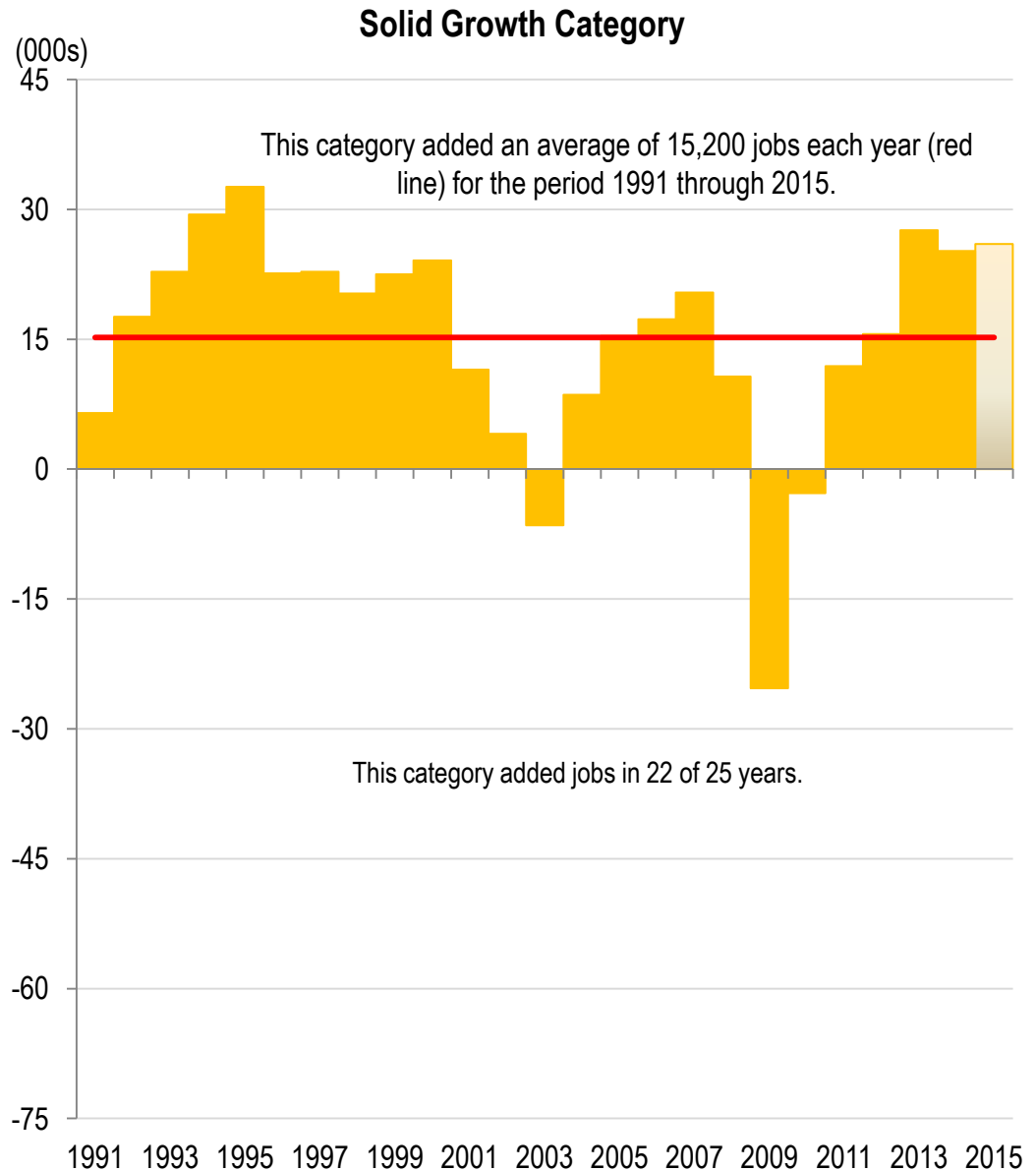
- Wholesale Trade
- Retail Trade
- State (Not Higher Education)
- Higher Education
- Local (Not K-12 Education)
- K-12 Education
- Accommodations and Food Services

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.



Limited Growth Sectors

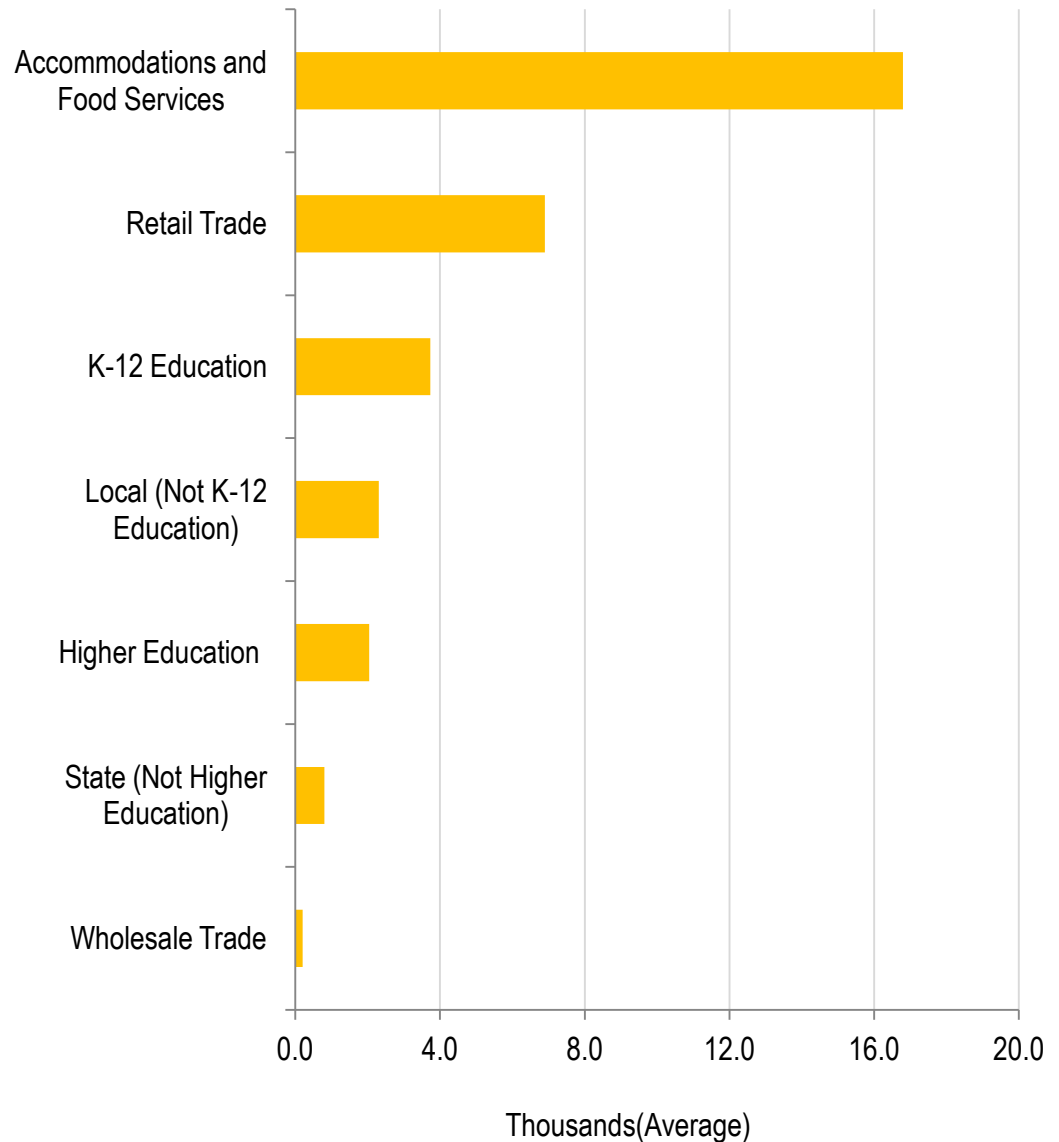
- Average employment for the first 10 months of 2016 shows this category of sectors added 33,400 jobs compared to the same period last year.

- The Leisure and Hospitality Sector (AFS + AER) has had a strong year. Most likely the number of jobs added in the AFS sector is overstated and will be lowered in the March 2017 benchmark revisions.

- Retail trade has also posted strong job gains as a result of population and job growth and another strong tourism season.

- In 2014, this category accounted for 29.8% of total job gains and 39.0% of total employees.

Job Change



Source: Bureau of Labor Statistics, cber.co.

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:

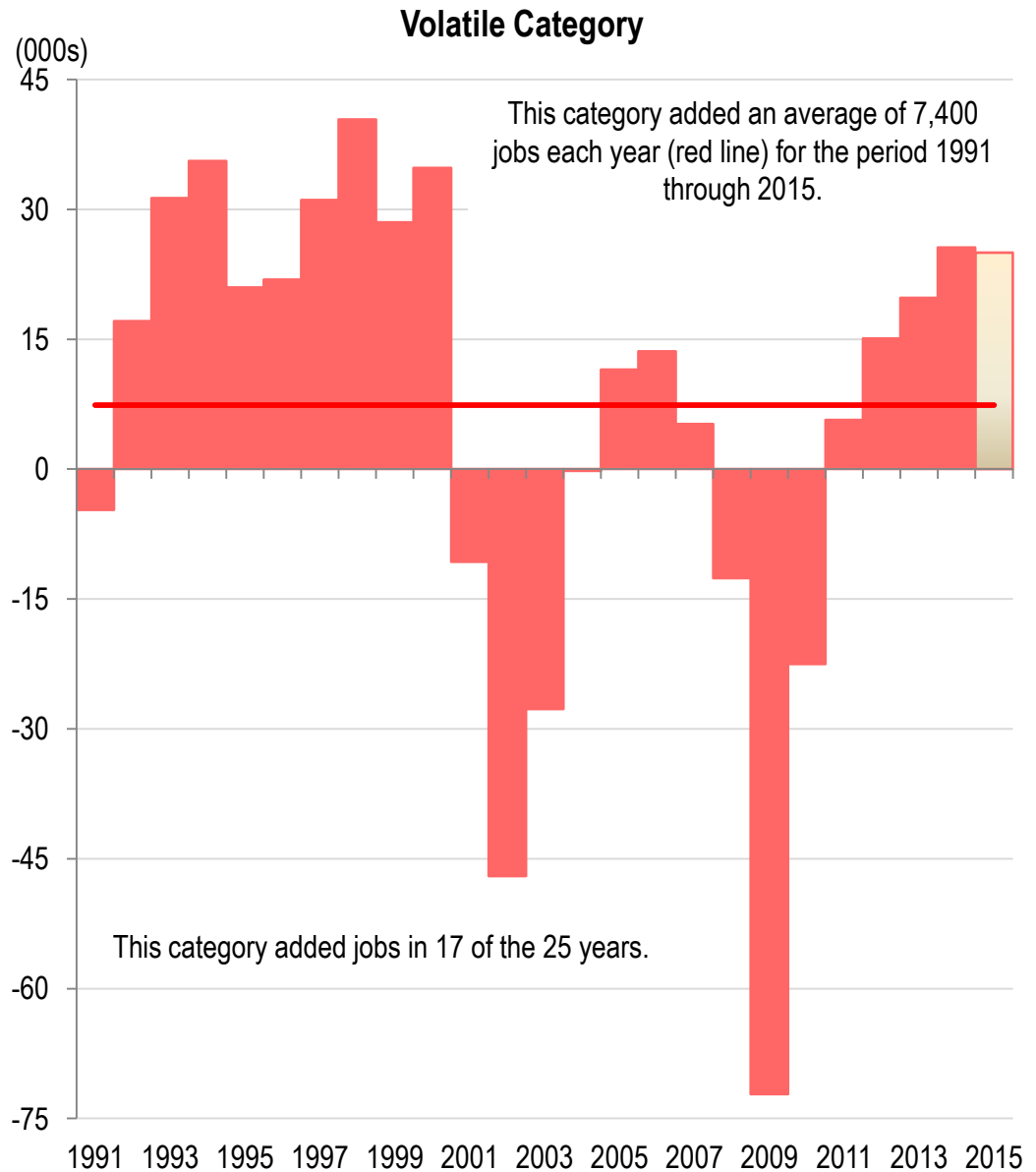
- Natural Resources and Mining
- Construction
- Manufacturing
- Transportation, Warehousing, and Utilities
- Employment Services
- Financial Activities
- Information
- Federal Government

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



● Volatile Sectors



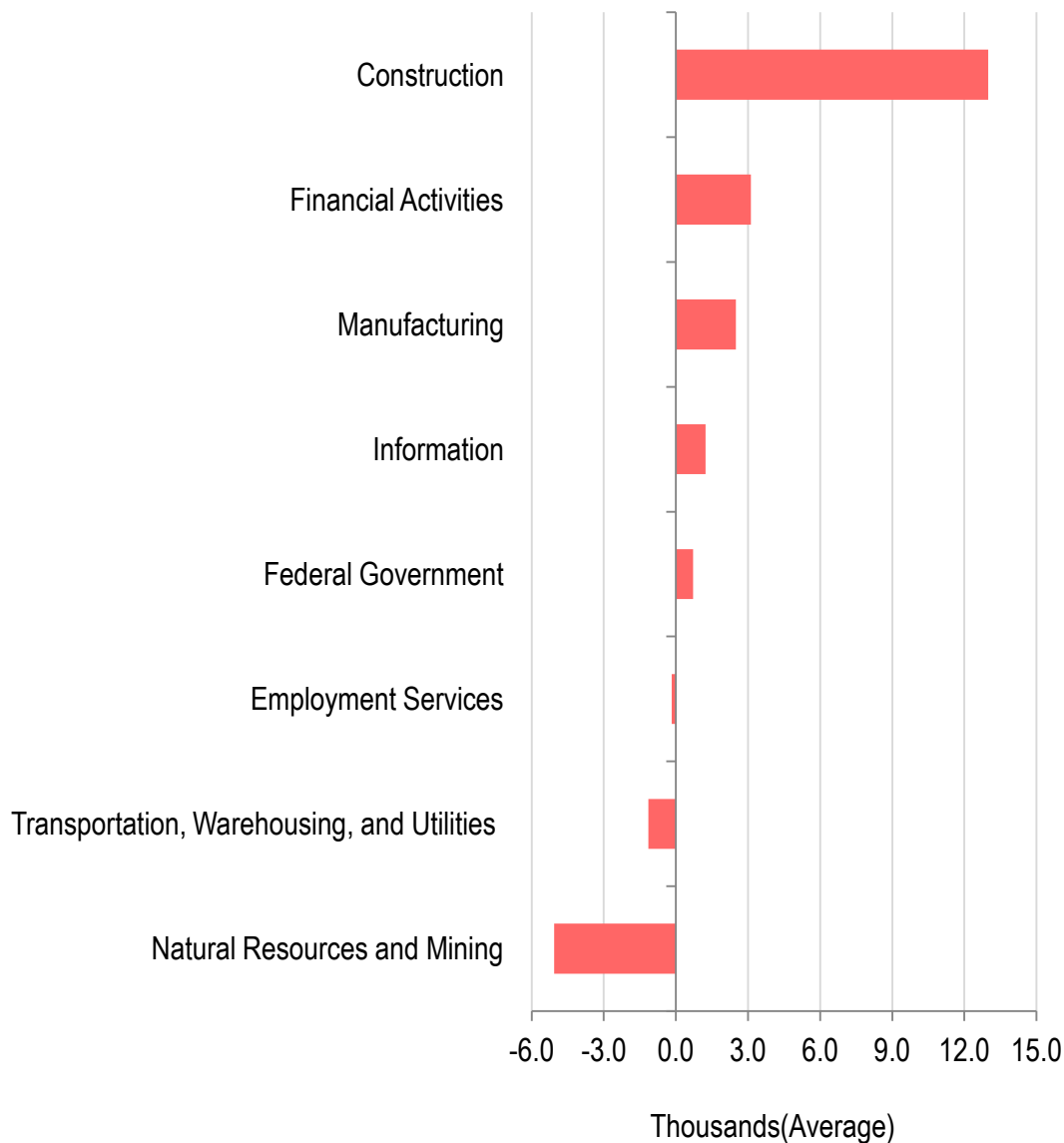
- Average employment for the first 10 months of 2016 shows this category of sectors added 14,200 jobs in 2016 compared to the same period last year.

- For this period, the Construction, Financial Activities, and Manufacturing Sectors led job growth, although the Manufacturing Sector has become a source of concern.

- It is likely the job data for the Employment Services and TWU sectors are understated. The job losses in the extractive industries are continuing, but at a declining rate.

- In 2014, this category accounted for 38.3% of total job gains and 29.0% of total employees.

Job Change



Source: Bureau of Labor Statistics, cber.co.

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Summary of Performance to cber.co 2016

Employment Forecast

This chart shows the year-to-date accuracy of the 2016 cber.co forecast

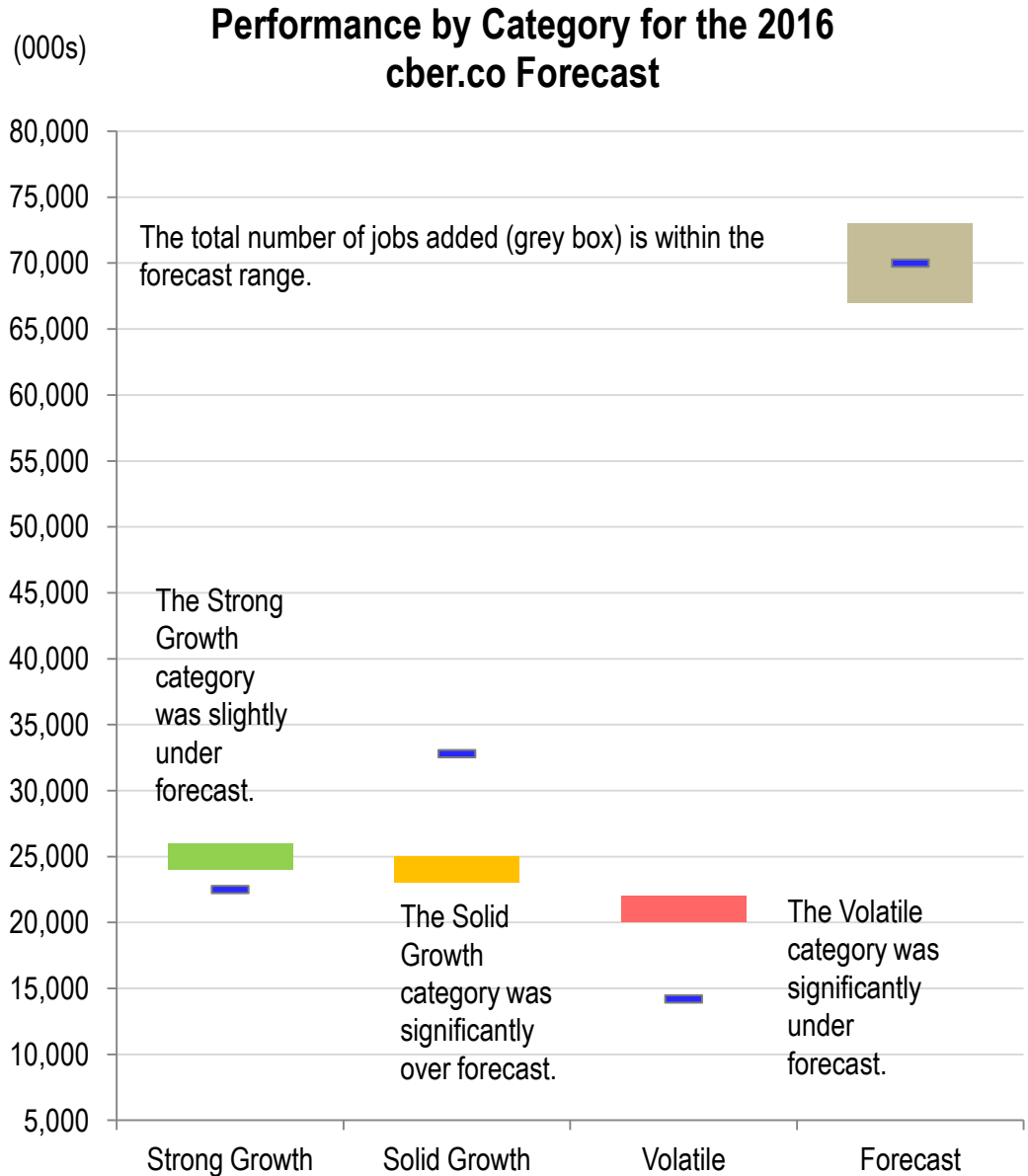
On this chart, the forecast ranges for the categories are:

- Strong Growth – green box.
- Solid Growth – yellow box.
- Volatile – red box.
- Total Employment – grey box.

The short blue lines indicate the level of change in the average employment for the first 10 months of 2016.

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

Average employment for the first 10 months of 2016 is 69,400 greater than the same period in 2015.



Source: Bureau of Labor Statistics, cber.co.

Loss of Momentum in Colorado Economy

The 2016 cber.co Colorado economic forecast released in January projected that 67,000 to 73,000 jobs would be added this year, a rate of growth in the range of 2.7% to 2.9%. This represented a decline from 2015, a sentiment shared by all Colorado economists.

As 2016 has progressed, the Colorado Department of Labor and Employment has released data showing that 2015 wasn't as strong as expected and that a slowdown began in the Q4 2015. Annual employment for 2015 will be revised downward by 2,000 to 4,000 people.

CDLE also released estimates showing that job growth for the Q1 2016 was overstated by about 10,000 workers.

Later this month, CDLE will release projected revisions for Q2 2016. They will likely show the loss of momentum has continued into Q2 2016 and may be more dramatic than the Q1 estimate.

The bottom line is that the Colorado economy remains on solid footing despite losing momentum.

The slide on the following page shows historical job growth for 2011 through 2014 for the Colorado Legislative Council, Office of State Planning and Budgeting, and the State Demography Office.

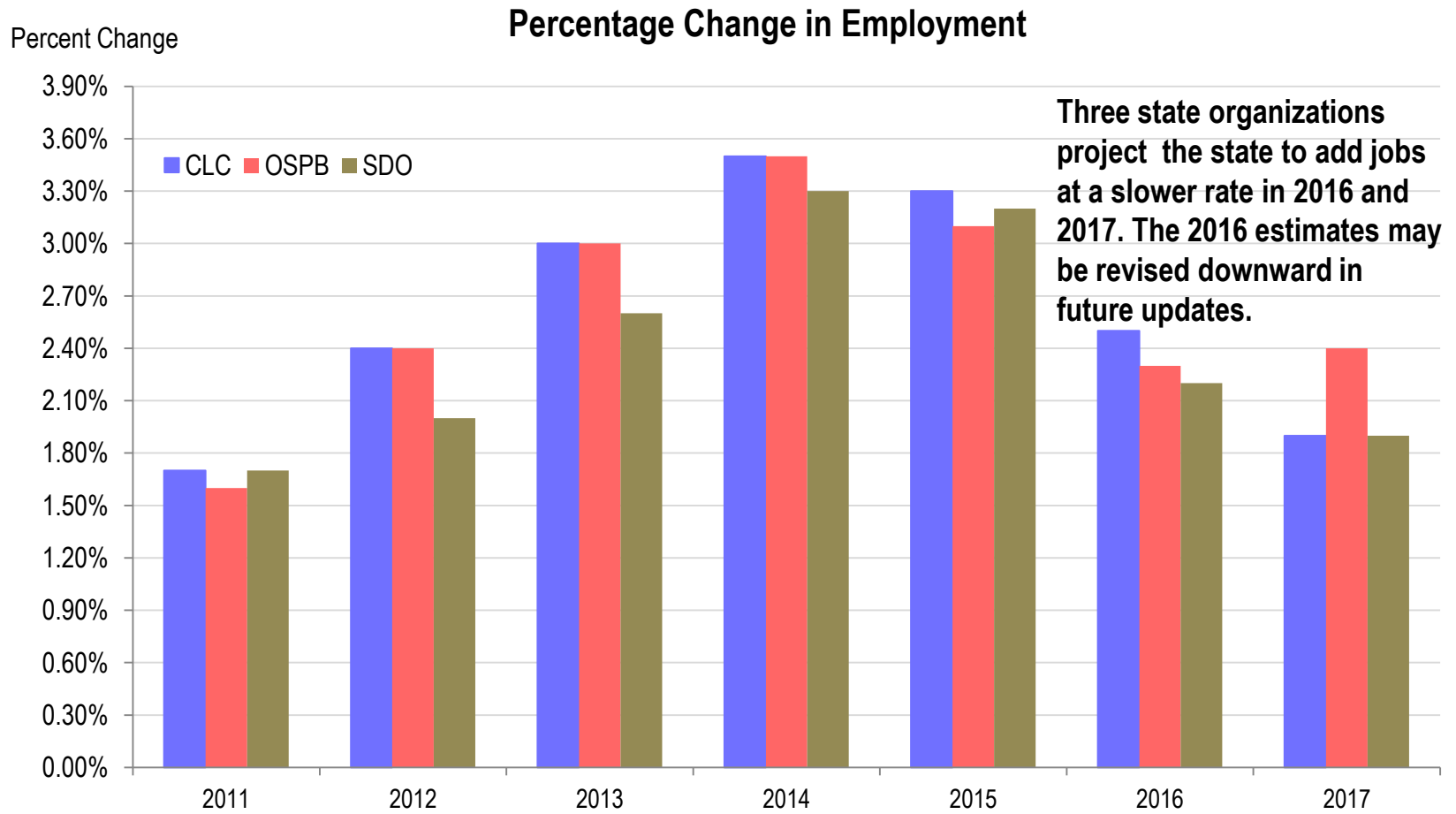
The SDO forecast includes sole proprietors and was presented in November. The CLC and OSPB forecasts were published in September; the next update will be in December.

Each of these forecasts shows a sharp drop off in the percentage of growth for 2016 and 2017.

The updated CDLE projections and the upcoming CLC and OSPB forecasts will provide more insight into how much momentum the state economy has lost in 2016 and how that will carry into 2017.

2015-2017 Estimates/Forecasts

OSPB, CLC, SDO



Source: Colorado Legislative Council (September), Office of State Planning and Budgeting (September), State Demography Office (November), cber.co.

Note: The Demography Office forecasts changes in total employment, including sole proprietors. OSPB and CLC will revise their forecasts in December. 42

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The Colorado Economy

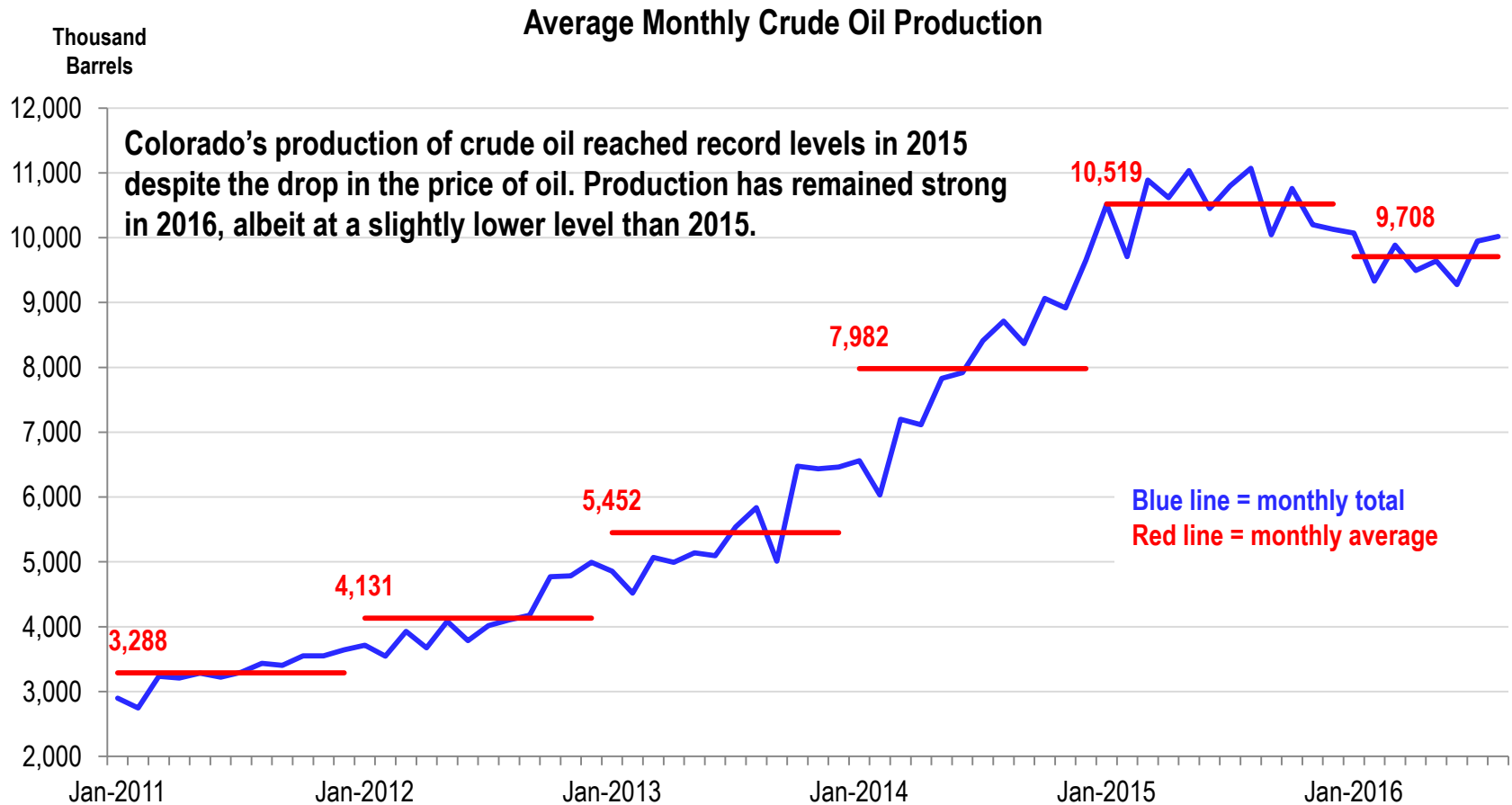
Extractive Industries, Manufacturing, Housing Prices, and Construction

● Extractive Industries, Manufacturing, ● Housing Prices, and Construction ●

The following slides show the changes in key metrics for the extractive industries, manufacturing, housing prices, and construction. These changes will have a major impact on the performance of the Colorado economy in 2016 and beyond.

- Rig count is down, employment is down, but production of oil in Colorado is strong.
- The extractive industries have lost about 10,000 jobs over the past two years. It appears the bleeding may be stopped.
- Colorado manufacturing has been stronger than U.S. manufacturing since the Great Recession; however, both are sluggish.
- Denver home prices continue to appreciate at almost twice the rate of the U.S. That is a mixed blessing.

Average Monthly Colorado Crude Oil Production 2011 to 2016 (Thousand Barrels)



Source: EIA, cber.co.

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Y-O-Y Monthly Employment Change in Colorado Extractive Industries

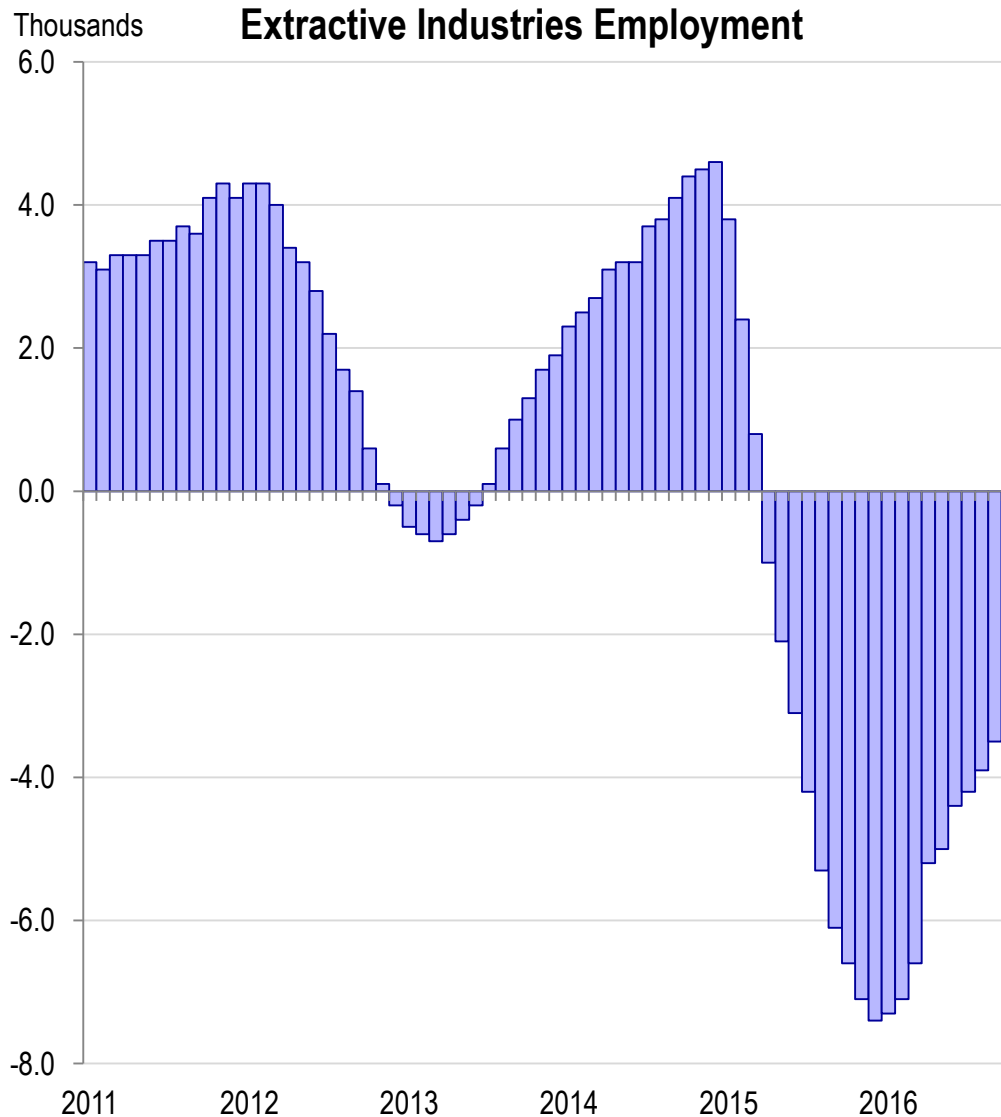
The year-over-year monthly change in employment in the Colorado extractive industries slowed in 2012. Jobs were lost between December 2012 and June 2013. The sector added jobs beginning in the second half of 2013. That growth continued through 2014.

The industry added jobs at a slower rate in Q1 2015, but has lost jobs since then.

The greatest number of jobs lost was in December 2015. Throughout 2016 the number of y-o-y jobs lost has decreased each month.

Monthly employment appears to have bottomed out around 26,000 workers. This is down from a peak of 36,400 workers in December, 2014.

Change in Colorado Employment Extractive Industries Employment



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

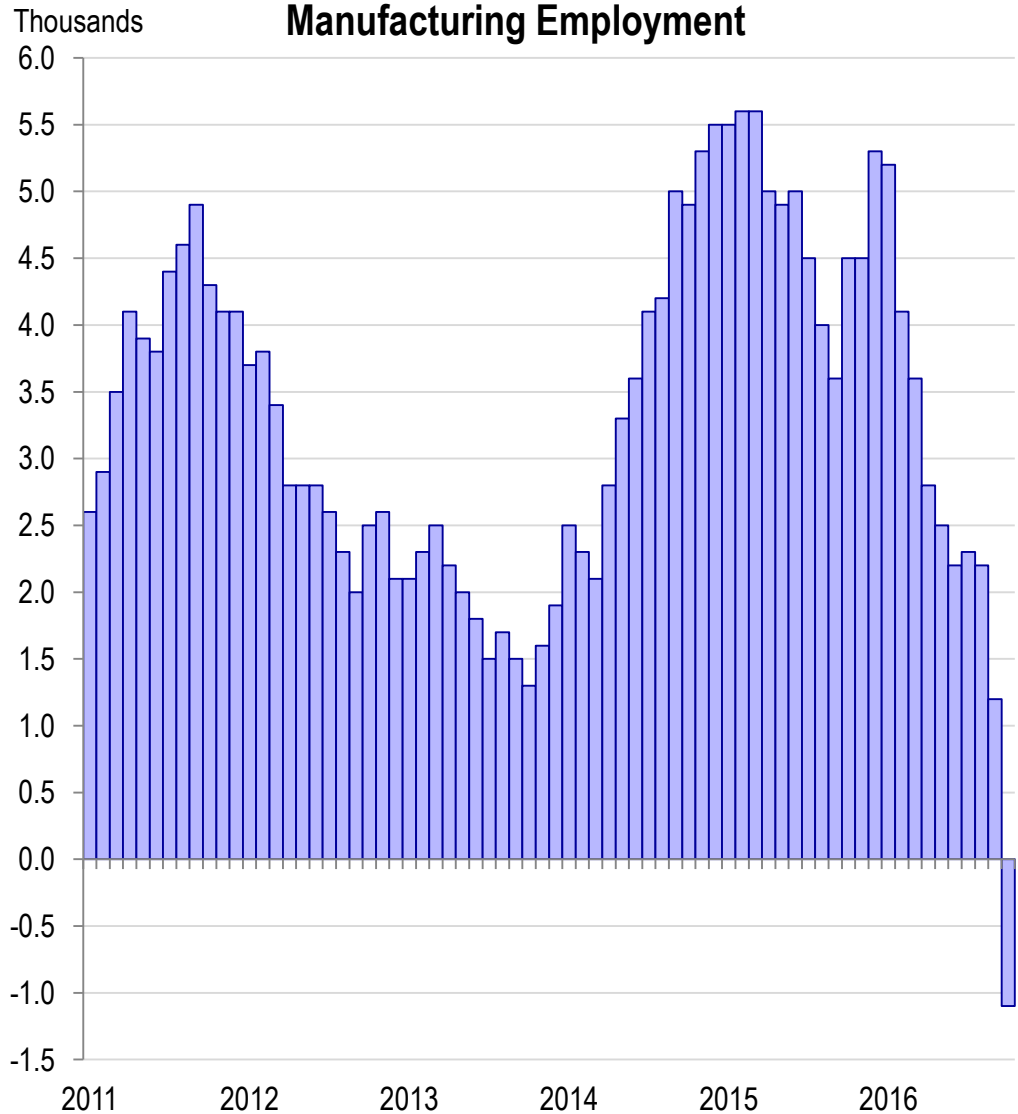
● Y-O-Y Monthly Employment Change in Colorado Employment - Manufacturing

Since Q4 2010 the year-over-year monthly change in Colorado manufacturing employment has been volatile. The monthly y-o-y change in employment has fluctuated between -1,100 and 5,600 jobs.

Since December 2015, manufacturing jobs have been added at a declining rate; however, jobs were lost for the first time in October. There were 1,100 fewer manufacturing jobs in October than the same period in 2015.

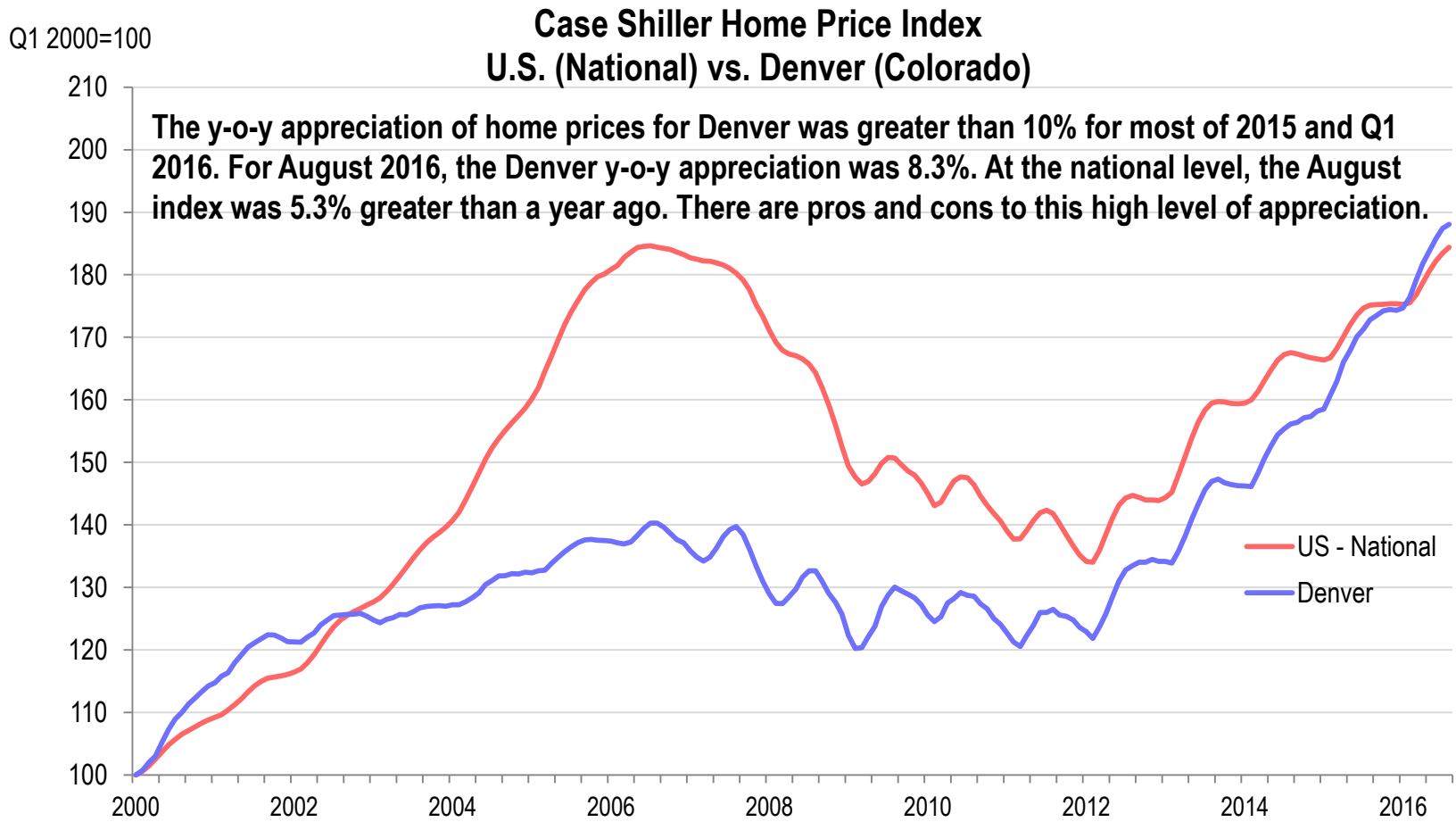
Colorado manufacturing is performing better than U.S. manufacturing.

Change in Colorado Employment Manufacturing Employment



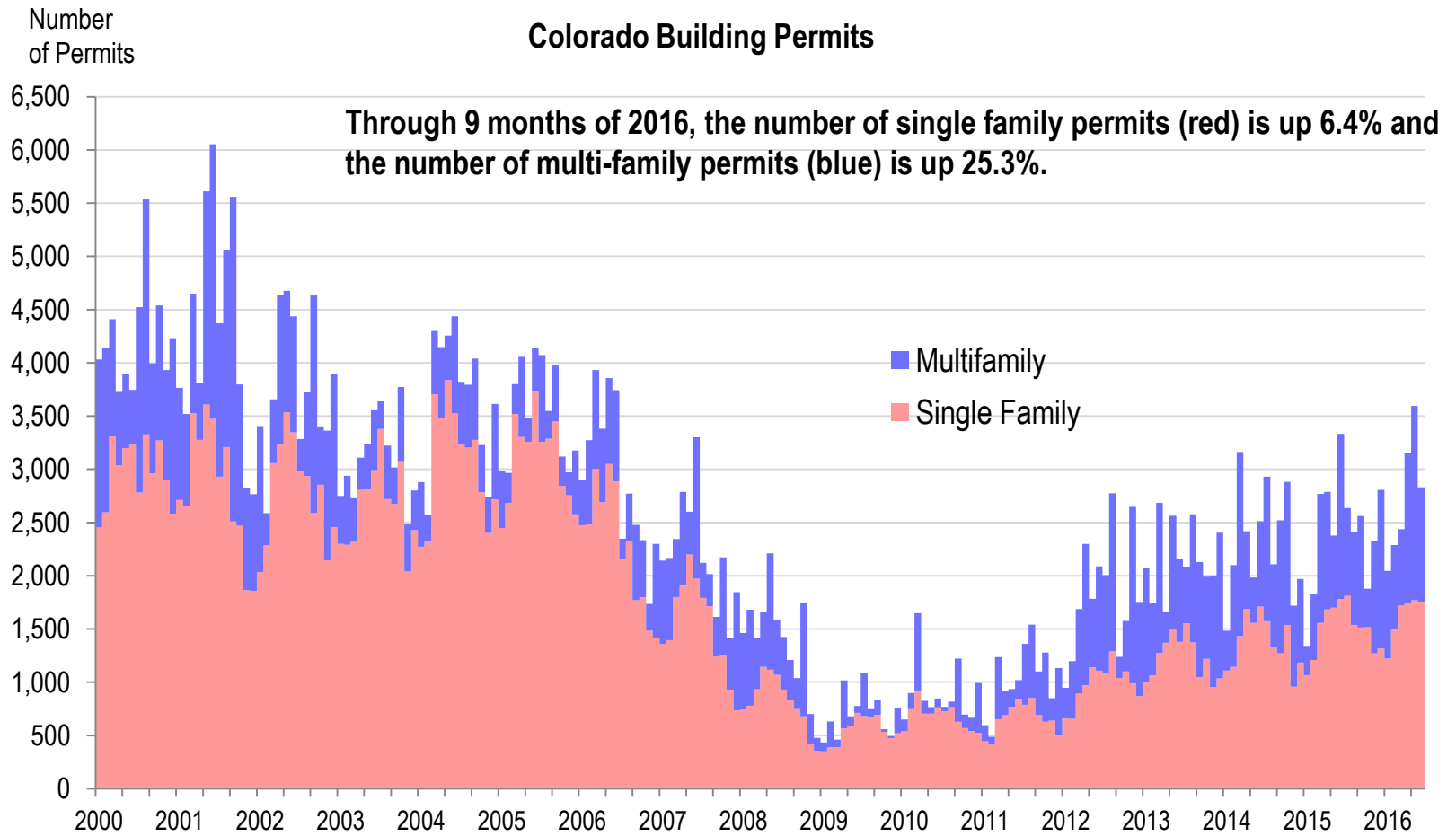
Source: Bureau of Labor Statistics NSA, cber.co.

Case Shiller Home Price Index National vs. Denver (Colorado)



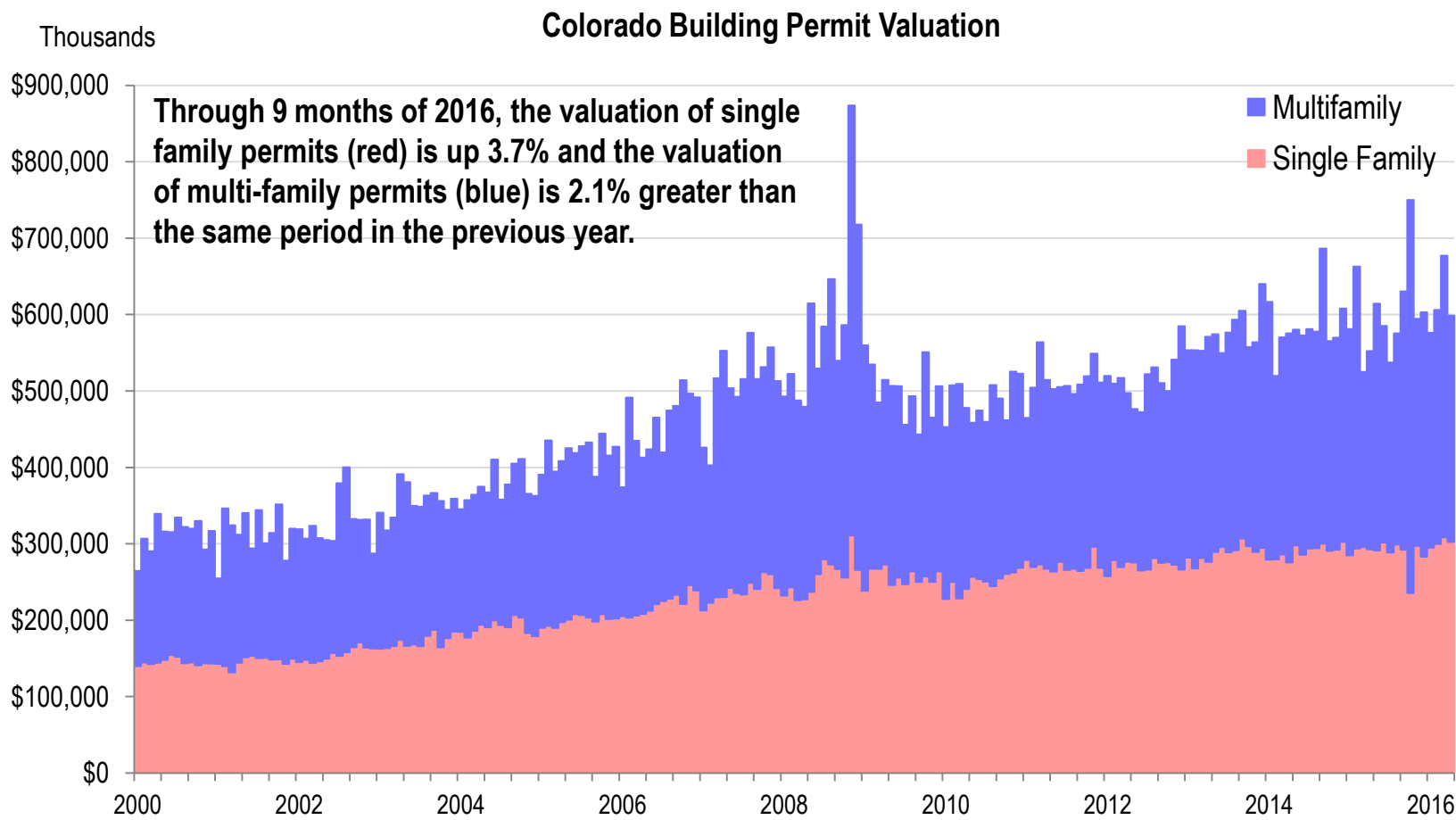
Source: S&P Core-Logic Case-Shiller, cber.co.

Colorado Residential Building Permits - Units



Source: TAMU Real Estate Center, U.S. Census Bureau, cber.co.

Colorado Residential Building Permits - Valuation



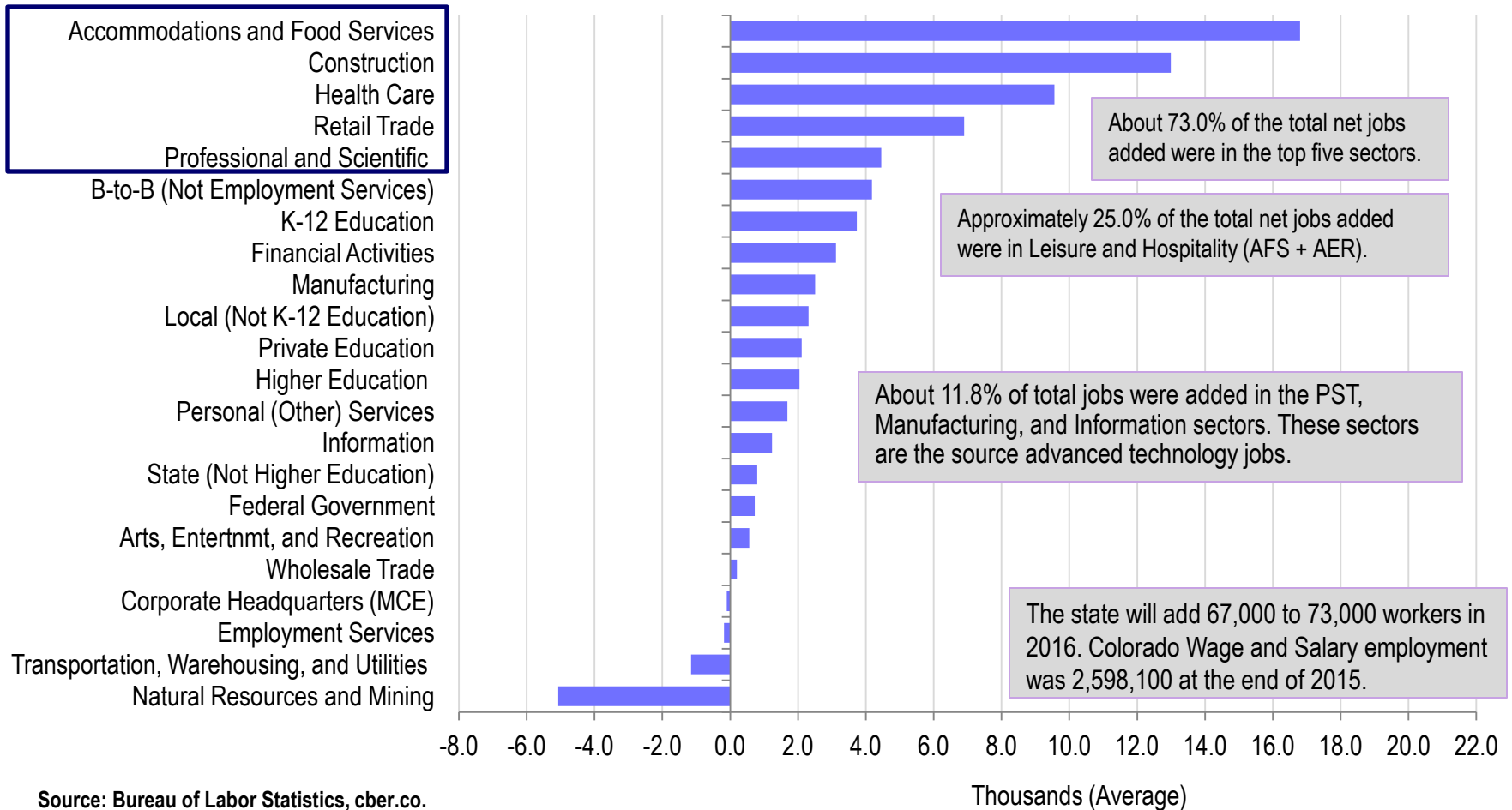
Source: TAMU Real Estate Center, U.S. Census Bureau, cber.co. Note: Not adjusted for inflation.



The Colorado Economy Summary

Job Changes First 10 Months of 2016 vs. Same Period in 2015

Job Change All Sectors



About 73.0% of the total net jobs added were in the top five sectors.

Approximately 25.0% of the total net jobs added were in Leisure and Hospitality (AFS + AER).

About 11.8% of total jobs were added in the PST, Manufacturing, and Information sectors. These sectors are the source advanced technology jobs.

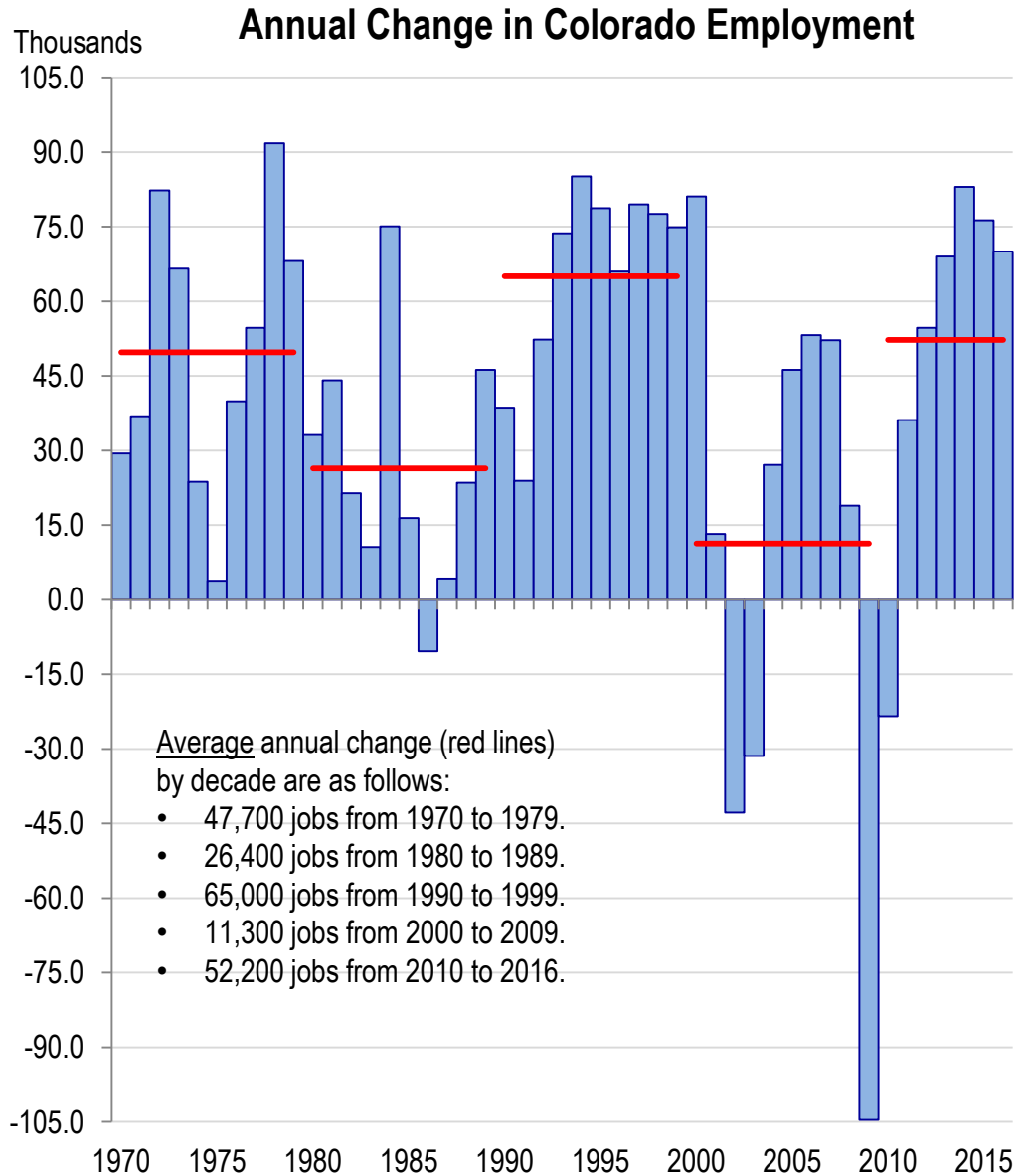
The state will add 67,000 to 73,000 workers in 2016. Colorado Wage and Salary employment was 2,598,100 at the end of 2015.

Annual Employment Change in Colorado Employment

The cber.co 2016 forecast projected the state would add 67,000 to 73,000 jobs in 2016. Colorado employment will increase by 2.7% to 2.9%.

After 10 months, the state is on track to add 69,400 jobs this year, prior to the BLS benchmark revisions.

The Colorado Department of Labor and Employment has indicated that the Q1 2016 jobs data may be overstated by as much as 10,000. The second preliminary estimate of the projected shortfall will be released at the end of November.



Source: Bureau of Labor Statistics, cber.co.

Summary of the Colorado Economy

The most recent BLS data suggests that about 70,000 wage and salary jobs will be added in Colorado this year. That level of employment may be revised downward by as much as 10,000 workers in the BLS March, 2017 benchmark revisions. At the same time, anecdotal evidence suggests there is enough demand in the economy for the state to add 75,000 to 80,000 jobs this year. This has not happened for the reasons listed below.

1. Unemployment rates are too low. There is not a sufficient supply of qualified drug-free workers to fill the demand for job openings. It is taking companies longer to fill jobs, they may choose to pay overtime rather than hire additional workers, they may opt to not fill vacant positions, or they may choose to automate their operations.

2. Baby boomers, who are in higher wage brackets, are retiring and being replaced by less-skilled workers, who are in lower wage groups. As a result total wages are temporarily lower. In addition, boomers are receiving retirement distributions which are less than their wages.

3. A similar situation has occurred because high paying jobs in the extractive industries have been cut. At the same time, lower paying jobs in other sectors have been added.

4. Baby boomers have more resources and different buying patterns than millennials. Boomers tend to purchase more services, while millennials tend to purchase more goods.

5. Baby boomers tend to live in suburbs in single family home. Millennials tend to live in metro areas in multi-family units. Over the next five years their housing arrangements are likely to change.

6. Inflation in Colorado will increase by 3.0+% in 2016, because of increased housing and healthcare costs. As a result consumers will have lower disposable incomes and will purchase fewer goods and services.

7. A case can be made that productivity and output have declined because companies incurred expenses to meet demands of special interest groups and comply with legislation that was focused on social issues.

8. Businesses may be hesitant to hire additional workers because of new FLSA regulations and increased minimum wages. Compliance will force companies to raise their prices, which will cause inflation to increase.

Summary of the Colorado Economy

Despite the challenges listed on the previous page, there are still many bright spots in the Colorado economy!

Happy Thanksgiving, there is a lot to be thankful for!



cber.co Colorado Economic Review Through October of 2016

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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 grant programs.