

Economic Review of 2019 and Outlook for 2020

United States and Colorado



cber.co
Colorado-based Business and Economic Research
Prepared
January 15, 2020

Economic Review of 2019 and Outlook for 2020

United States and Colorado

The theme of the 2020 forecast is “slower and more modest growth”. Both the U.S. and Colorado economies entered 2020 with momentum that will carry them into Q2 2020. Most of the economic indicators are positive, some industries are doing well, and others are struggling. PST and health care remain strong, but manufacturing and agriculture are struggling. The construction industry will benefit from strong builder sentiment and low interest rates. Compared to previous years, the overall economic growth is modest, but the expansion will be alive for another year.

United States Contents

- Key Forecasts for U.S. and Colorado
- Gross Domestic Product
- Leading Indicators
- Employment
- Wages and Income
- Debt
- Equities
- Industrial Performance
- Retail and Auto Sales
- Manufacturing and Professional Technical Services
- Housing and Construction
- Energy
- Agriculture
- Summary

Colorado Contents

- Gross Domestic Product
- Population
- Unemployment
- Employment
- Sectors to Watch in 2020
- Occupations
- The Colorado Divide
- Agriculture
- Other Activities
- Housing and Construction
- Oil Production
- State Government
- Summary

Key Data Forecasts for United States and Colorado

United States

- Global GDP 3.0%
- U.S. GDP 2.0%
- Consumer spending 2.0%
- Employment 1.5 million jobs or 125,000 jobs per month
- Annual unemployment rate 3.6%
- Consumer price index 2.1%, core index 2.0%
- Real disposable personal Income 4.1%
- Advanced retail sales, excluding food service sales, 3.3%
- Automobile and light truck sales, 16,8 million units
- Crude oil production up from 12.24 million barrels/day to 13.3 b/d
- Average price for WTI crude per barrel, \$59.25.

Colorado

- Population 72,400 people
- Real GDP growth of 3.0%
- Consumer price index 2.2%
- Private hourly earnings 3.5%
- Annual unemployment rate 3.3%
- Employment 50,000 workers, or 4,167 jobs per month, 1.8% growth
- Leading job growth: PST, health care, construction, T&W, manufacturing
- Total building permits, similar to 2019, permits may not match the needs of residents
- Housing price appreciation will remain low
- Agriculture production -animal production will perform well and crops will struggle
- State government is facing financial and service challenges
- Crude oil production 15.5 to 16 million barrels.

The United States Economy



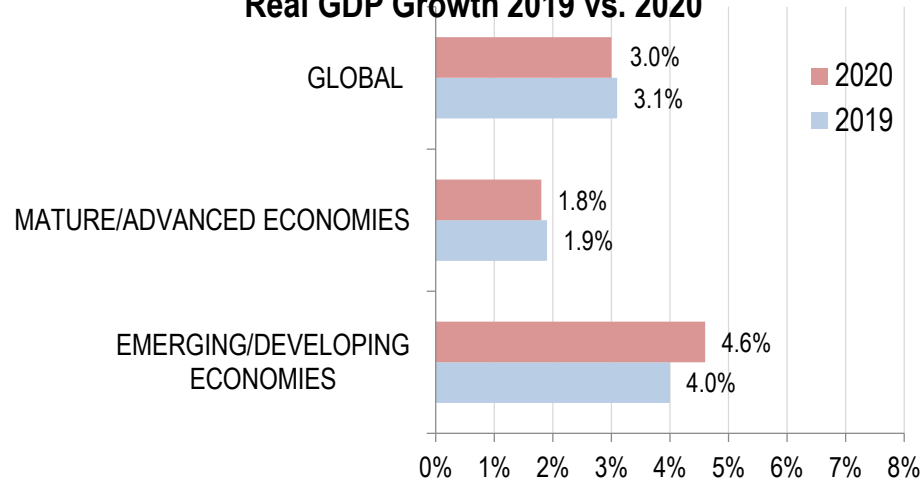
Gross Domestic Product

Global and United States GDP

Global (3.0%) and U.S.(2.0%) real GDP growth will slow in 2020. Consumers will continue to drive growth in the U.S.

Global Real GDP

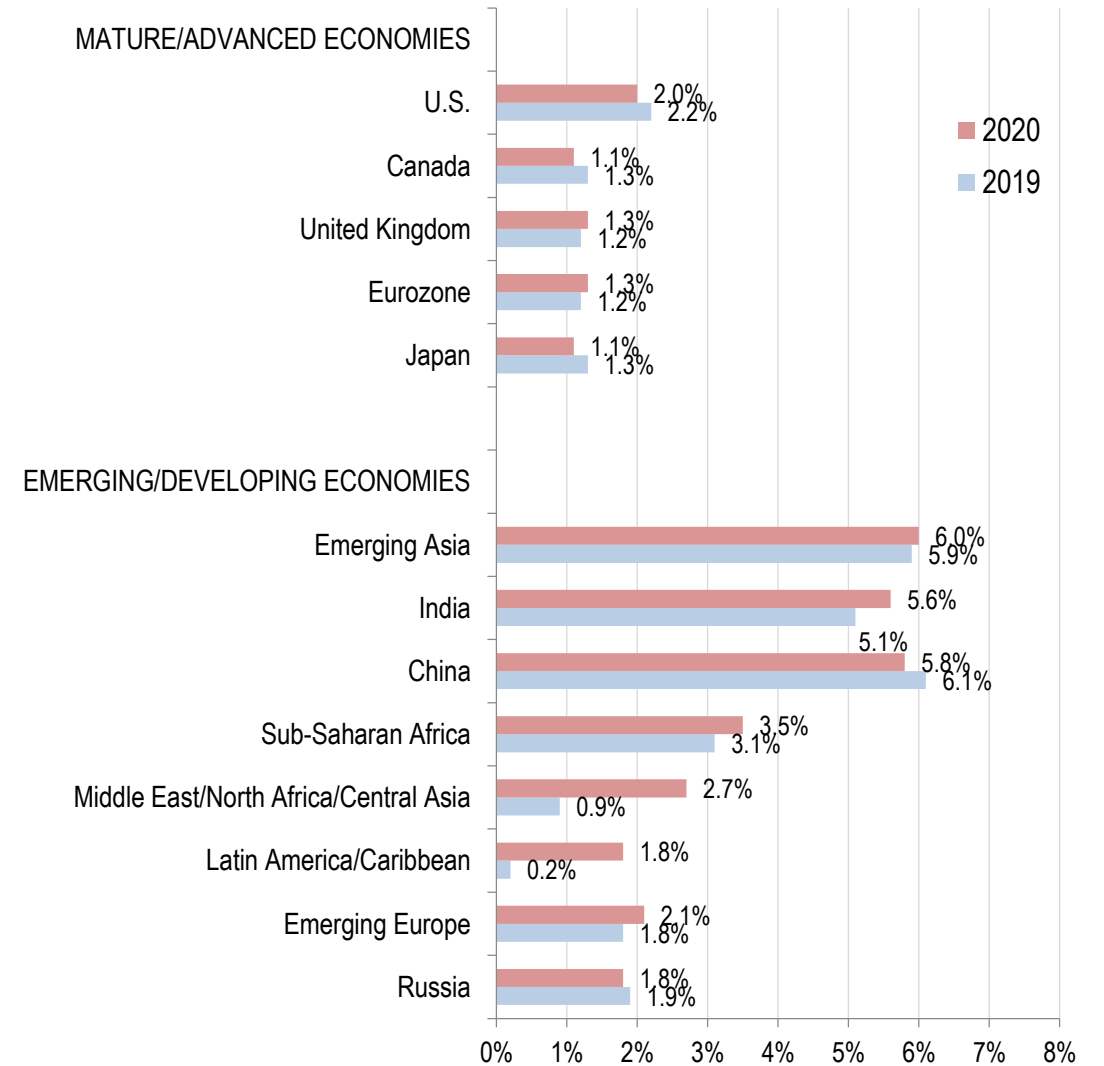
Real GDP Growth 2019 vs. 2020



Over the past year the global economy has slowed. The decline in real GDP growth will continue in advanced economies, but some developing economics will see improvement in 2020.

Real GDP Growth 2019 vs. 2020

Geographic Region

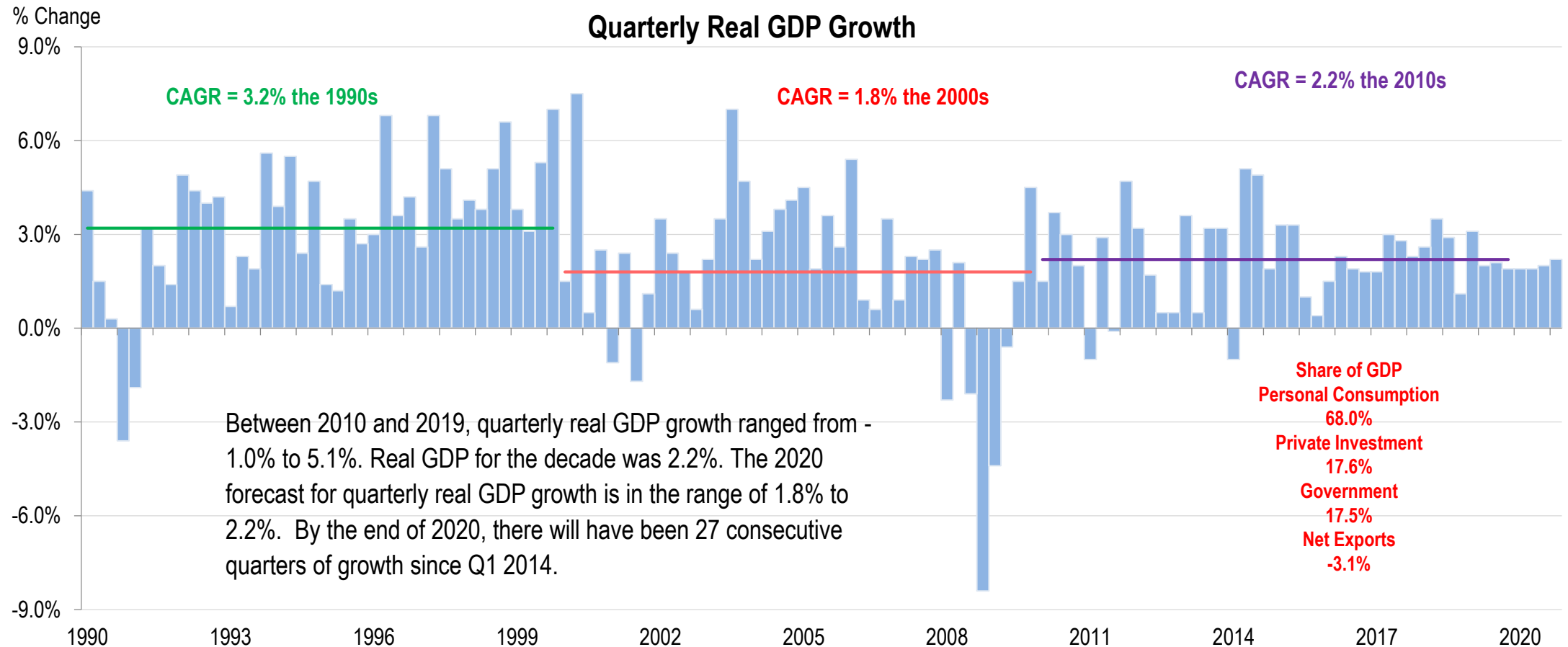


Source: IMF (October 2019), The Conference Board (November 2019), cber.co.

Colorado-based Business and Economic Research <https://cber.co>

Quarterly Real GDP Growth

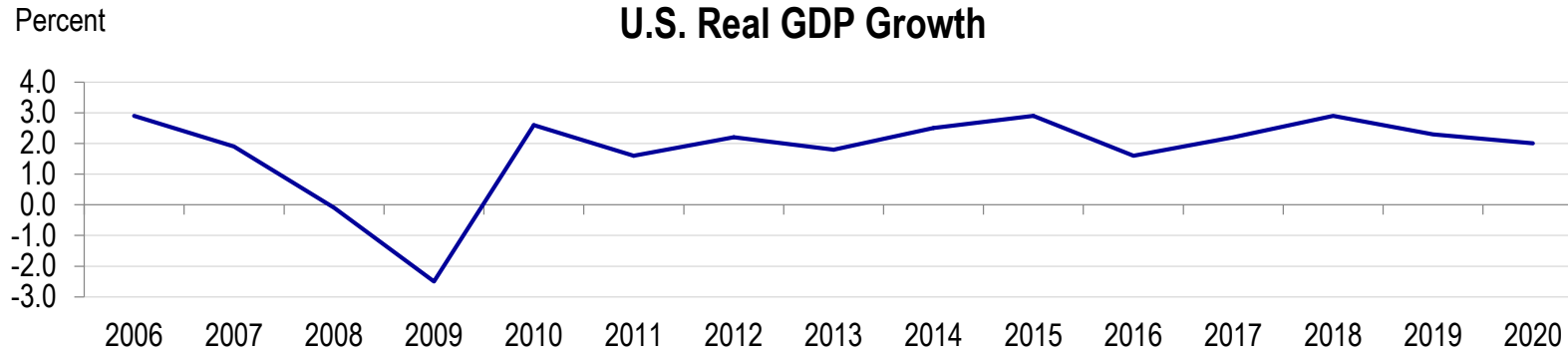
United States



Source: Bureau of Economic Analysis, Table 1.1.1, Share of GDP based on 2018, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

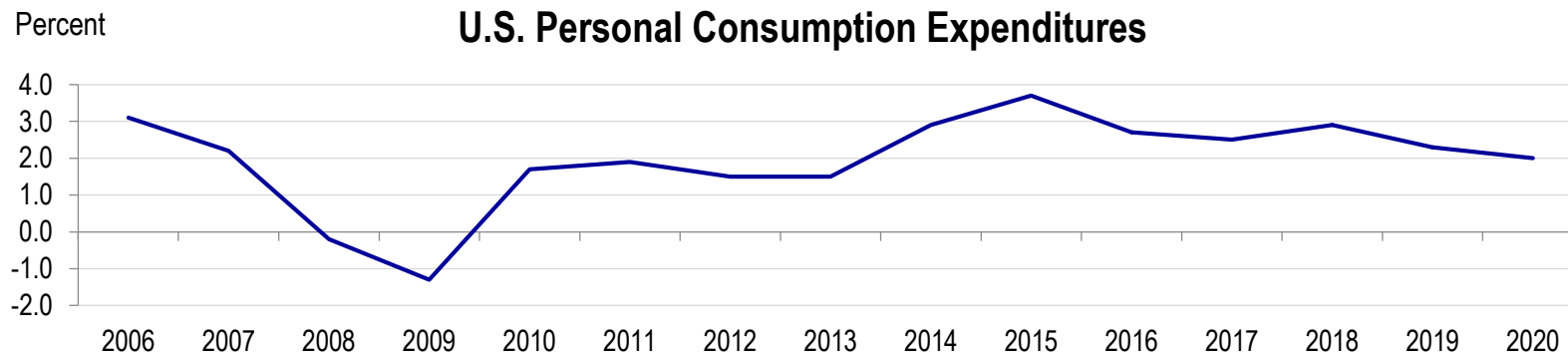
Gross Domestic Product and Personal Consumption Expenditures



U.S. Real GDP Growth

Gross Domestic Product is defined as C+I+G+X or consumption + business investment + government spending + net exports.

Real GDP growth for 2019 will be in the range of 1.8% to 2.2%.

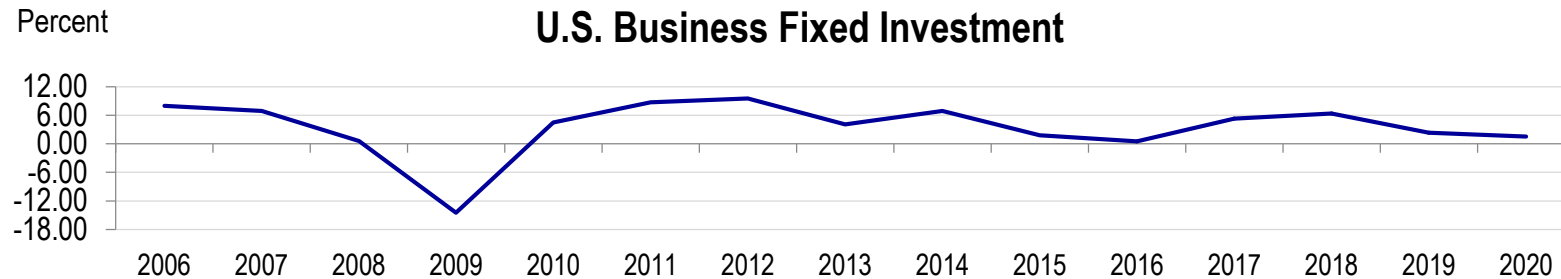


U.S. Personal Consumption Expenditures

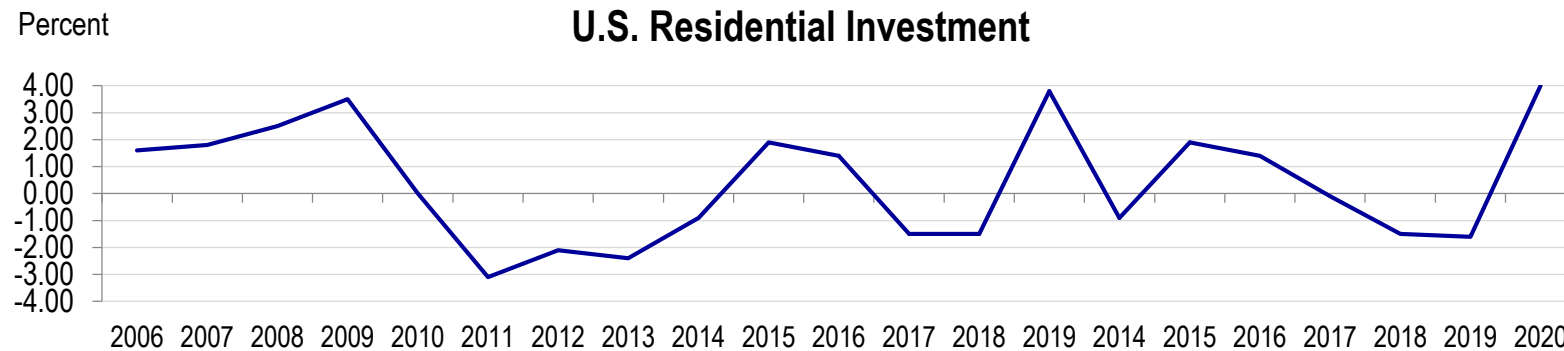
Personal consumption accounts for 68% of GDP. It will continue to be a driver of growth at a slower rate in 2020, approximately 2.0%. Spending will be driven by solid job and wage growth.

Source: Bureau of Economic Analysis, cber.co.

Business Fixed Investment and Residential Construction



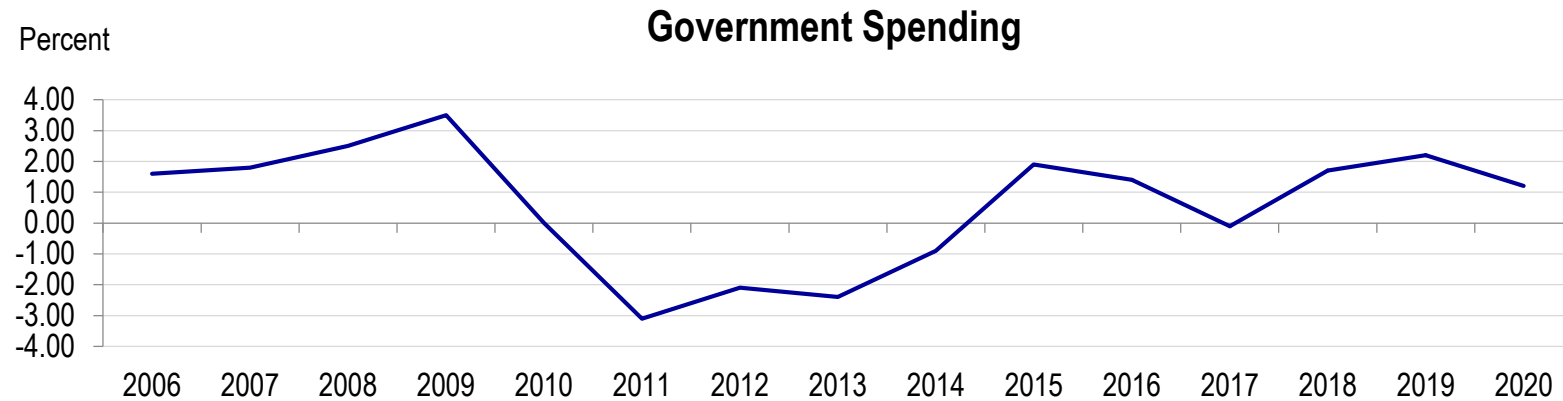
U.S. Business Fixed Investment
Business investment will continue to be subdued as companies continue to be hesitant about investing.



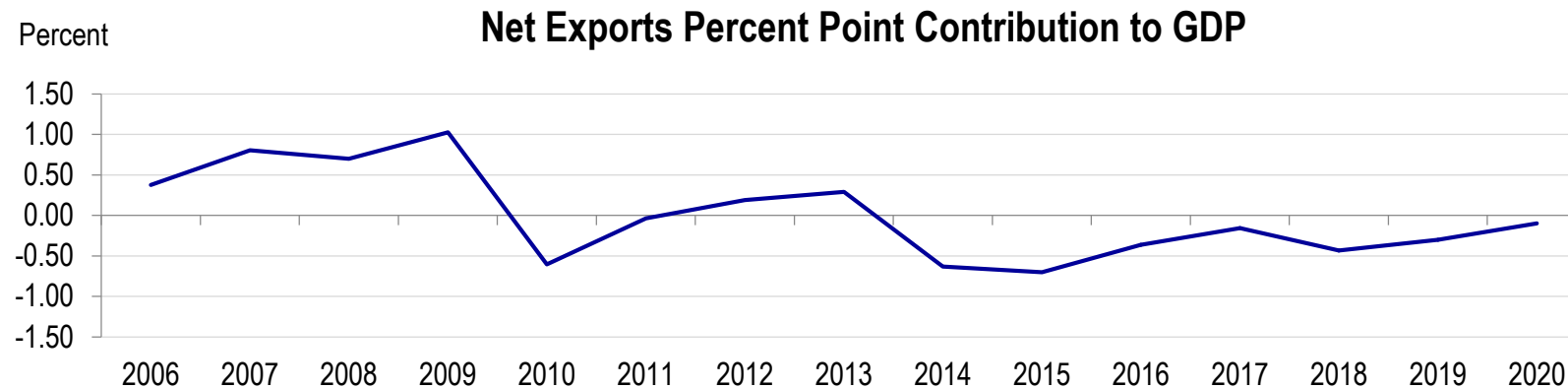
U.S. Residential Investment
On the other hand, indicators from the housing industry are more optimistic. There are signs that millennials may be a source of growth in the housing market, plus interest rates are low, and overall housing appreciation has subsided.

Source: Bureau of Economic Analysis, cber.co.

Government Spending and Net Exports



Government Spending
Government spending is expected to decline in 2020.



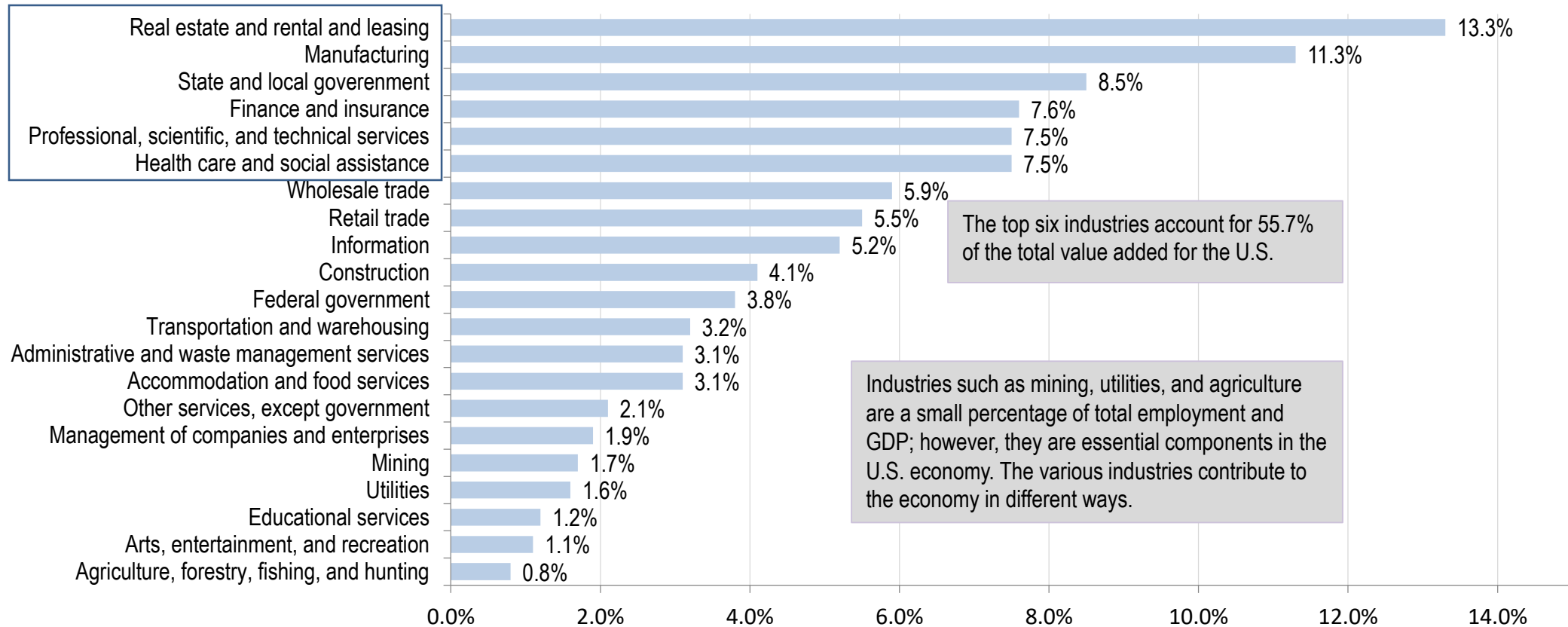
Net Exports Percent Point Contribution to GDP
On the other hand, net exports are projected to be less of a drag on GDP growth.

Source: Bureau of Economic Analysis, cber.co.

U.S. 2018 Value Added by Industry

As Percentage of Total GDP

Value Added by Industry as a Percentage of Total GDP



Source: Bureau of Economic Analysis. Note: Total does not equal 100% because of rounding.

Colorado-based Business and Economic Research <https://cber.co>

The U.S. Economy – Leading Indicators

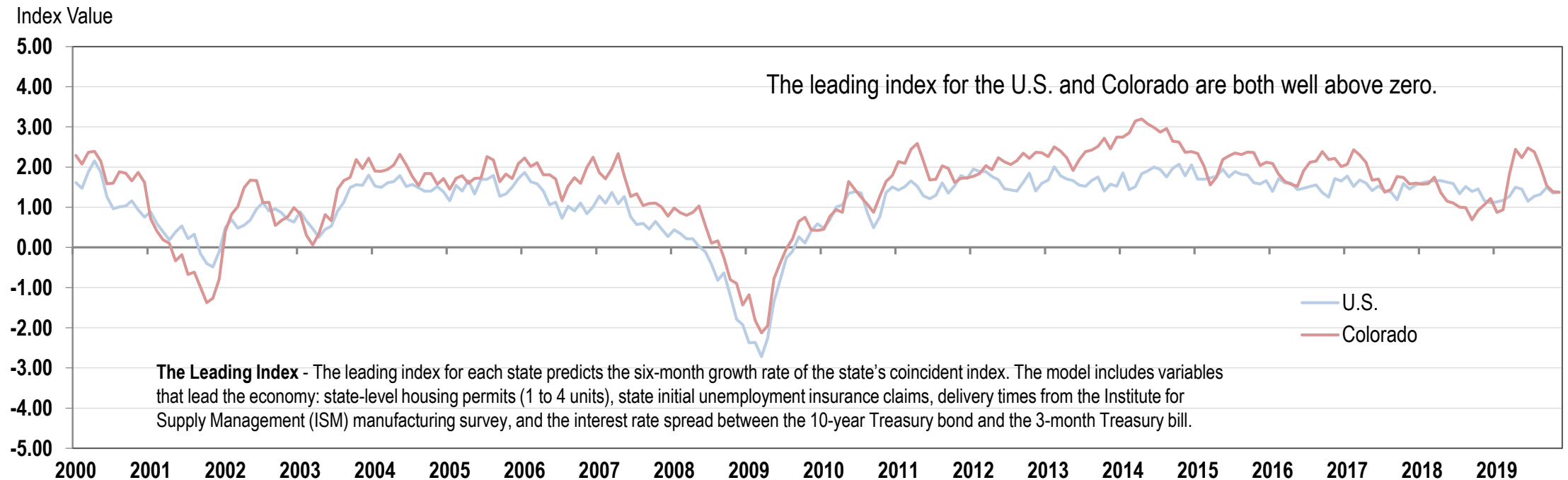
The Federal Reserve Leading Indicators, CAB Index, the University of Michigan Consumer Sentiment Survey, and the NFIB survey.

Most leading indicators point to continued growth.

Philadelphia Fed Leading Index

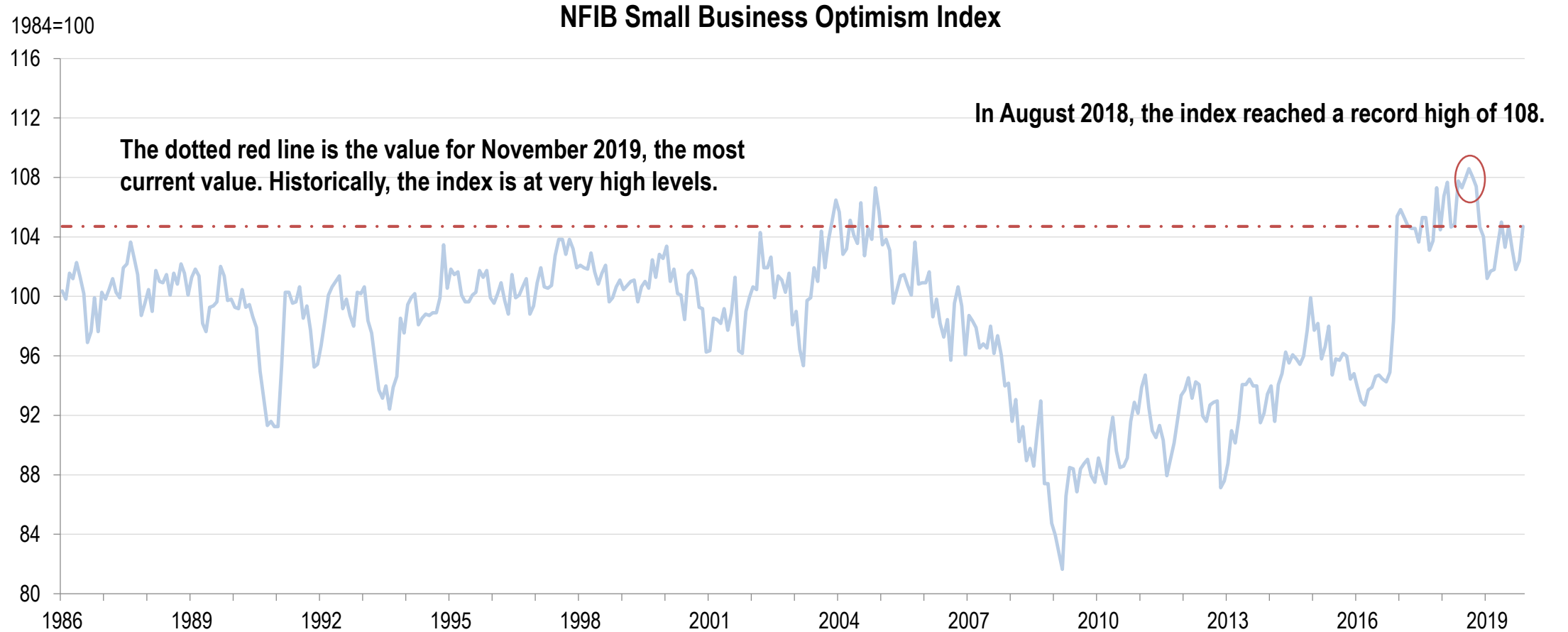
U.S. vs. Colorado

Philadelphia Federal Reserve Leading Index – U.S. vs. Colorado



Source: Philadelphia Federal Reserve, cber.co. Note: The leading index predicts the six-month growth rate of the U.S. and state's coincident index.

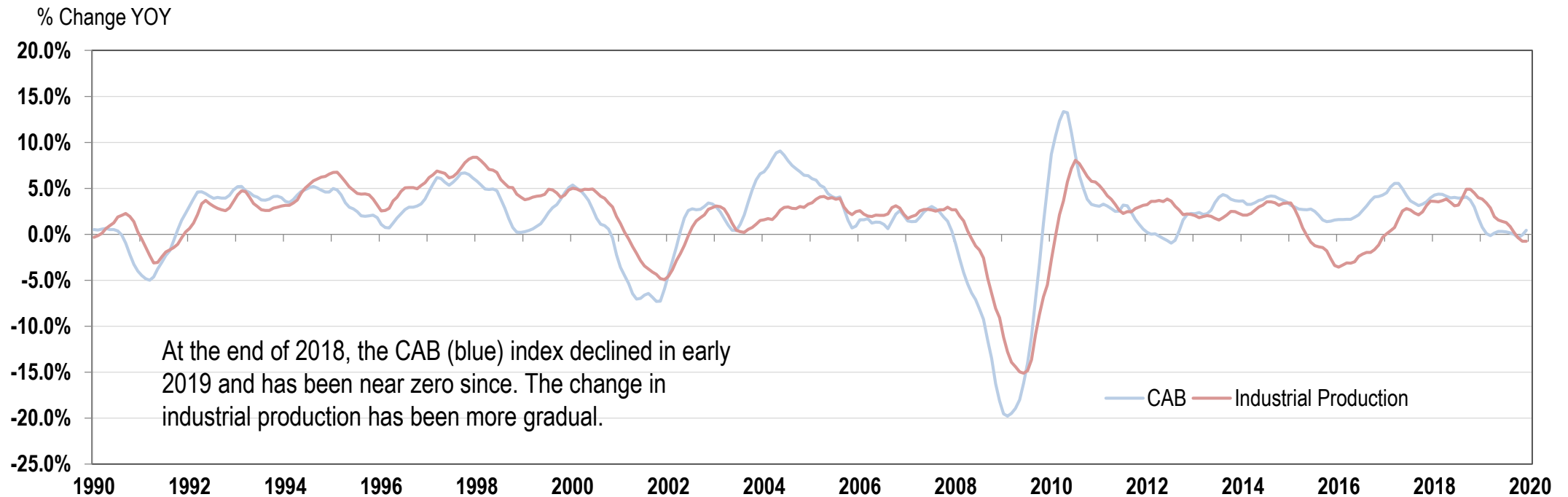
NFIB Small Business Optimism Index



Source: NFIB, cber.co. Index 1984=100

Change in Chemical Activity Barometer vs. Industrial Production

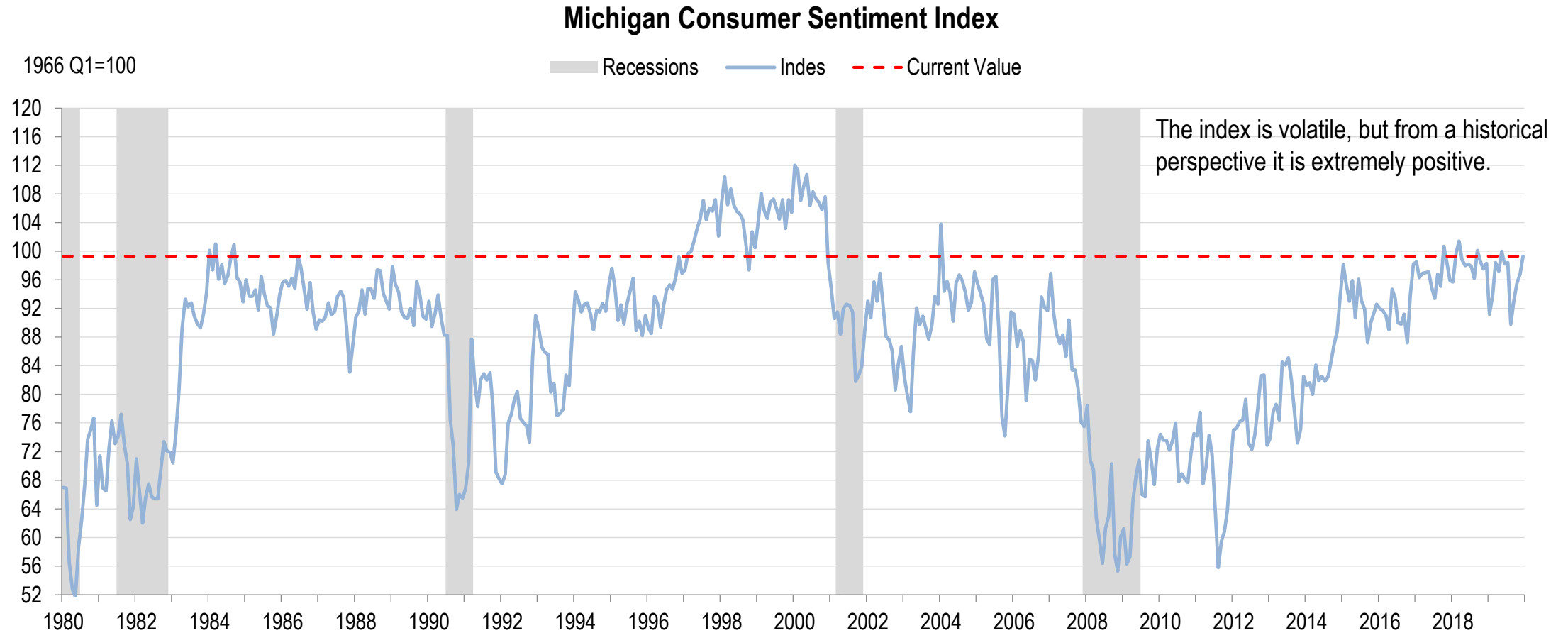
3 MMA YOY Percentage Change in CAB vs Industrial Production



Source: American Chemistry Council, cber.co.

Consumer Sentiment Index

University of Michigan



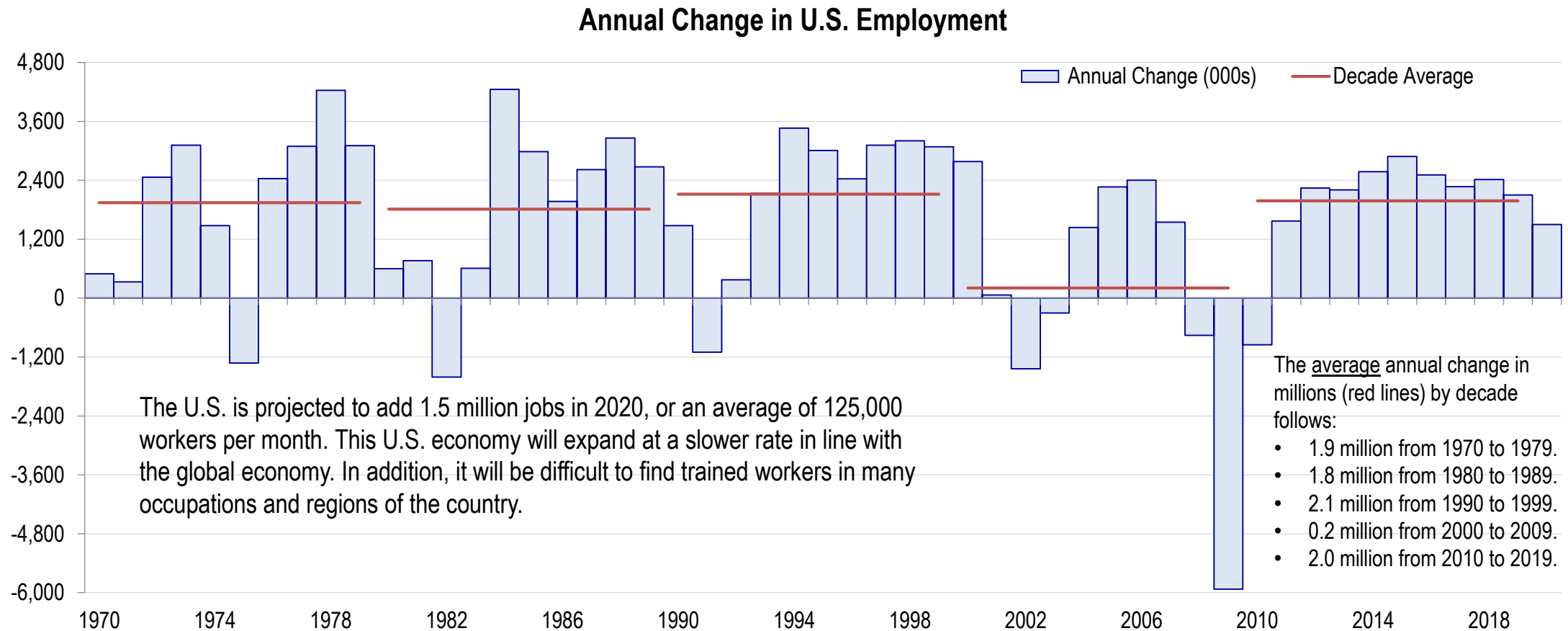
Source: University of Michigan, cber.co.

The U.S. Economy - Employment

Employment, Multiple Jobholders, Job Openings vs. Number of Unemployed, Unemployment Claims, and Labor Force Participation Rate

The U.S. economy will continue to experience a low unemployment rate and solid employment gains. The job market will continue to benefit from a slightly stronger labor force participation rate.

Annual Change in U.S. Employment



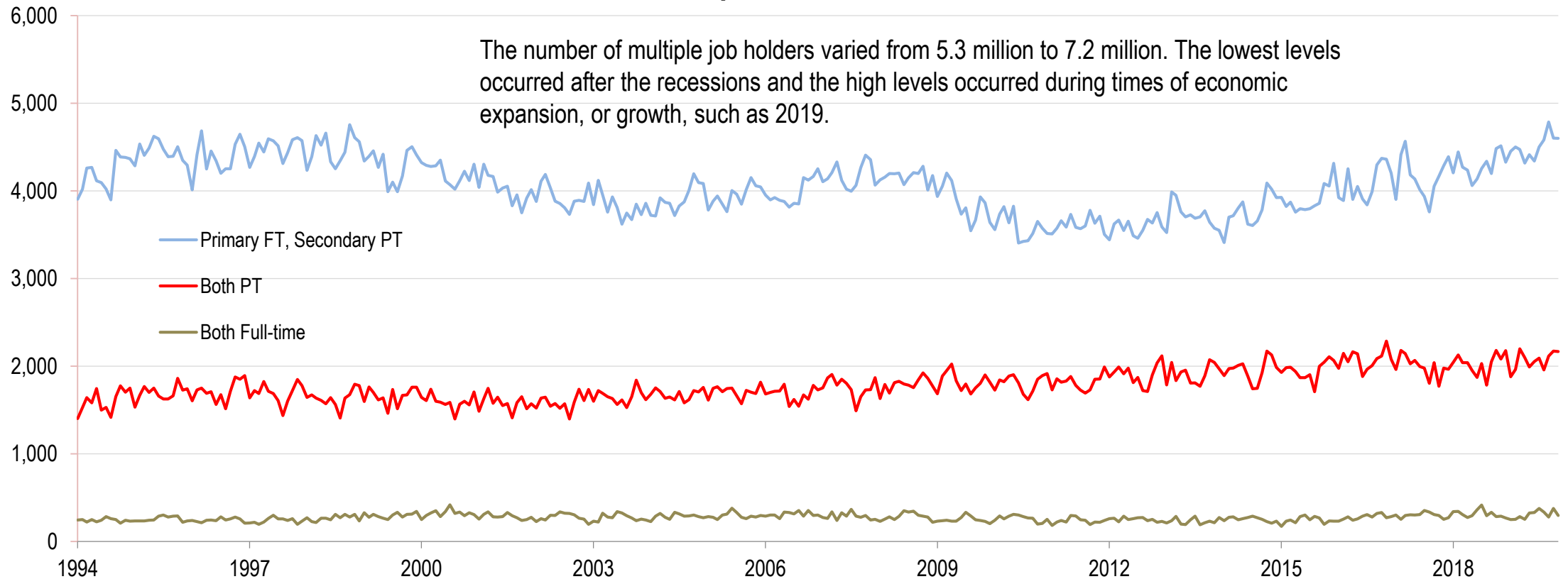
Source: Bureau of Labor Statistics, NSA; cber.co.

Colorado-based Business and Economic Research <https://cber.co>

Multiple Jobholders

Primary Job Full Time, Secondary Job Part Time

Multiple Jobholders



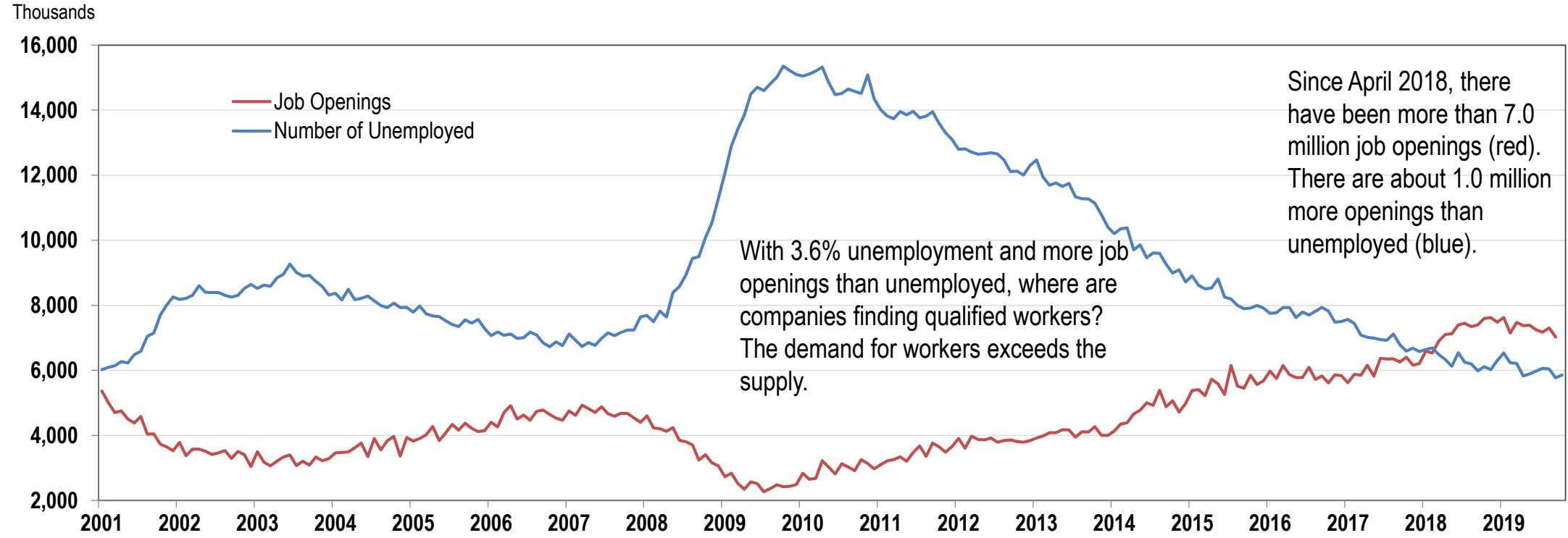
Source: Bureau of Labor Statistics, NSA; cber.co.

Colorado-based Business and Economic Research <https://cber.co>

Job Openings vs. Number of Unemployed

United States

Job Openings vs. Number of Unemployed



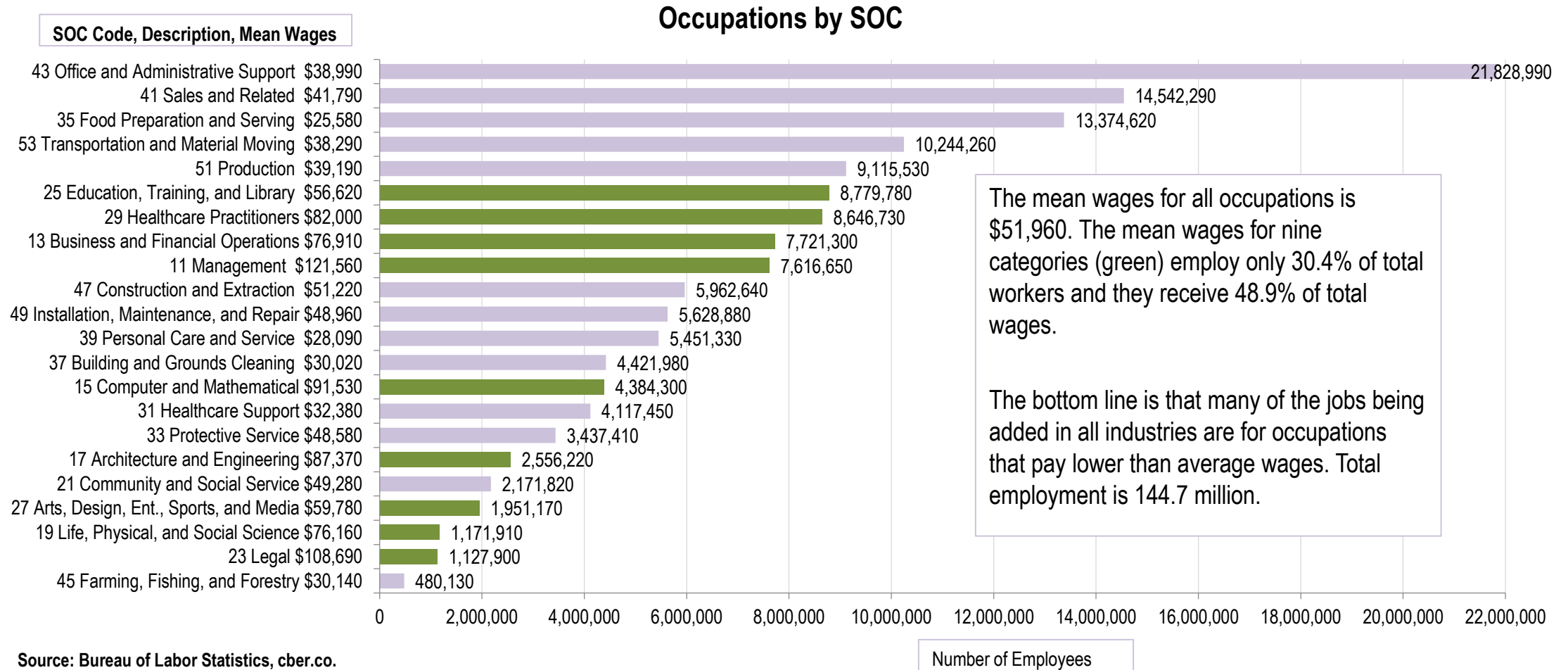
With 3.6% unemployment and more job openings than unemployed, where are companies finding qualified workers? The demand for workers exceeds the supply.

Since April 2018, there have been more than 7.0 million job openings (red). There are about 1.0 million more openings than unemployed (blue).

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

Occupations by SOC

United States 2018

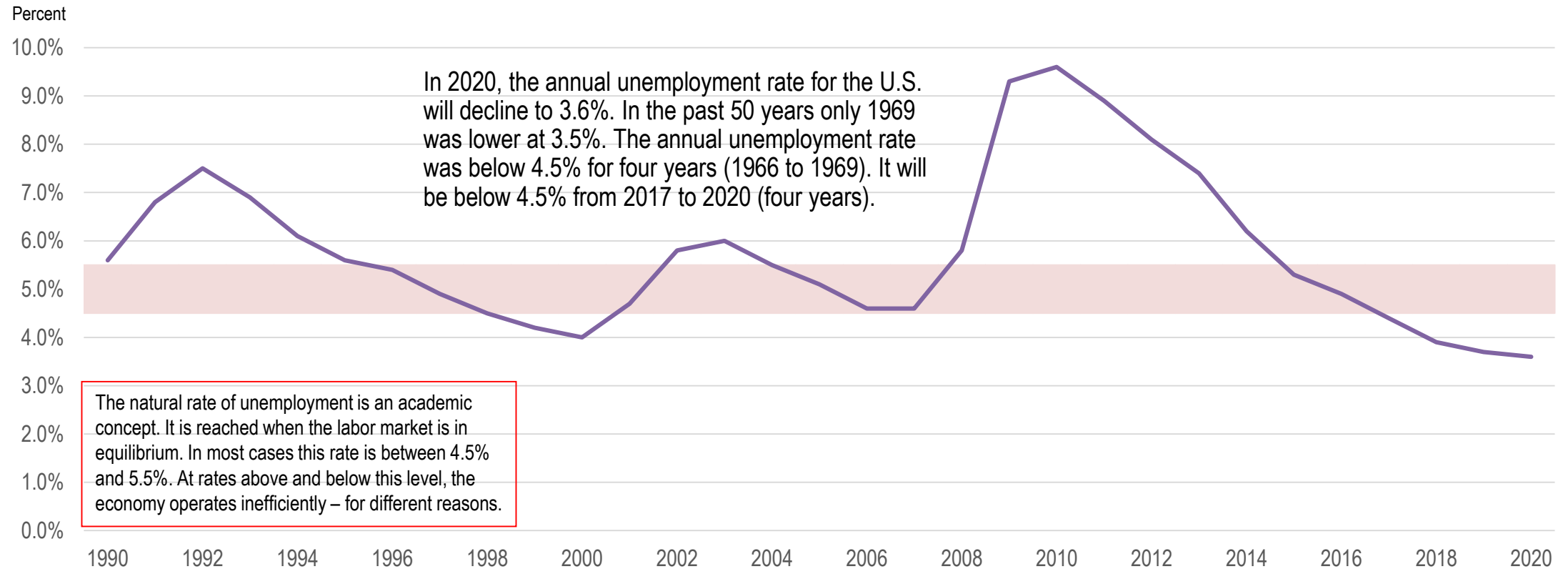


Source: Bureau of Labor Statistics, cber.co.

Annual Change in Unemployment

United States

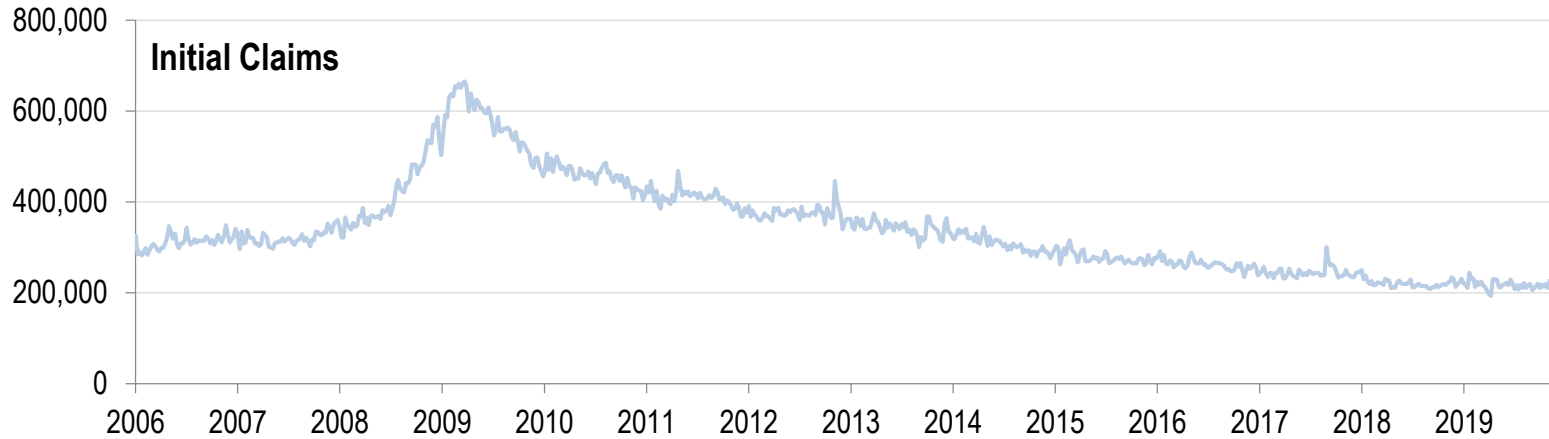
Annual Change in Unemployment – United States



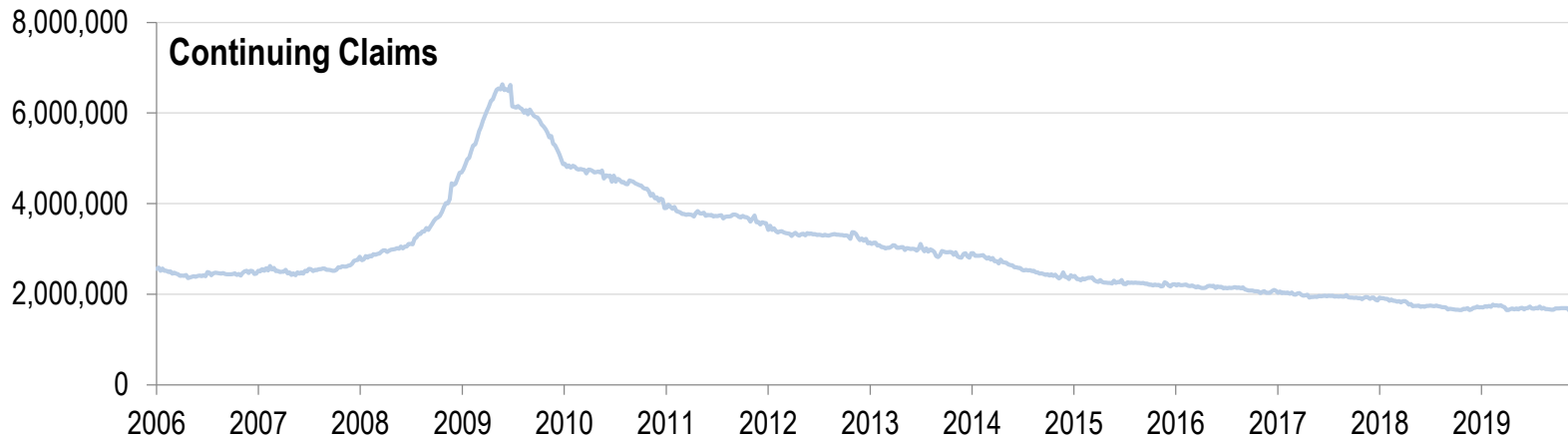
Source: Bureau of Labor Statistics, NSA; cber.co.

Initial and Continuing Unemployment Claims

1990 to 2019



Initial Claims
The number of initial claims was fairly constant during 2018 and 2019.

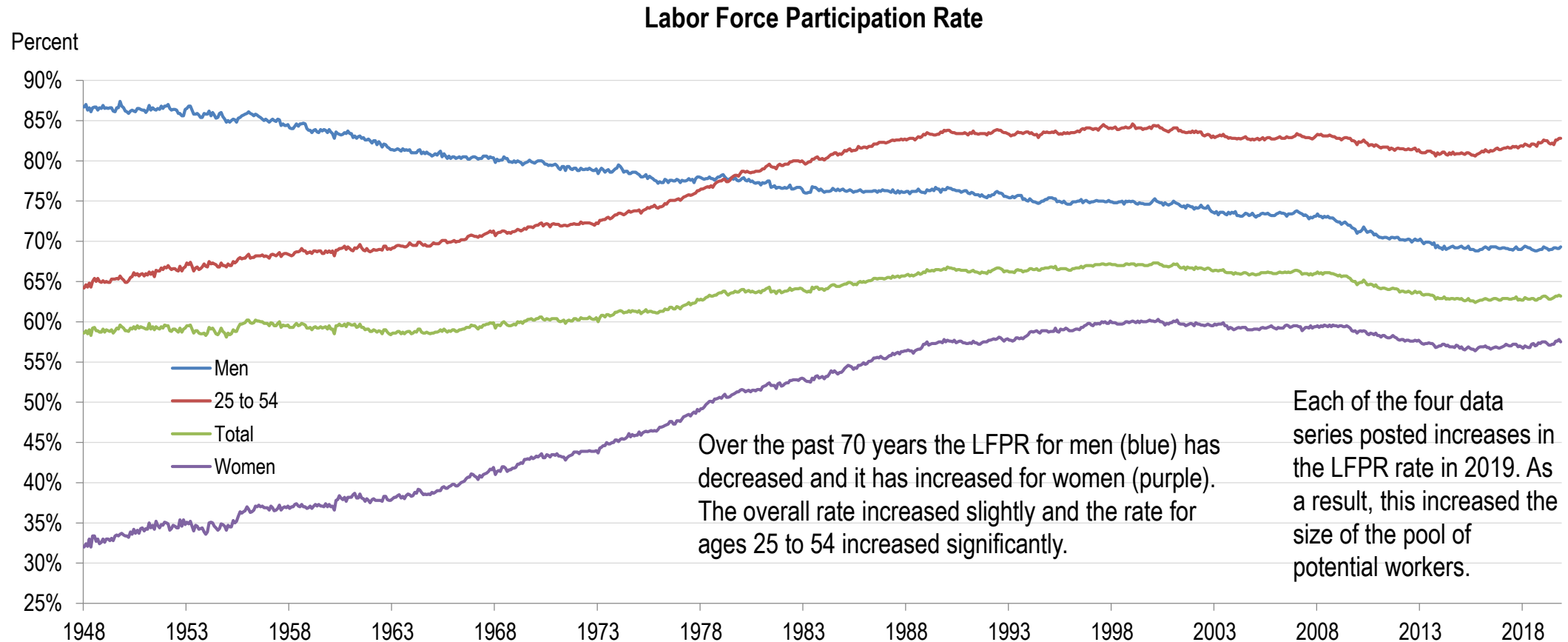


Continuing Claims
The number of continuing claims trended downward during 2018 and 2019.

Source: FRED, Department of Labor, cber.co.

Labor Force Participation Rate (LFPR)

Total, Men, Women, Age 25 to 54



Source: FRED, BLS, cber.co.

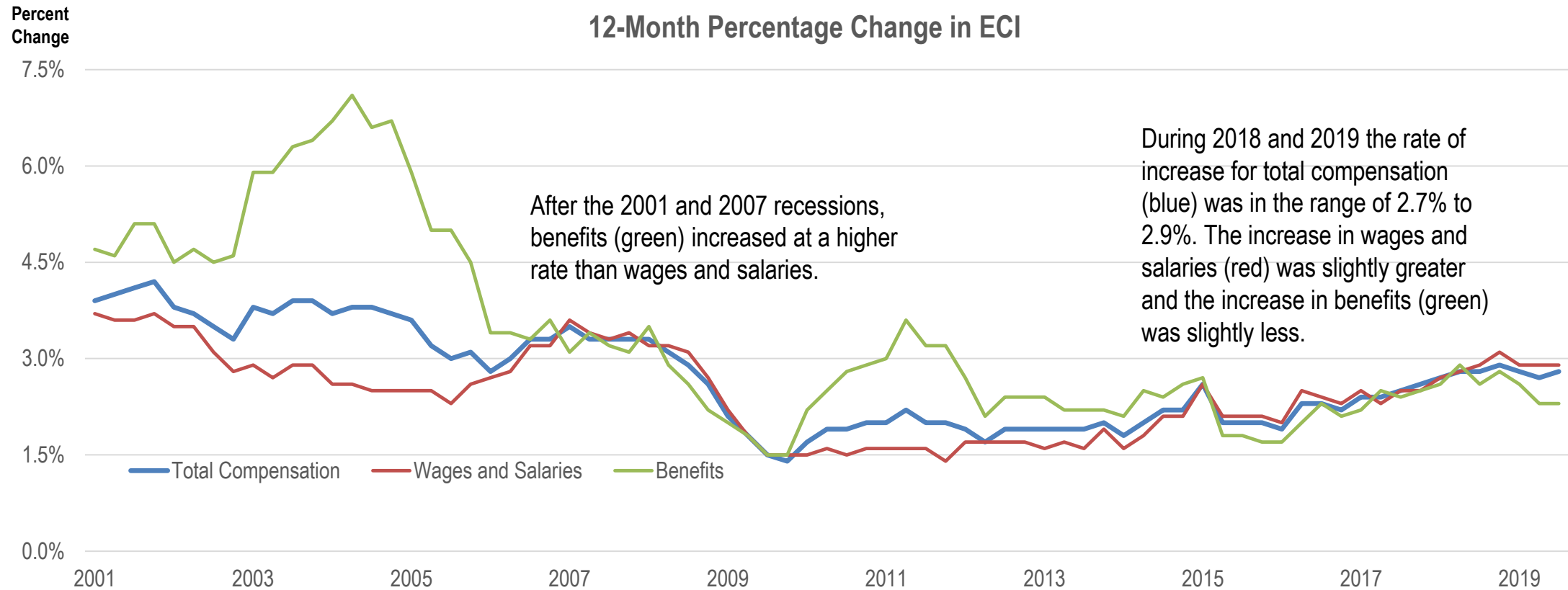
The U.S. Economy – Wages and Income

Employment Cost Index, Inflation, Real Median Household Income, and Real Disposable Income

Wages and income will see modest gains. Inflation will be about 2.0%.

12-Month Change in Employment Cost Index

Total Compensation, Wages and Salaries, Benefits

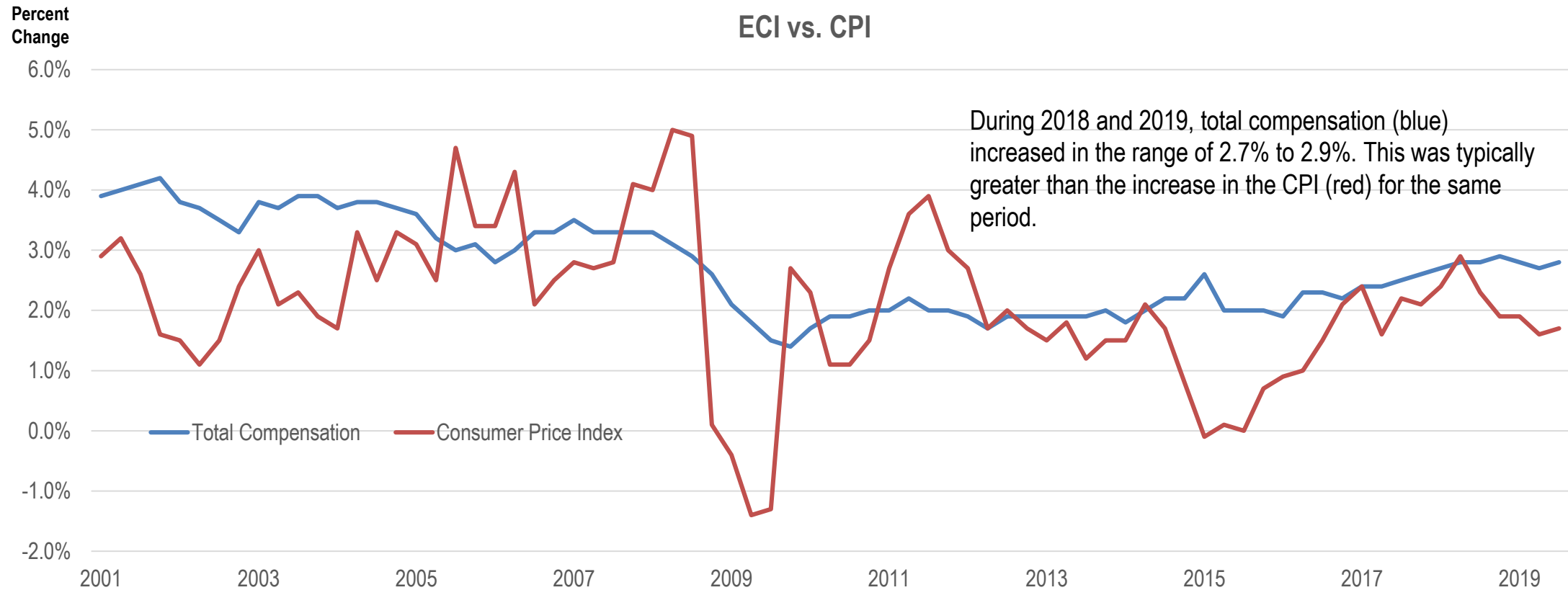


Source: Bureau of Labor Statistics, SA, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

Employment Cost Index vs. U.S. CPI

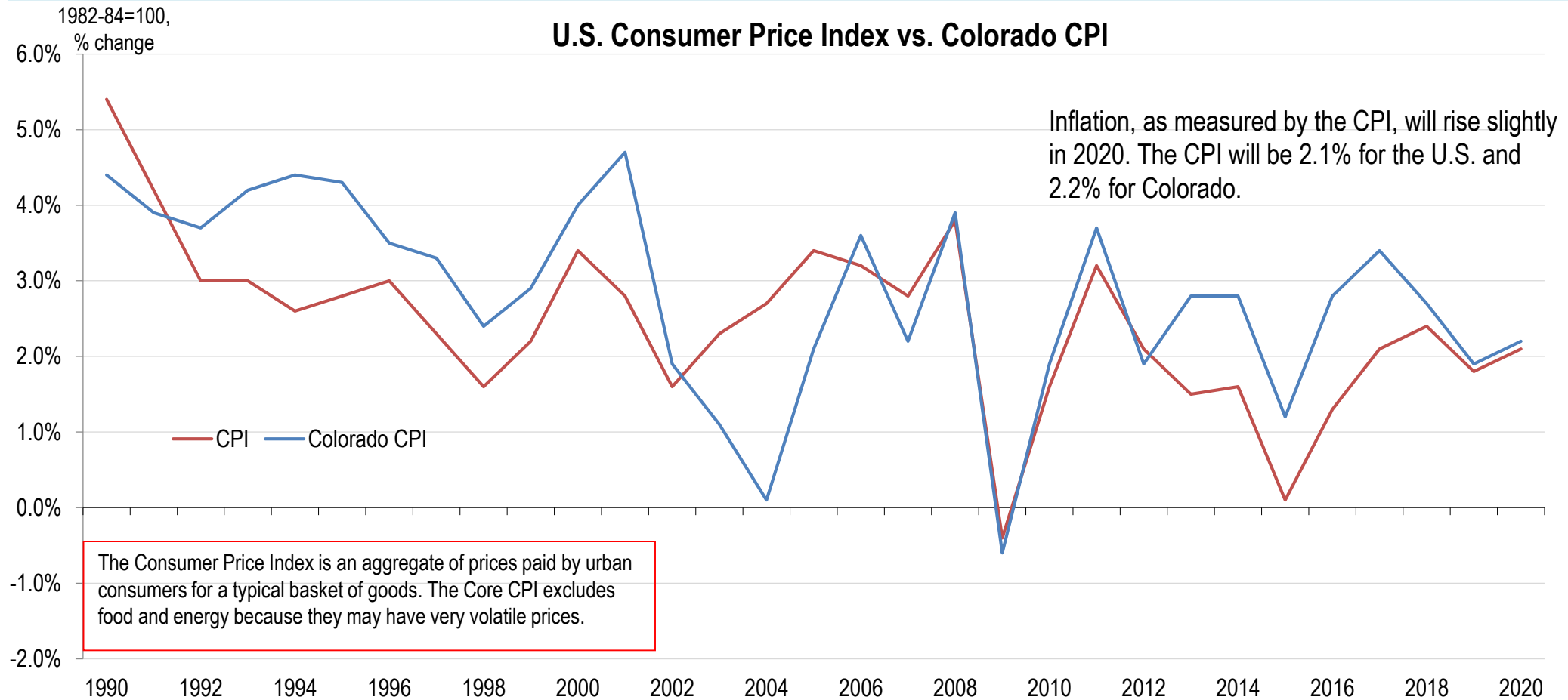
12 Month Percentage Change by Quarter



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

Consumer Price Index (CPI)

U.S. CPI vs. Colorado CPI

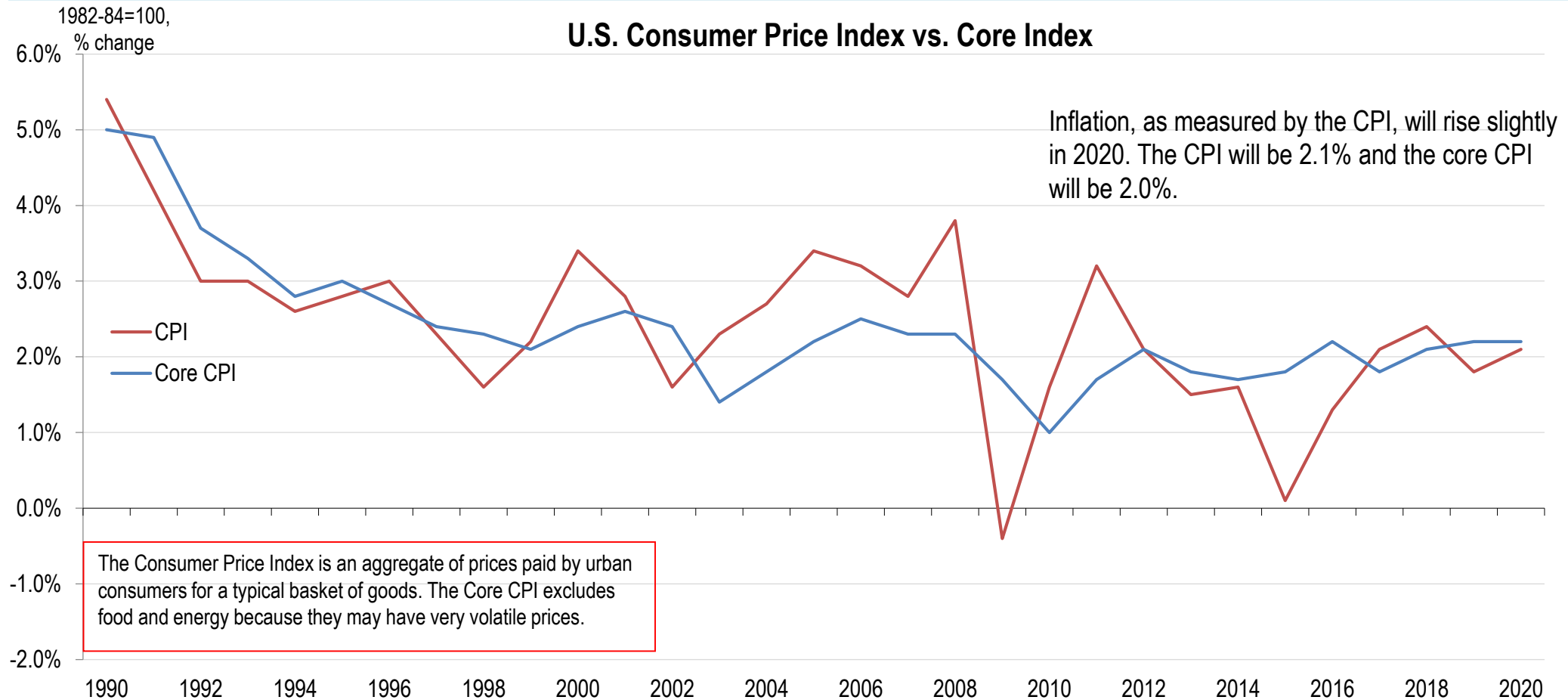


Source: Bureau of Labor Statistics, NSA, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

Consumer Price Index (CPI)

U.S. CPI vs. U.S. Core CPI

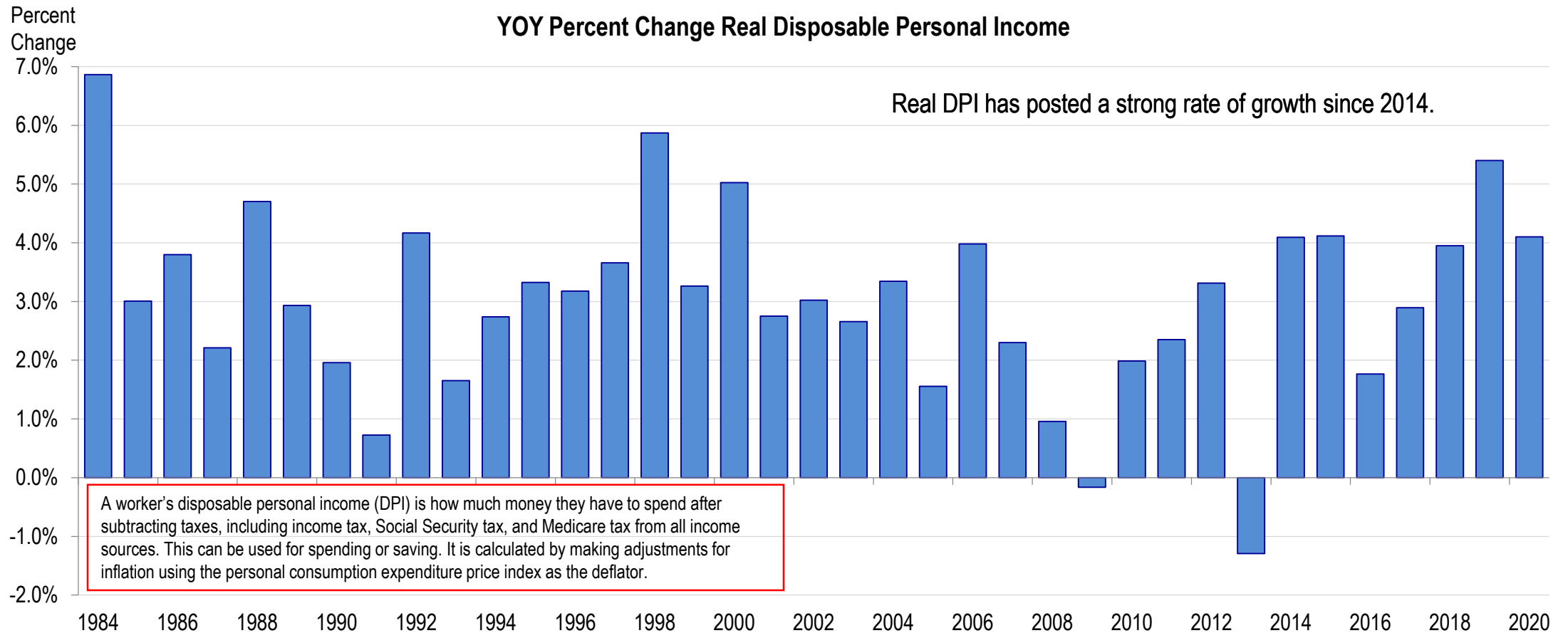


Source: Bureau of Labor Statistics, NSA, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

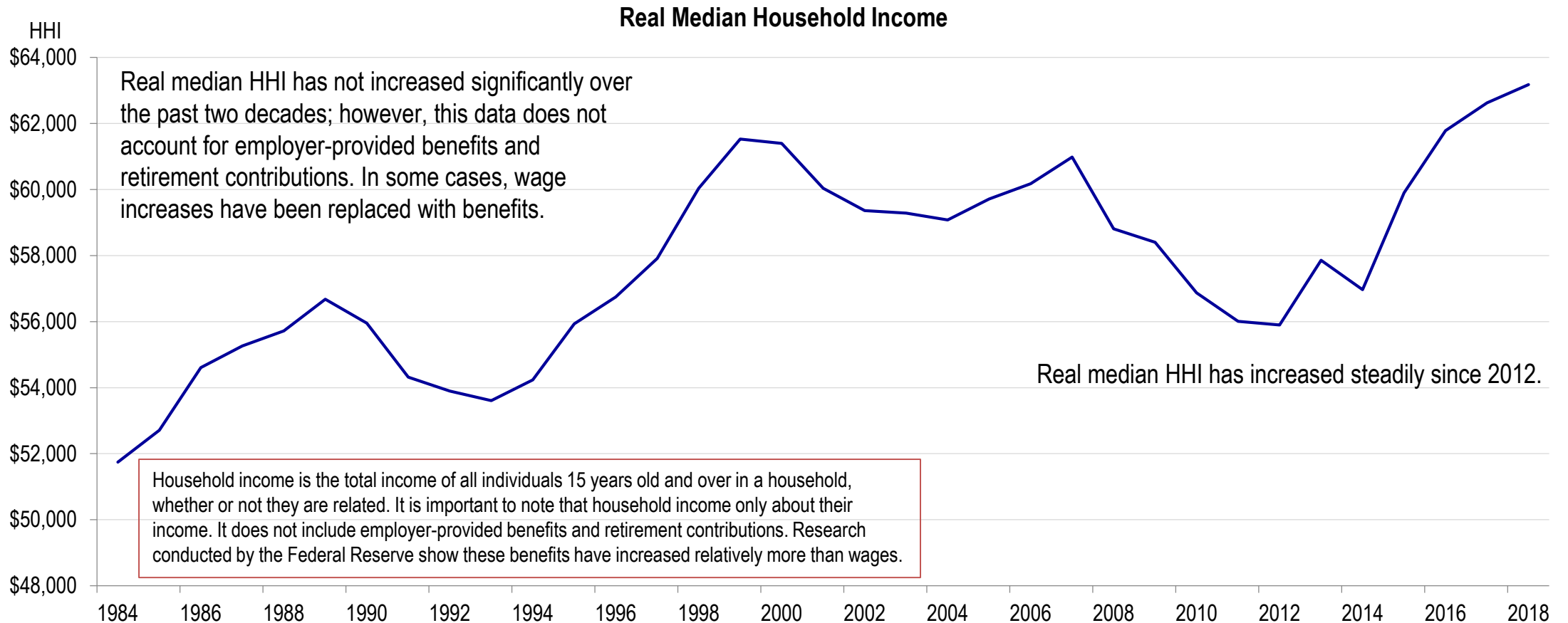
Real Disposable Personal Income

Percent Change Prior Year



Source: FRED, BEA, cber.co

Real Median Household Income



Source: FRED, Federal Reserve, CPI-U-RS Adjusted Dollars, Not Seasonally Adjusted, cber.co

The U.S. Economy - Debt

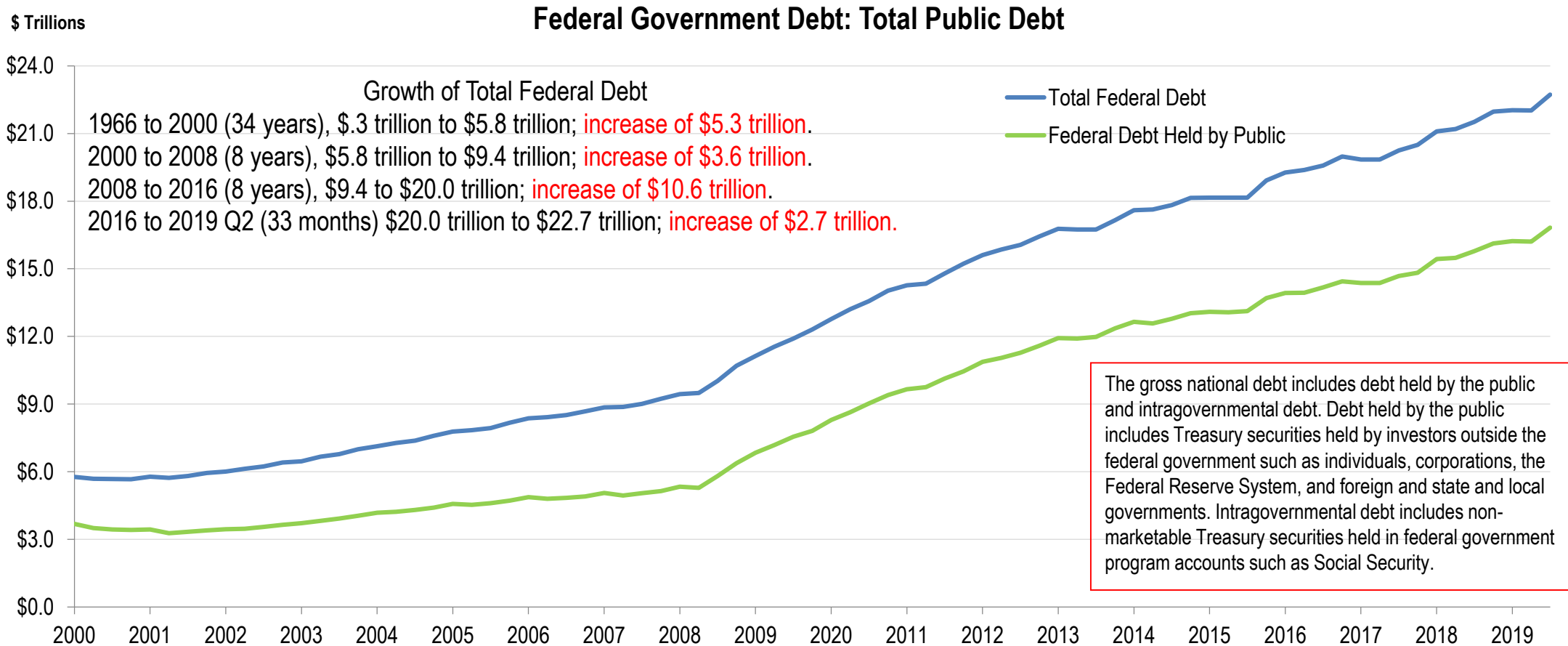
Government Debt, Consumer Debt, Household Debt, and Savings Rate

Debt is justified if it is responsibly used to make purchases that stimulate consumption and growth. Debt is criticized if debt service obligations prevent consumption and growth. Consumers appear to be managing their debt.

“The federal budget is on an unsustainable path, with high and rising debt. Over time, this outlook could restrain fiscal policymakers’ willingness or ability to support economic activity during a downturn.” - Jay Powell - Federal Reserve Chairman, November 2019.

U.S. Federal Government Debt

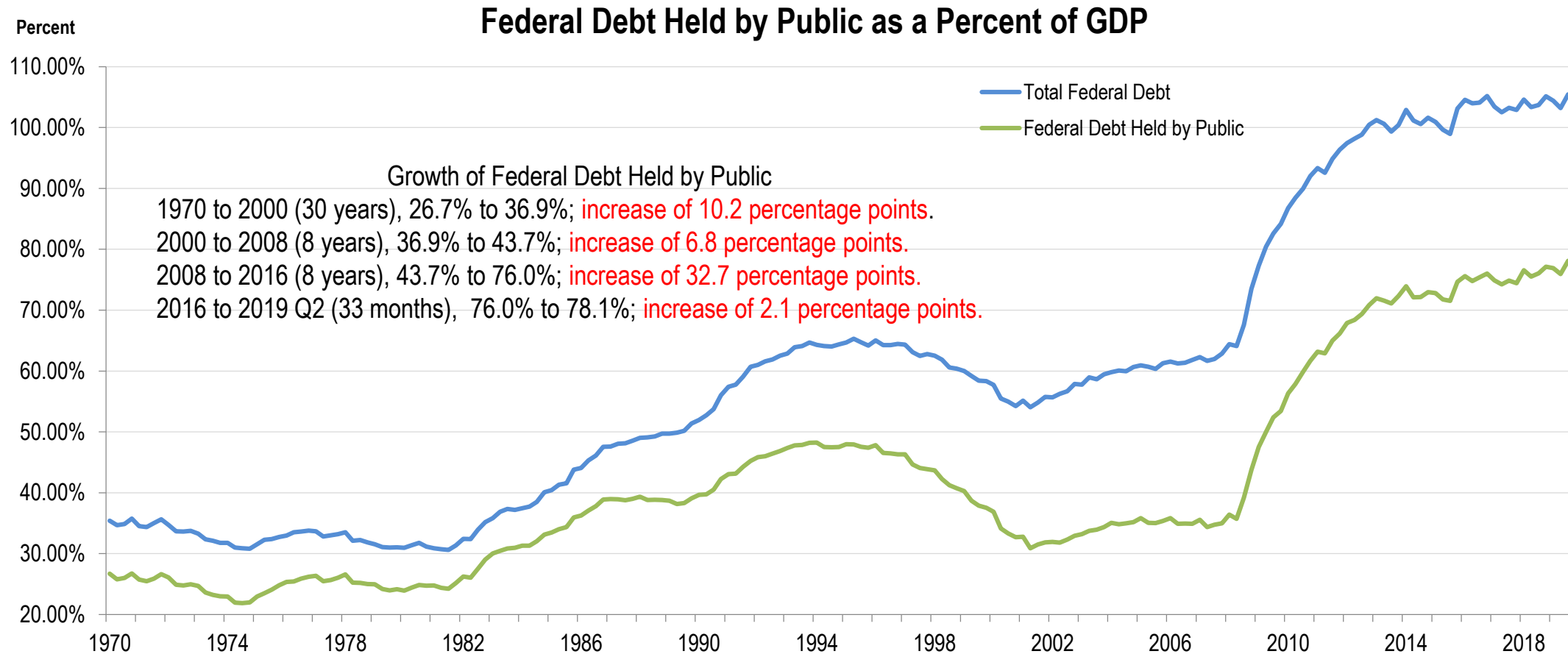
Total Federal Debt and Debt Held by Public



Source: FRED, U.S. Department of Treasury, cber.co.

U.S. Federal Government Debt

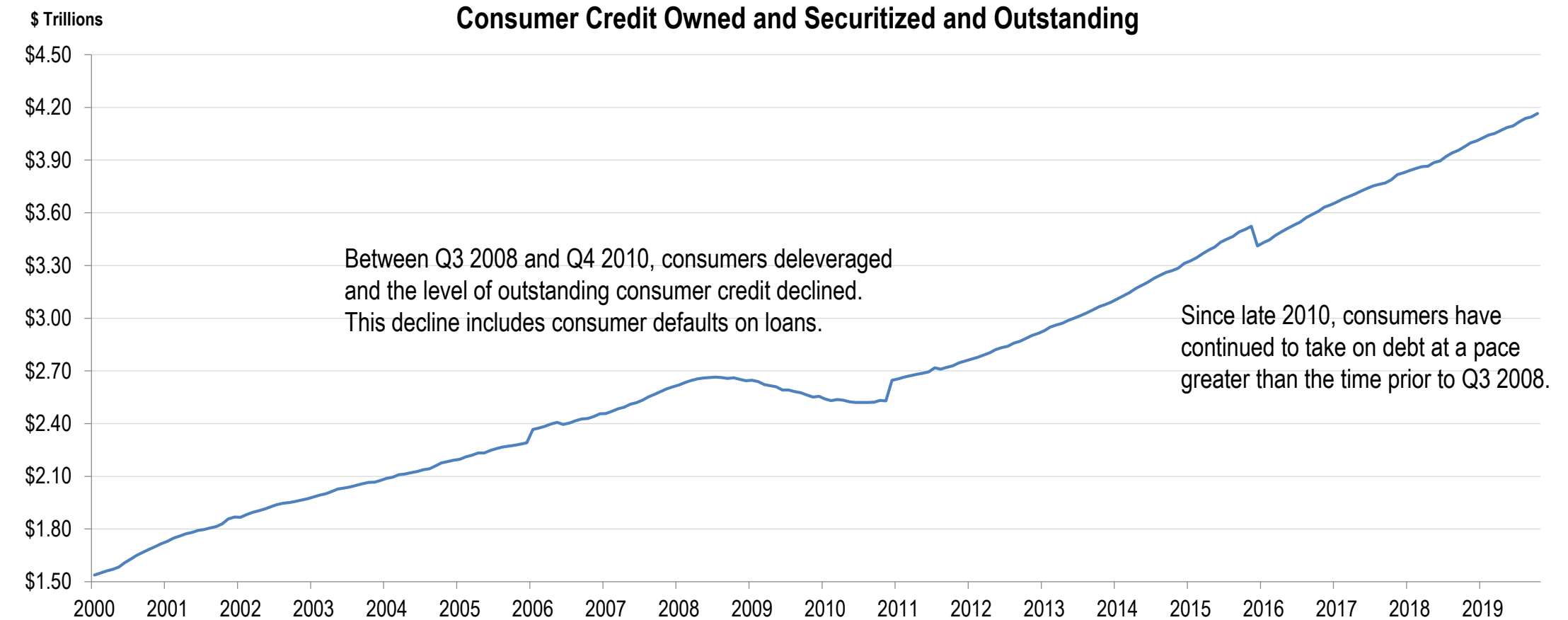
Total Federal Debt and Debt Held by Public as a Percent of GDP



Source: FRED, Federal Reserve Bank of St. Louis, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

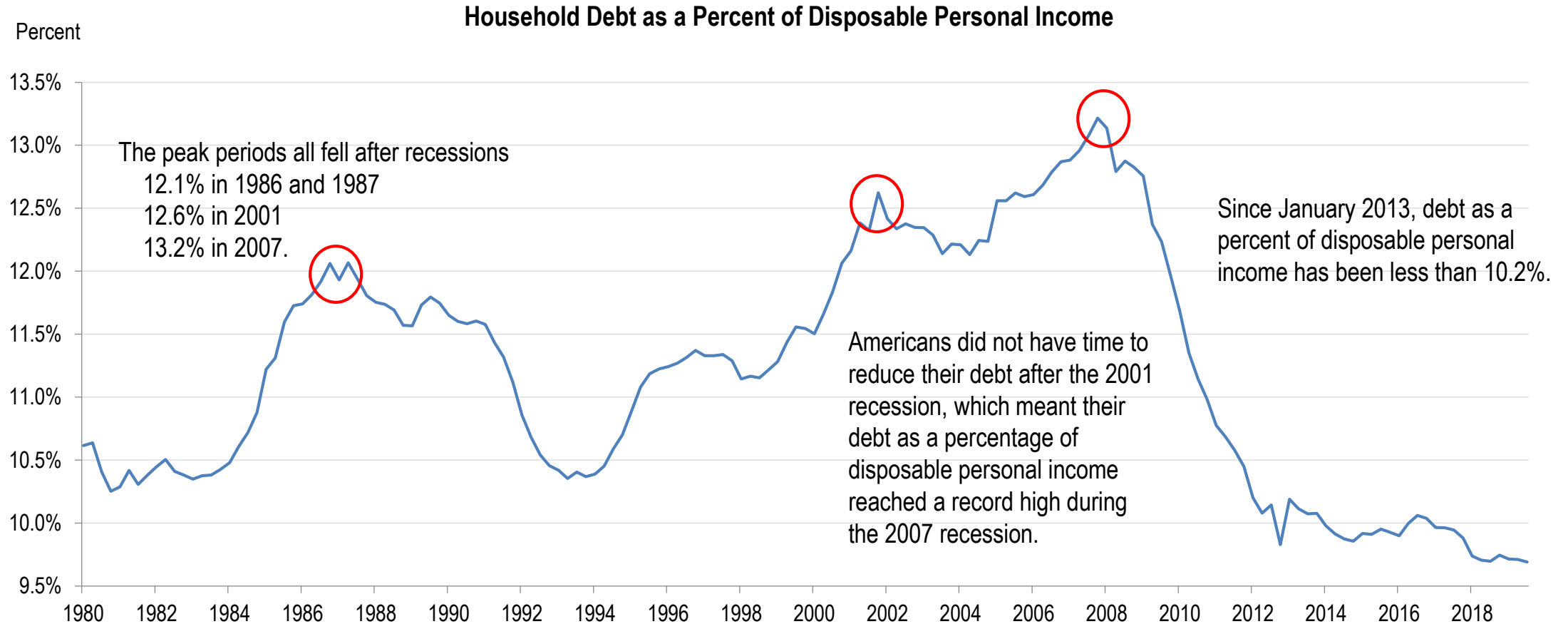
U.S. Consumer Credit Outstanding



Source: FRED, Federal Reserve, G.19, SA.

Household Debt

Percent of Disposable Personal Income

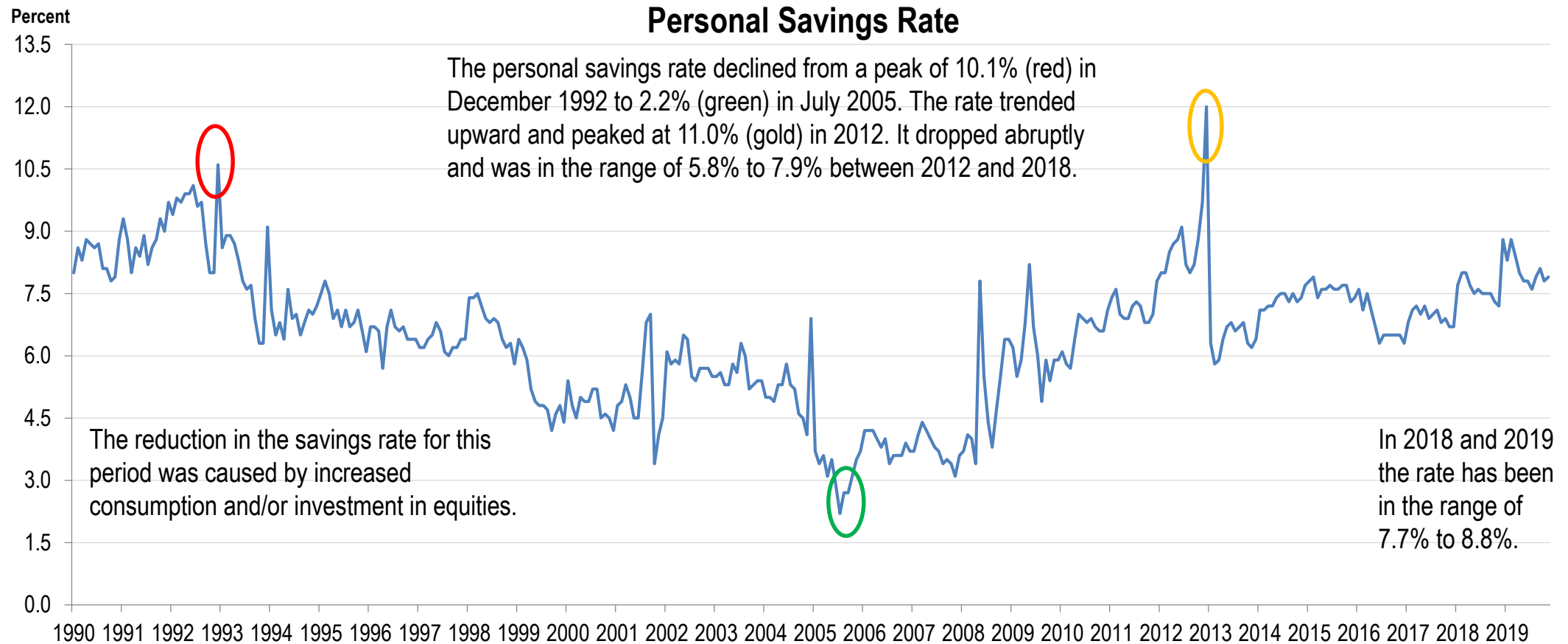


Source: FRED, Census Bureau, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

U.S. Personal Savings Rate

Percentage of Disposable Personal Income



Source: FRED, SA.

United States Economy - Equities

S&P Performance and Volatility

In 2019 there was volatility in the equity markets, but the bull market continued its run. The strength of the equity markets bolsters investor wealth and consumer confidence.

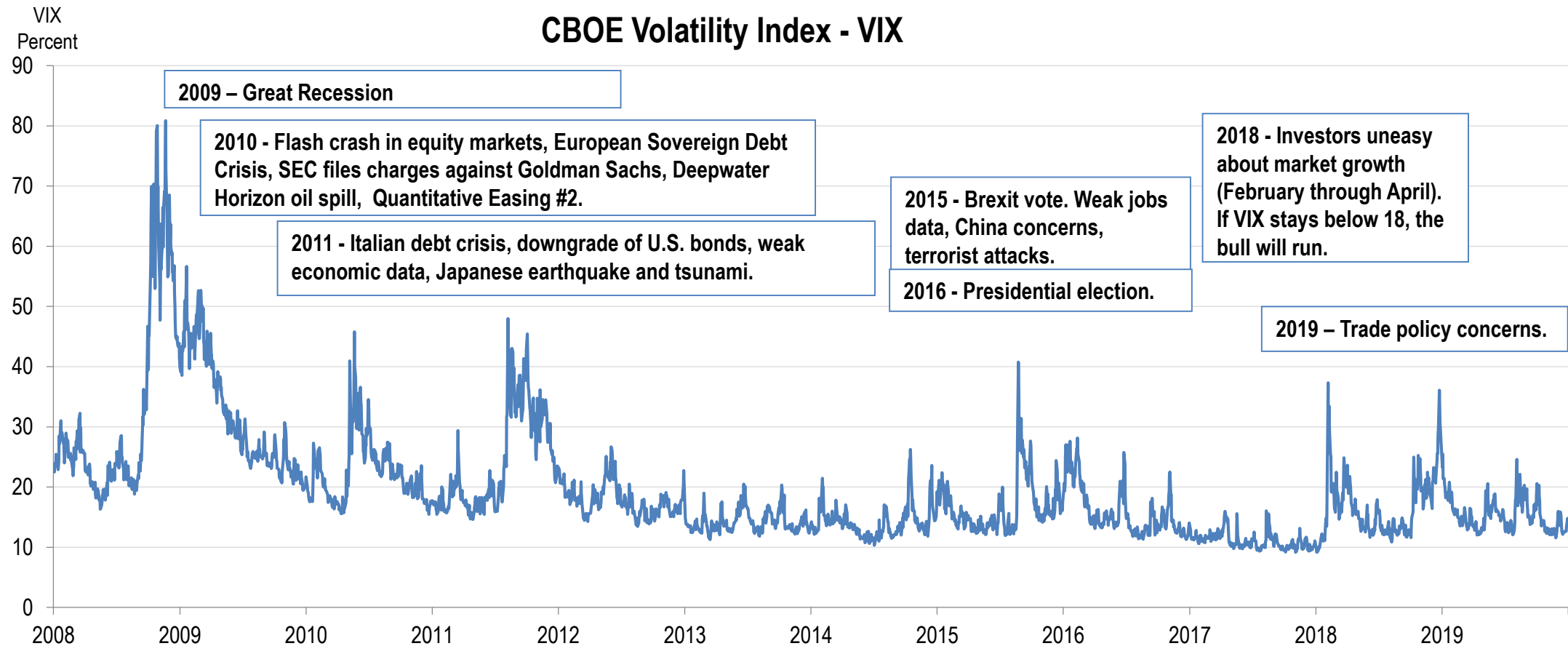
Standard and Poor's 500 Index



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

CBOE Volatility Index

VIX (VIXCLS)



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

Colorado-based Business and Economic Research <https://cber.co>

United States Economy – Industry Performance

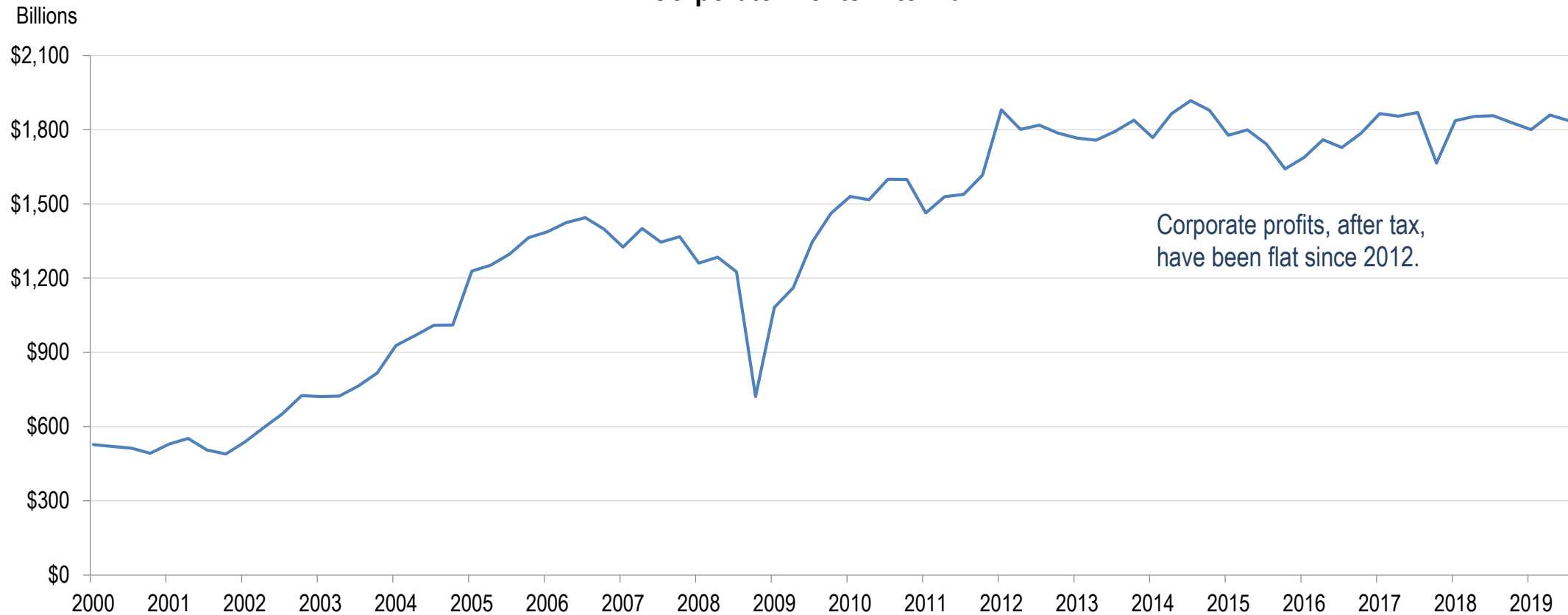
Productivity, Capacity Utilization, Industrial Production, Inventory to Sales Ratio, Corporate Profits

The metrics for industry performance are generally positive. Corporation profits and productivity have been flat since 2012; industrial production was flat in 2019; Capacity utilization has been in a satisfactory range, and the range of the inventory-to-sales ratio is adequate.

Corporate Profits

After Tax (without IVA and CCAdj)

Corporate Profits After Tax

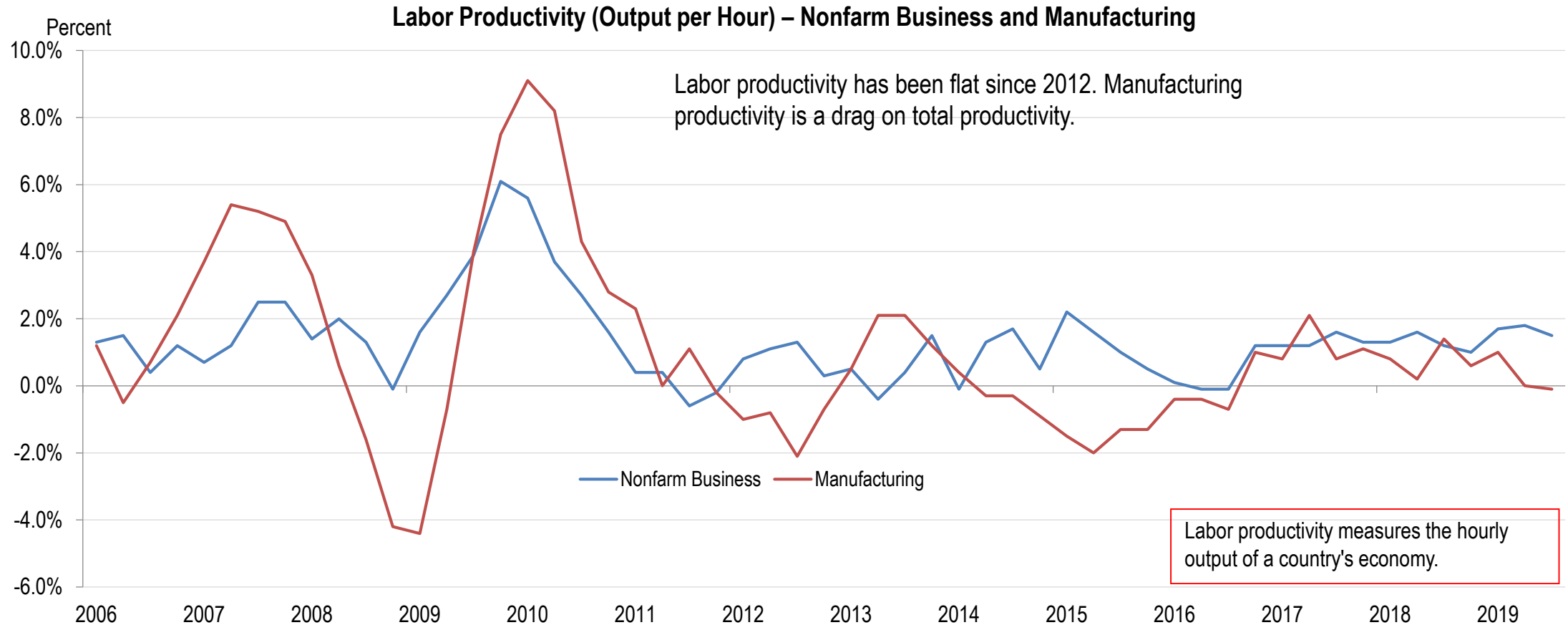


Source: FRED, BEA, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

U.S. Labor Productivity (Output per Hour)

Percent Change Same Quarter Prior Year Nonfarm Business

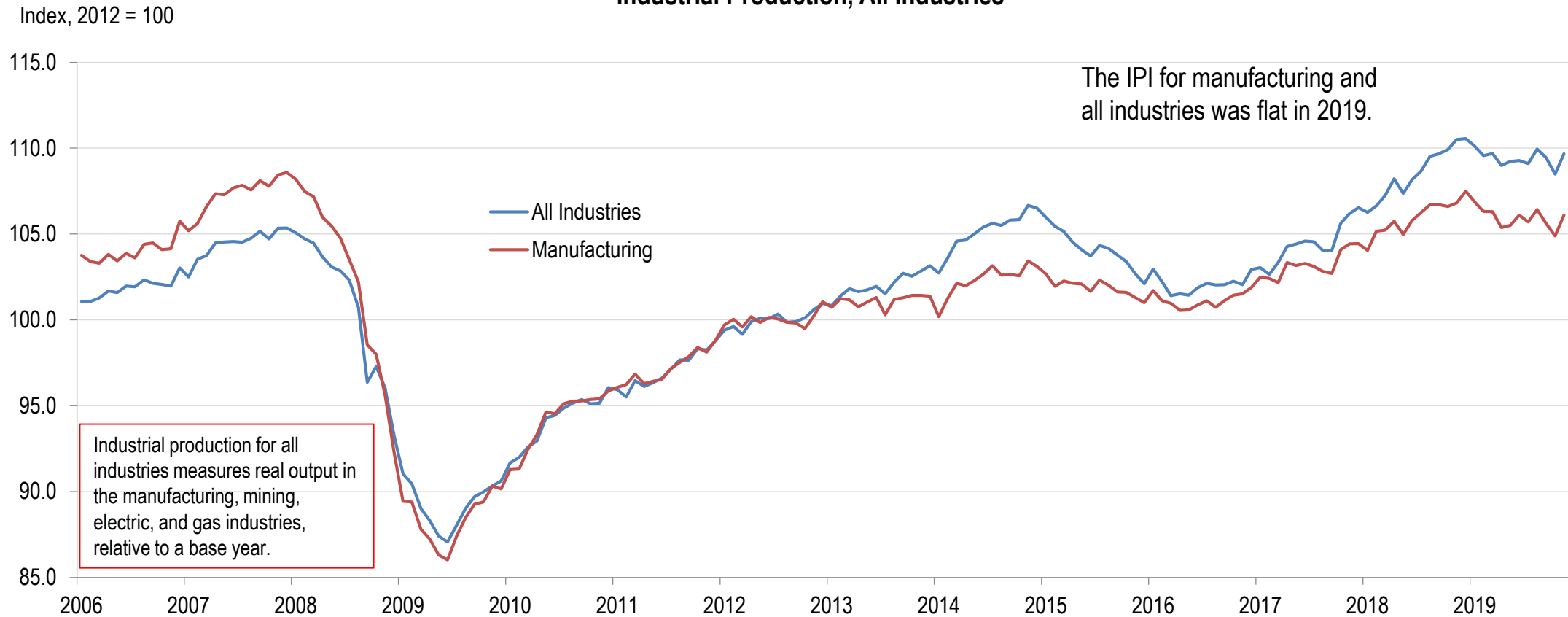


Source: Bureau of Labor Statistics, Major Sector Productivity (NonFarm Business) NSA, cber.co.

Industrial Production Index

All Industries and Manufacturing

Industrial Production, All Industries



Source: FRED, Federal Reserve, SA, cber.co.

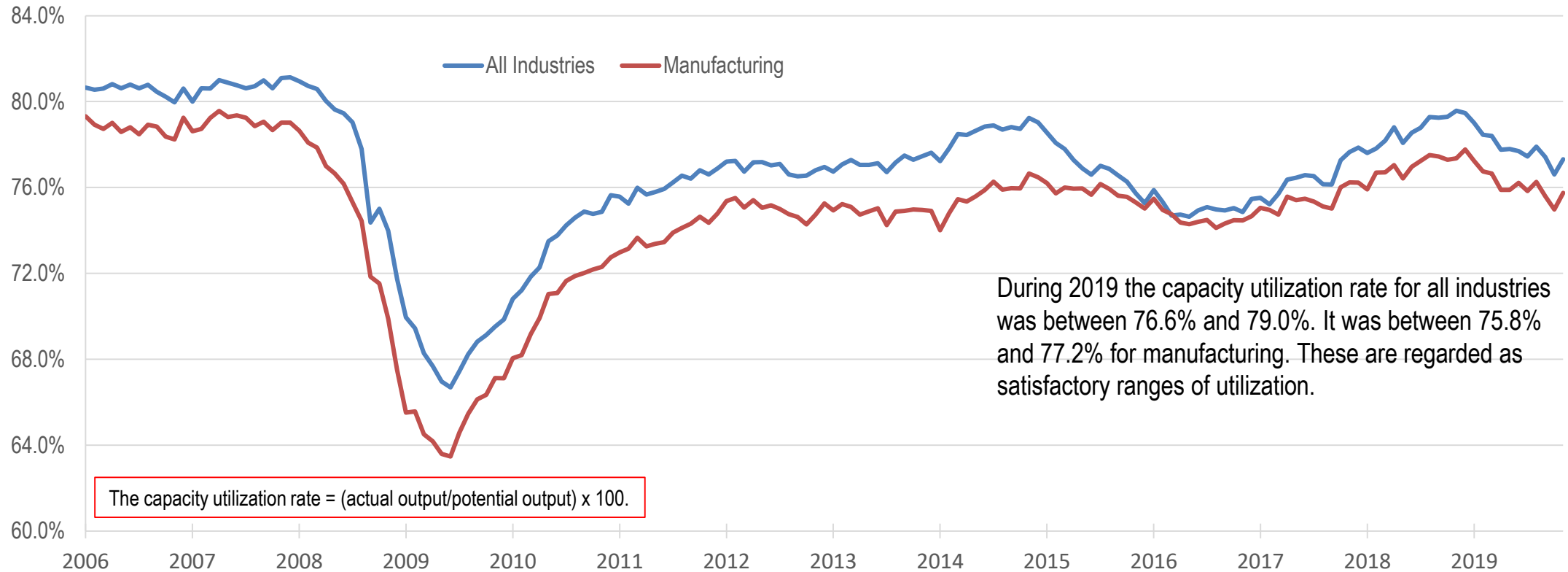
Colorado-based Business and Economic Research <https://cber.co>

Capacity Utilization

Total All Industries and Manufacturing

Percent

Capacity Utilization – All Industries and Manufacturing



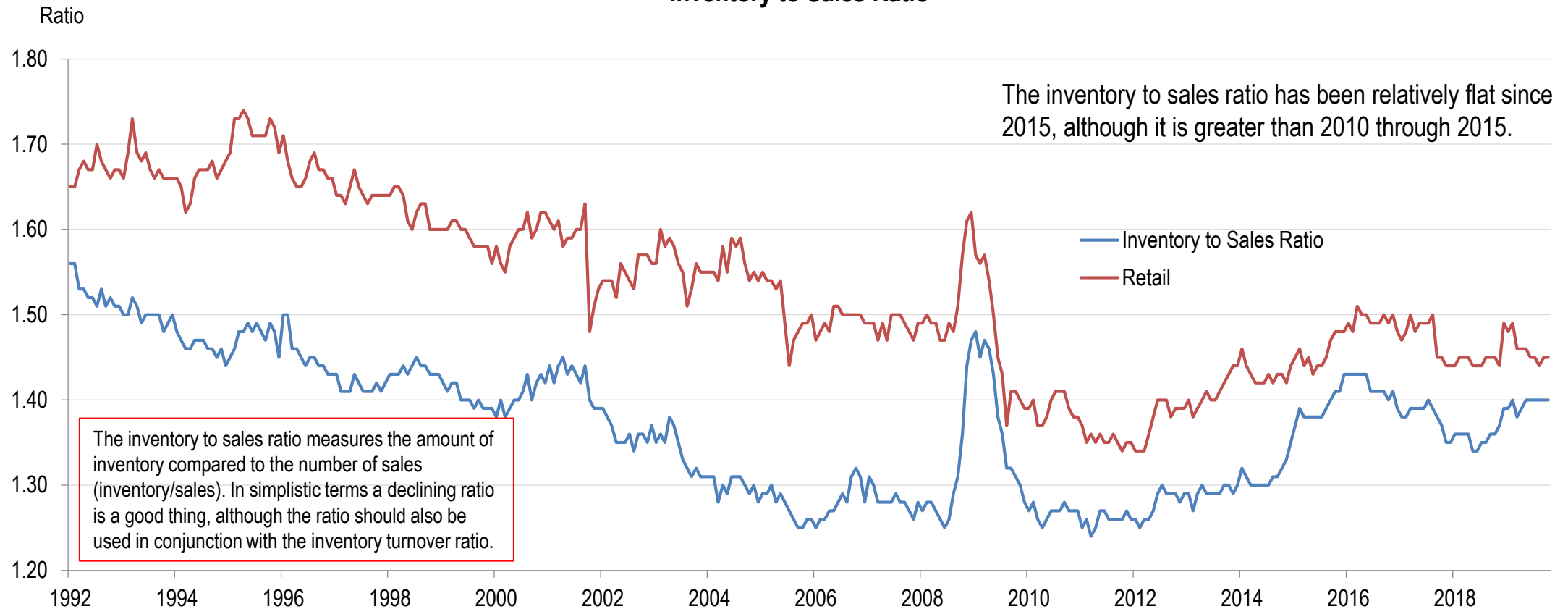
Source: FRED, Federal Reserve, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

Inventory to Sales Ratio

All Businesses and Retail

Inventory to Sales Ratio



Source: FRED, Census Bureau, cber.co.

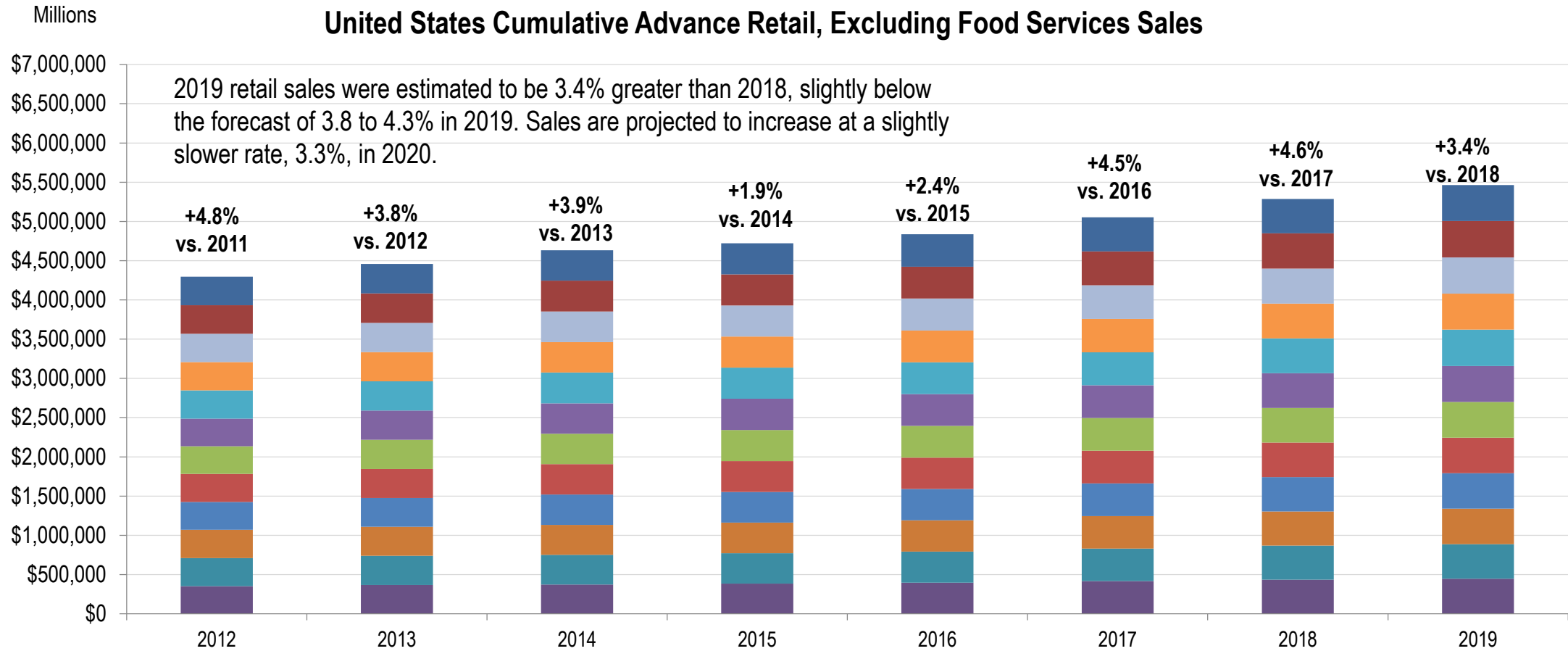
Colorado-based Business and Economic Research <https://cber.co>

The U.S. Economy - Retail and Auto Sales

Retail sales will increase at a slower rate in 2020. In addition, the sale of light auto and trucks will drop below \$17 million in 2020 because of a strong used car market.

Cumulative Advance Retail, Excluding Food Services Sales

Monthly

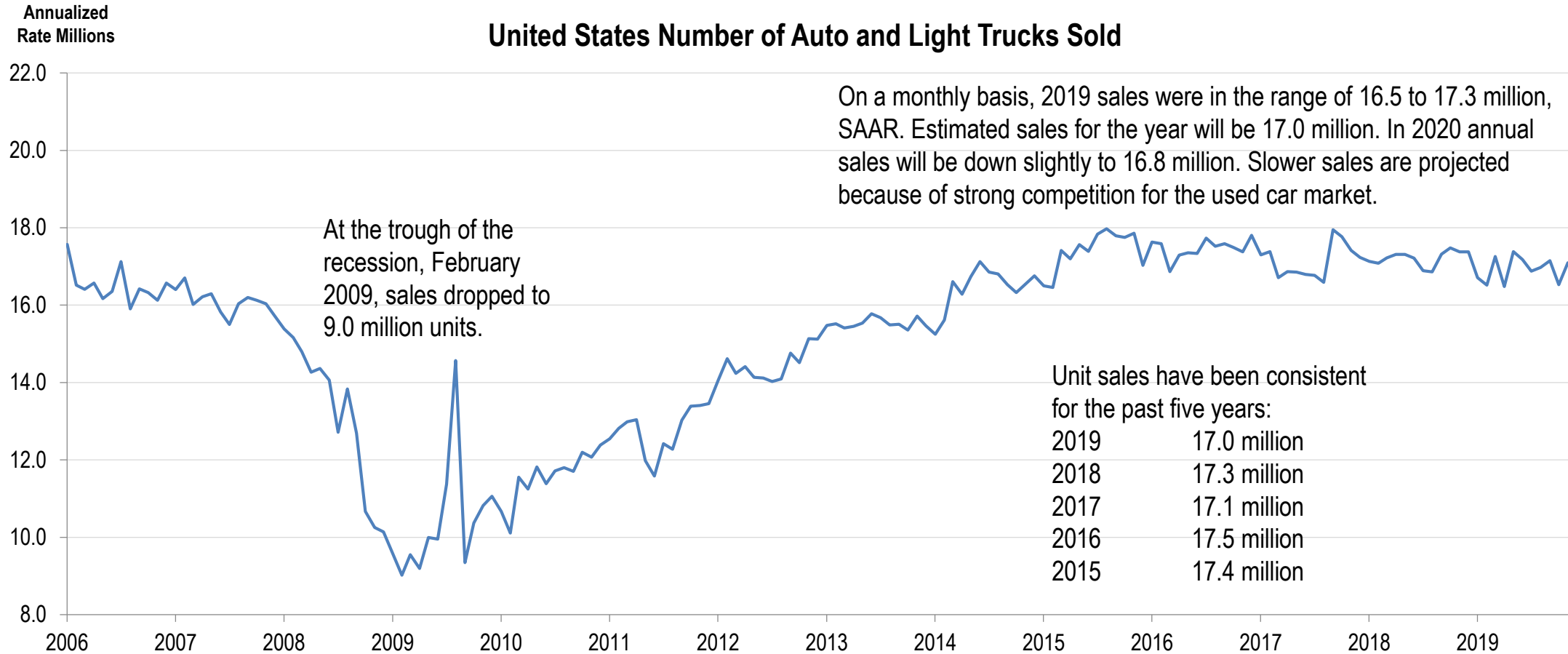


Source: U.S. Census Bureau, FRED, cber.co.

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

U.S. Auto and Light Truck (ALT) Sales

Monthly (Annualized Rate Millions)



Source: FRED, Federal Reserve Bank of St. Louis, Seasonally Adjusted Annualized Rates (SAAR), cber.co.

Colorado-based Business and Economic Research <https://cber.co>

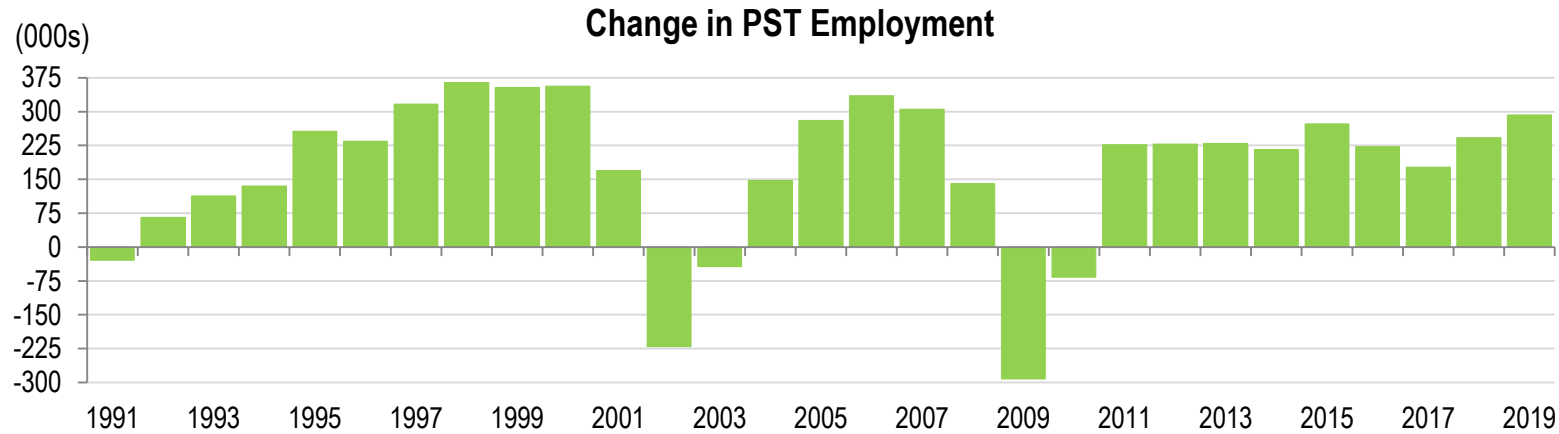
The U.S. Economy – Manufacturing and PST

Manufacturing and Professional, Scientific and Technical Services Employment, Manufacturing and Nonmanufacturing Indices, Trade-Weighted U.S. Dollar, Durable Goods Ordered, Manufacturing Shipments, Real Exports of Goods and Services

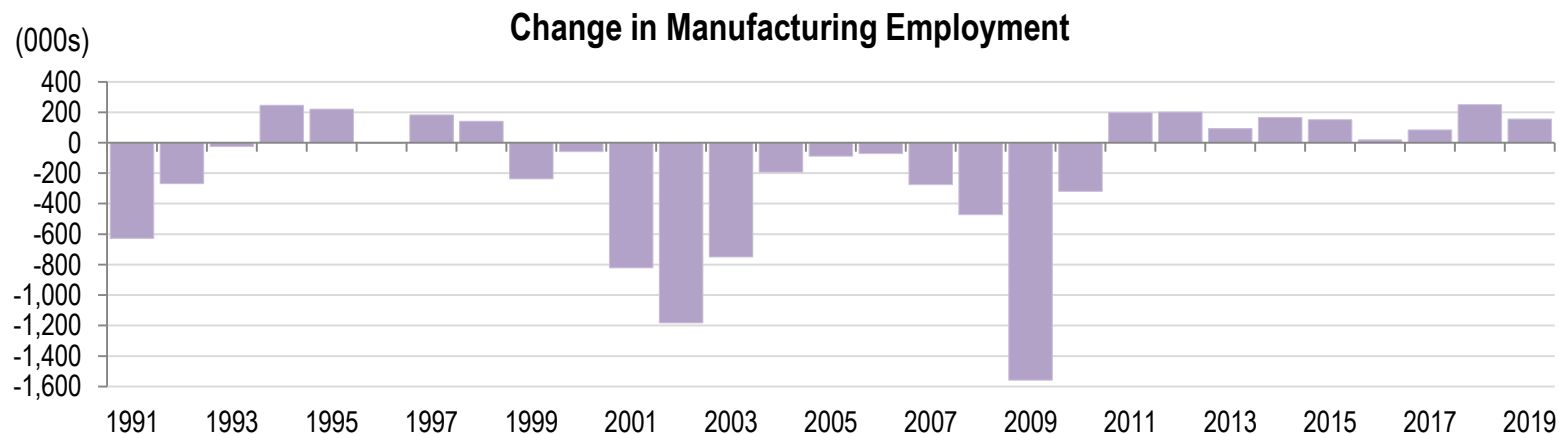
The PST sector has been a source of GDP and economic growth since 2010. Manufacturing has posted eight years of small employment gains during that period, but the sector is currently in a slump.

Change in Employment

U.S. Professional, Scientific, and Technical Services and Manufacturing



Professional, Scientific, and Technical
Between 2011 and 2019, the PST sector added an average of 234,000 jobs per year compared to 256,000 jobs per year for the period 1993 to 2001. The outlook for PST continues to be favorable in 2020.



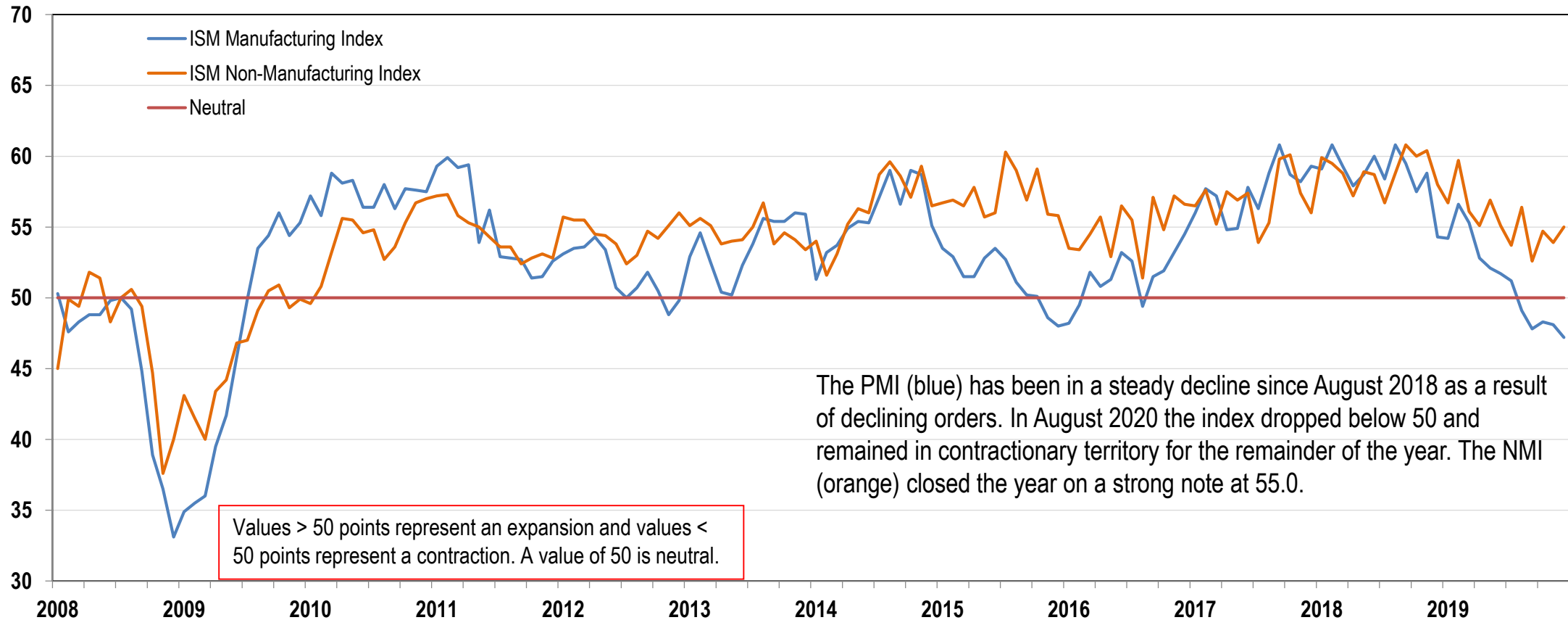
Manufacturing
U.S. manufacturing has also enjoyed 8 consecutive years of job growth between 2011 and 2019. It added an average of 146,000 jobs per year during this period. In 2018, there were 250,000 manufacturing jobs added. This is the largest number of jobs added during the period 1991 to 2019. As 2019 closed, the manufacturing sector was in a slump.

Source: Bureau of Labor Statistics, cber.co.

ISM PMI Composite Indices

Manufacturing vs. Non-manufacturing

ISM Manufacturing (PMI) vs. Non-Manufacturing (NMI) Composite Indices



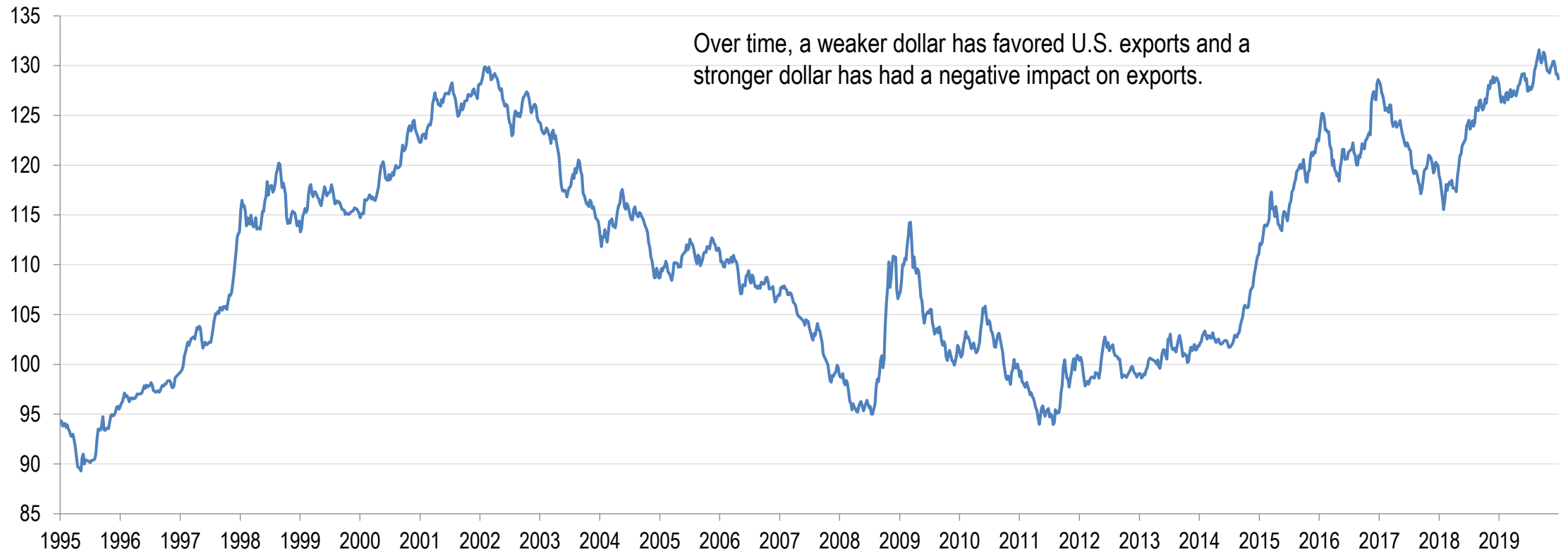
Source: FRED, ISM, cber.co

Colorado-based Business and Economic Research <https://cber.co>

Trade Weighted U.S. Dollar Index: Broad

Trade Weighted U.S. Dollar Index: Broad

1997=100



Source: FRED, The Federal Reserve, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

Durable Goods Ordered



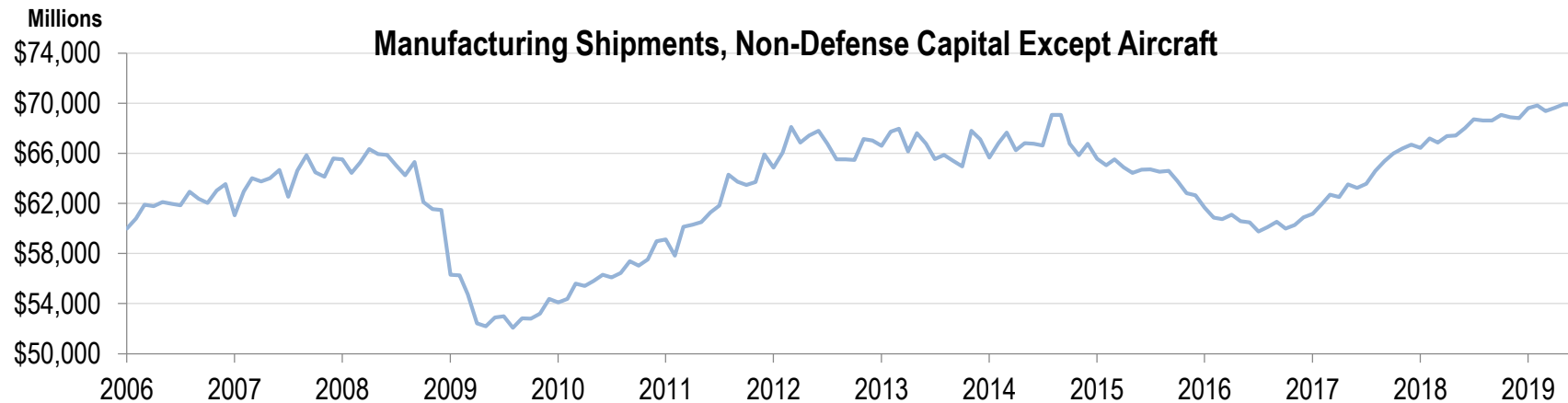
Source: FRED, BEA, cber.co.

United States Manufacturing Shipments

All Industries



Total Manufacturing Shipments
After showing an increase from 2016 to 2018, total manufacturing shipments were flat in the second half of 2018 through 2019.

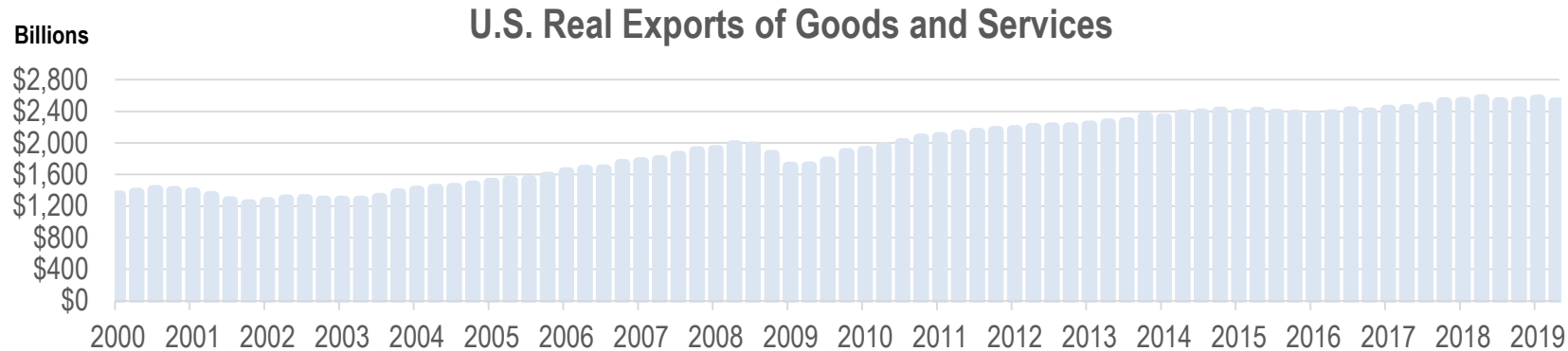


Manufacturing Shipments, Non-Defense Capital Except Aircraft
This group of manufacturers posted gains from the second half of 2016 through 2018. Shipments were flat in 2019.

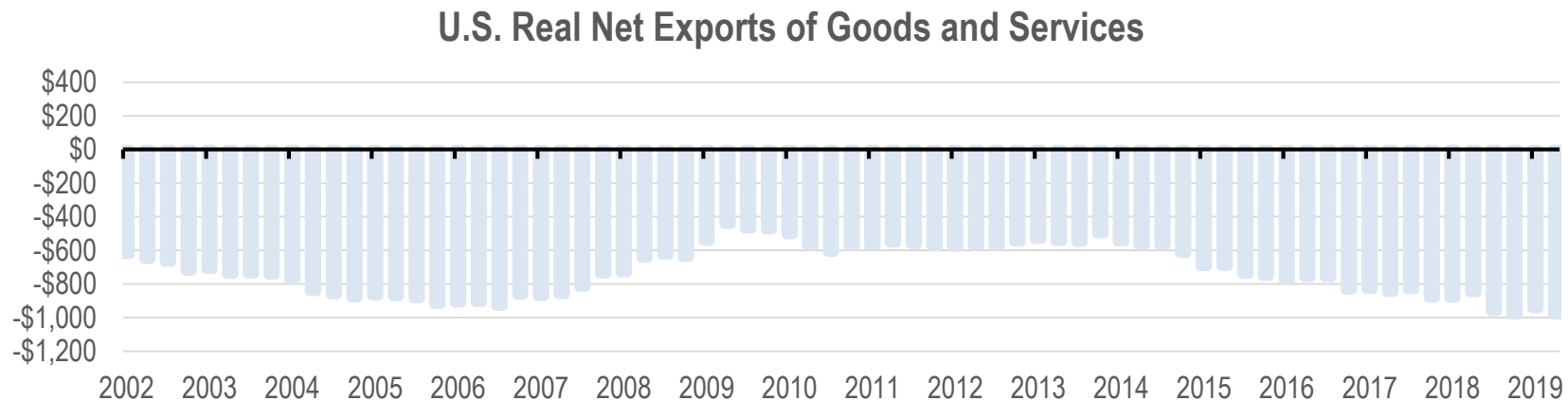
Source: FRED, SA. U.S. Bureau of the Census, cber.co. Note: Not adjusted for inflation.

Exports of U.S. Goods and Services

Real Exports of U.S. Goods and Services



Real Exports of Goods and Services
Real exports have increased slightly over the past two years.



Real Net Exports
Real net exports reached their lowest value in Q2 2009. The deficit increased slightly from Q2 2009 to Q3 2013. It has increased at a more significant rate since Q1 2014, but leveled off in the second half of 2018.

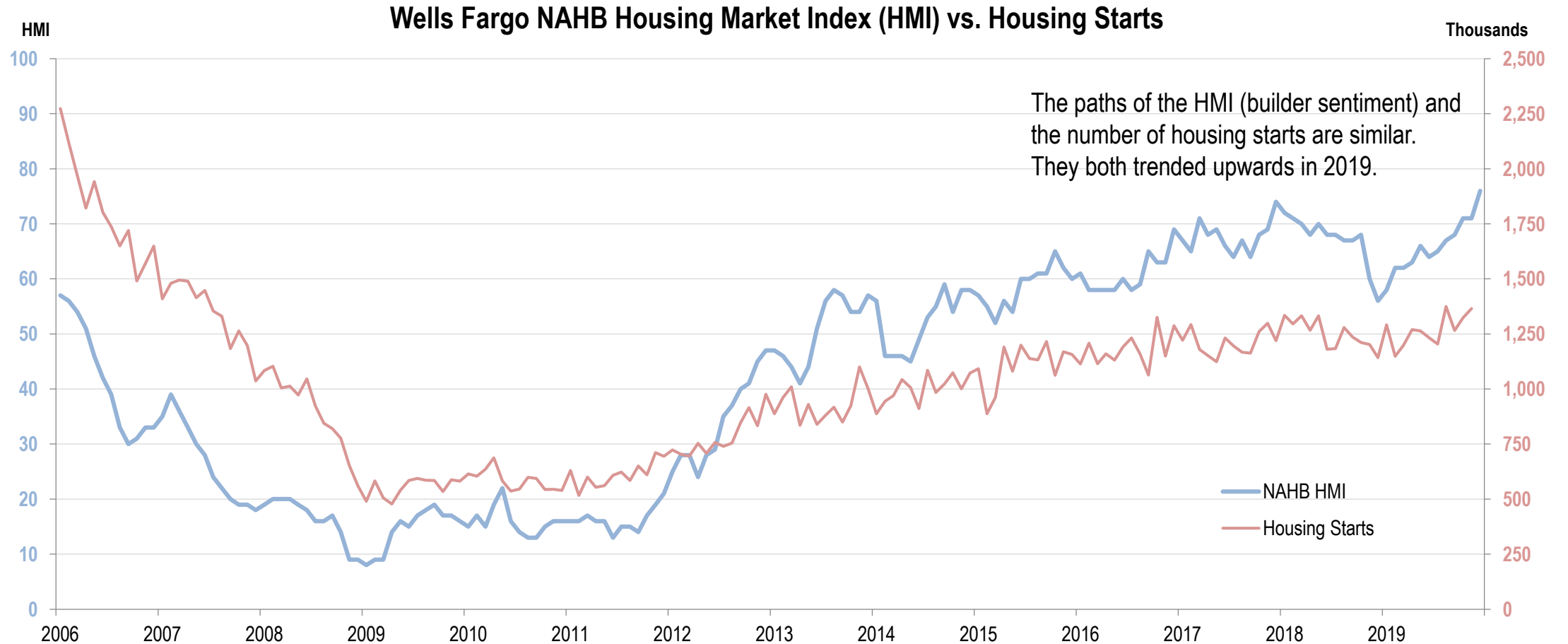
Source: FRED, BEA, NETEXC, SAAR, cber.co Note: Chained on 2012.

The U.S. Economy – Housing and Construction

NAHB HMI and Housing Starts, 30-Year Fixed Rate Mortgages, Case Shiller Home Price Index, Median Price of New Home, Construction Spending, and Residential Housing Permits

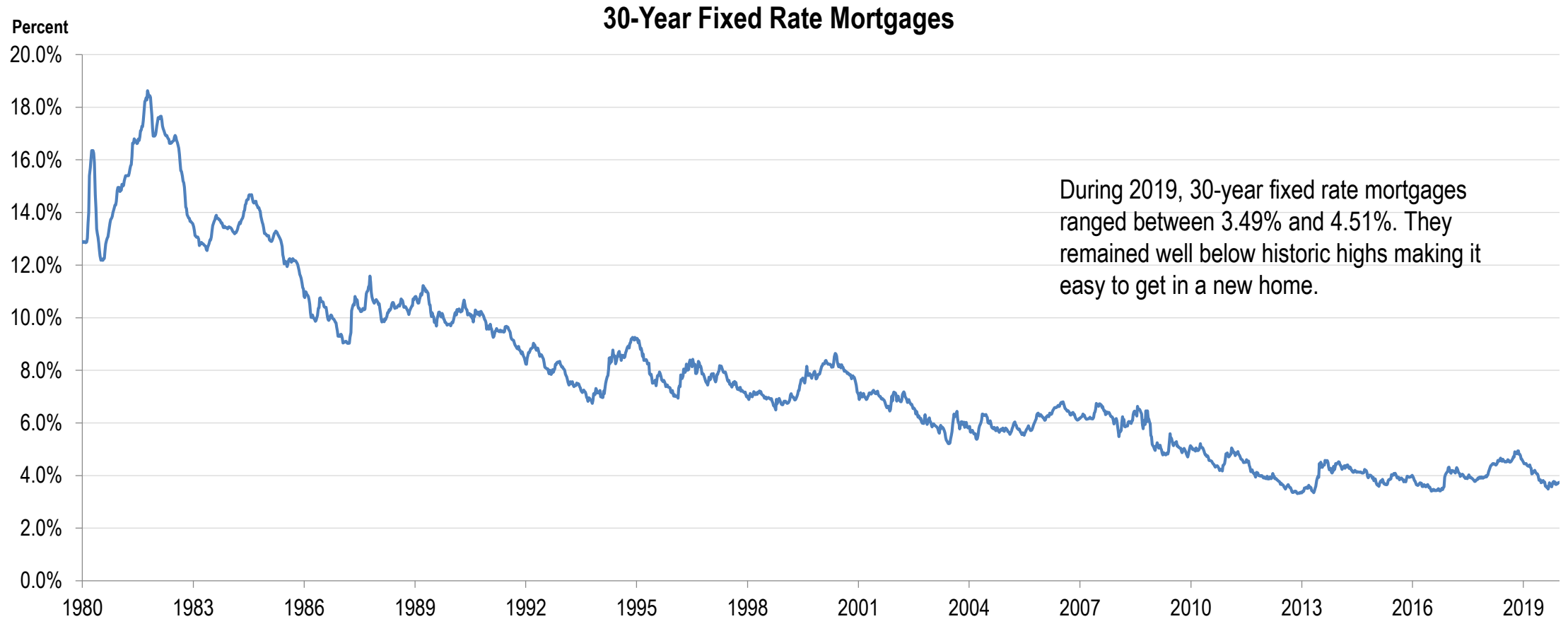
Builders are upbeat. The number of permits issued and starts are solid. Construction spending and employment levels point to continued growth. Inflation and interest rates remain low, and housing prices are increasing at a slower rate. There is optimism that millennials will keep the boom intact as they move from the cities to the suburbs to raise families.

Wells Fargo NAHB HMI vs. Housing Starts



Source: NAHB, cber.co.

30-Year Fixed Rate Mortgages

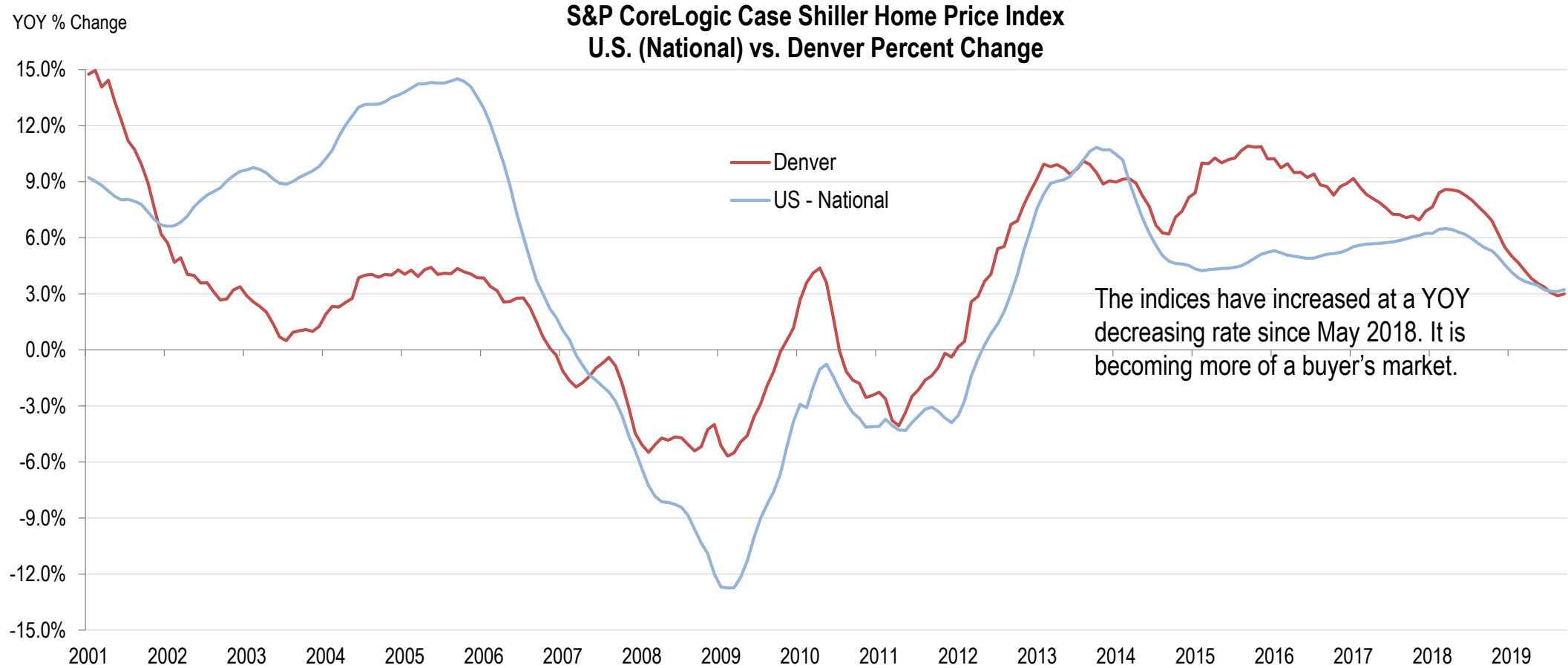


Source: FRED, Freddie MAC, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

Case Shiller Home Price Index

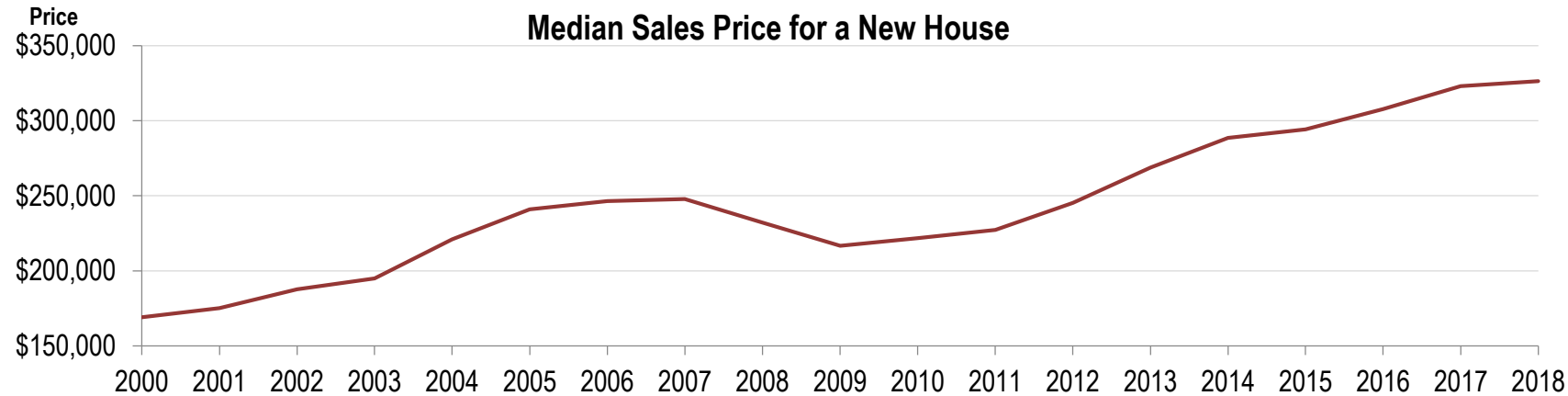
National vs. Denver Rate of Change



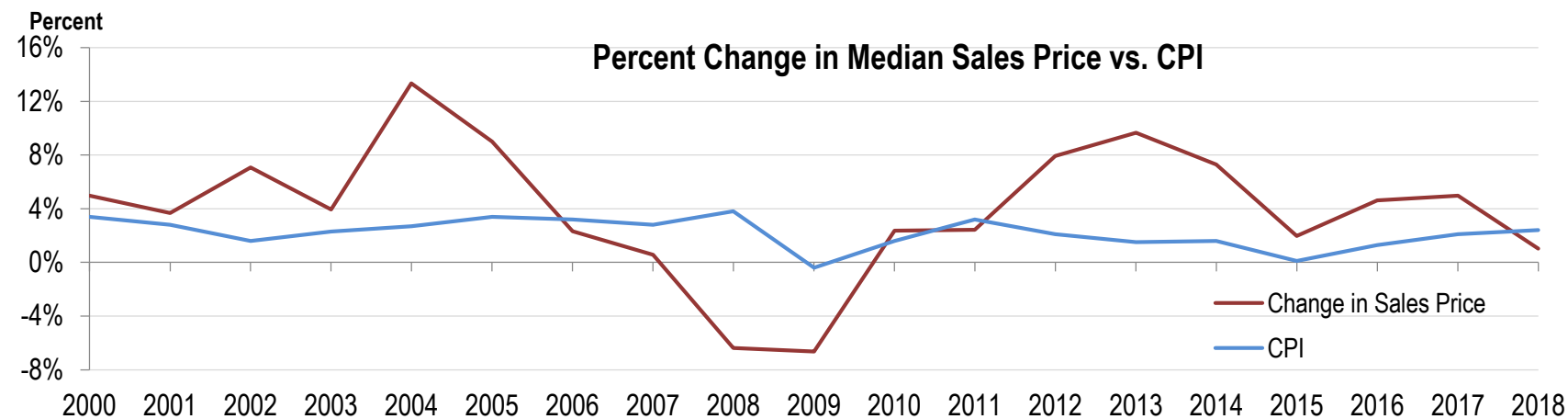
Source: S&P Core-Logic Case-Shiller, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

Median Sales Price for a New House



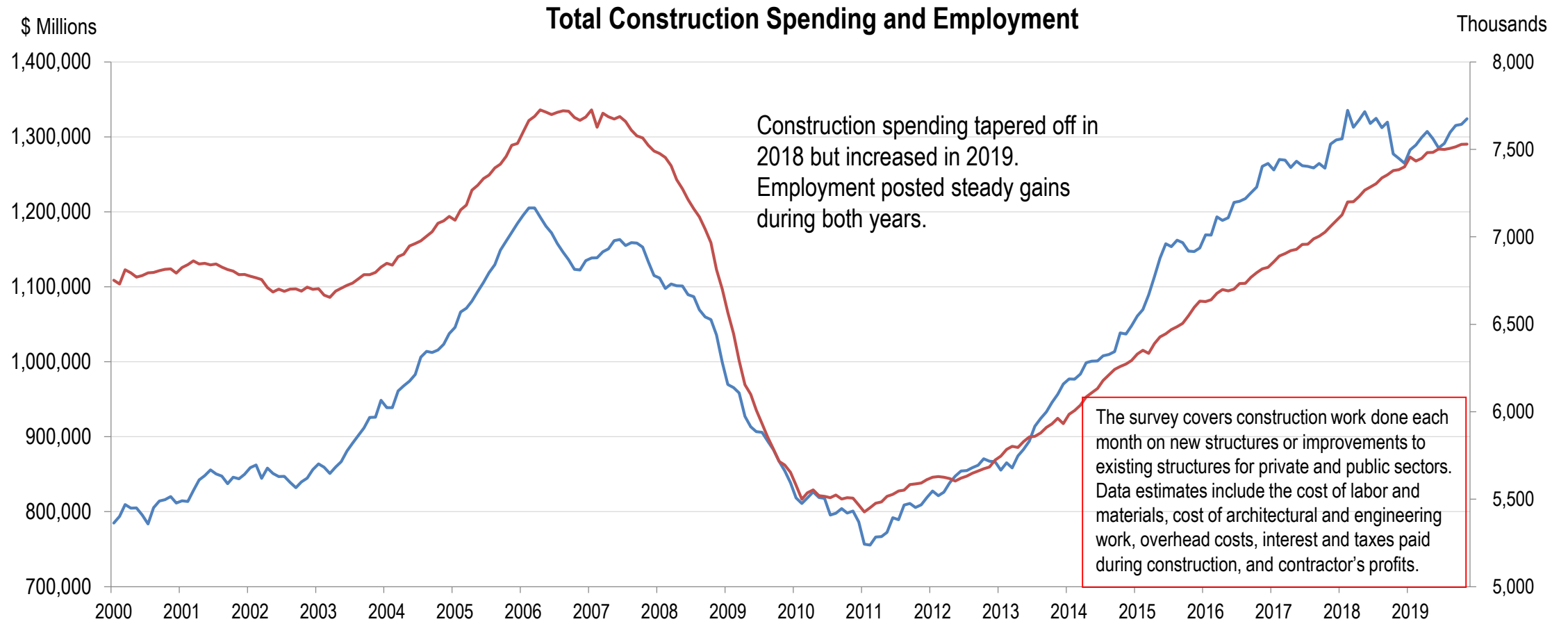
Median Sales Price
Between 2000 and 2018, the median sales price of a new house increased at an annualized rate of 3.7%.



% Change in Sales Price vs. CPI
Between 2000 and 2018, the U.S. CPI increased at an annualized rate of 2.1%.

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

Total U.S. Construction Spending and Employment

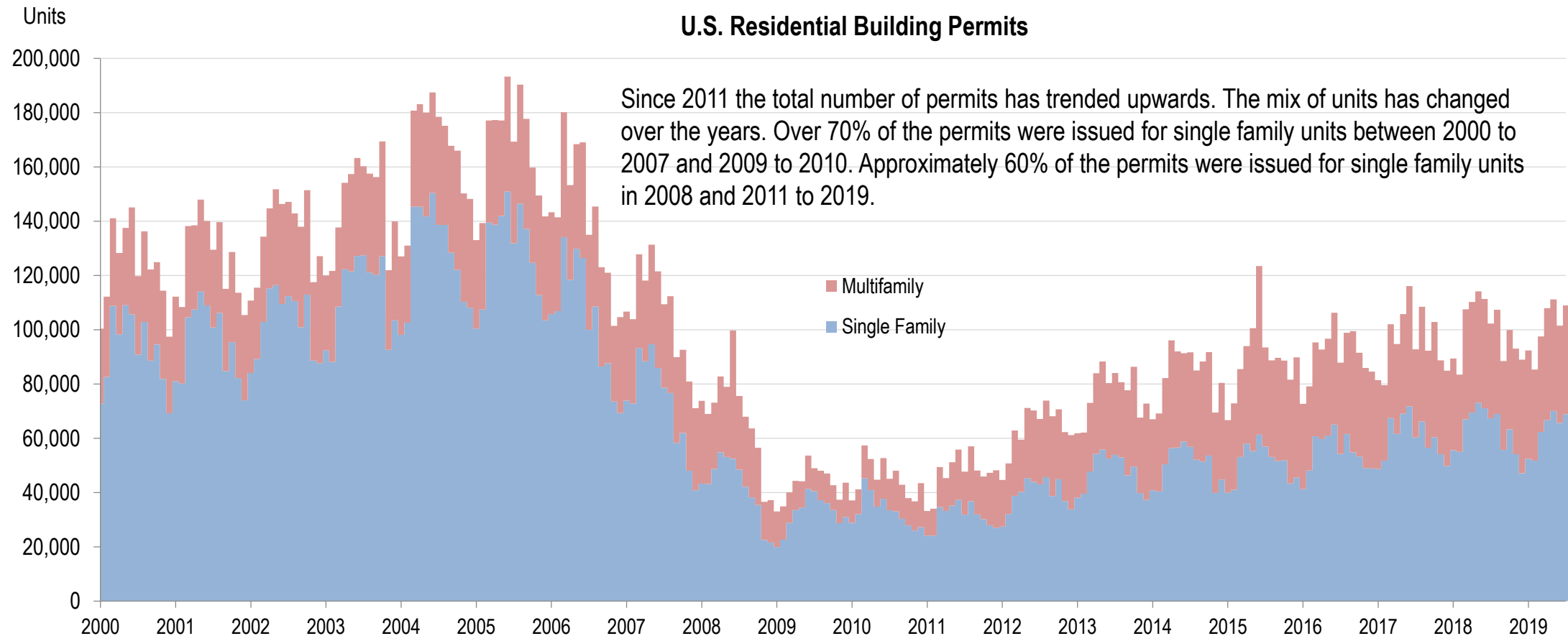


Source: FRED, Census Bureau, not adjusted for inflation, SAAR; BLS, SA cber.co.

Colorado-based Business and Economic Research <https://cber.co>

U.S. Residential Building Permits

Units



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

Colorado-based Business and Economic Research <https://cber.co>

United States Economy - Energy

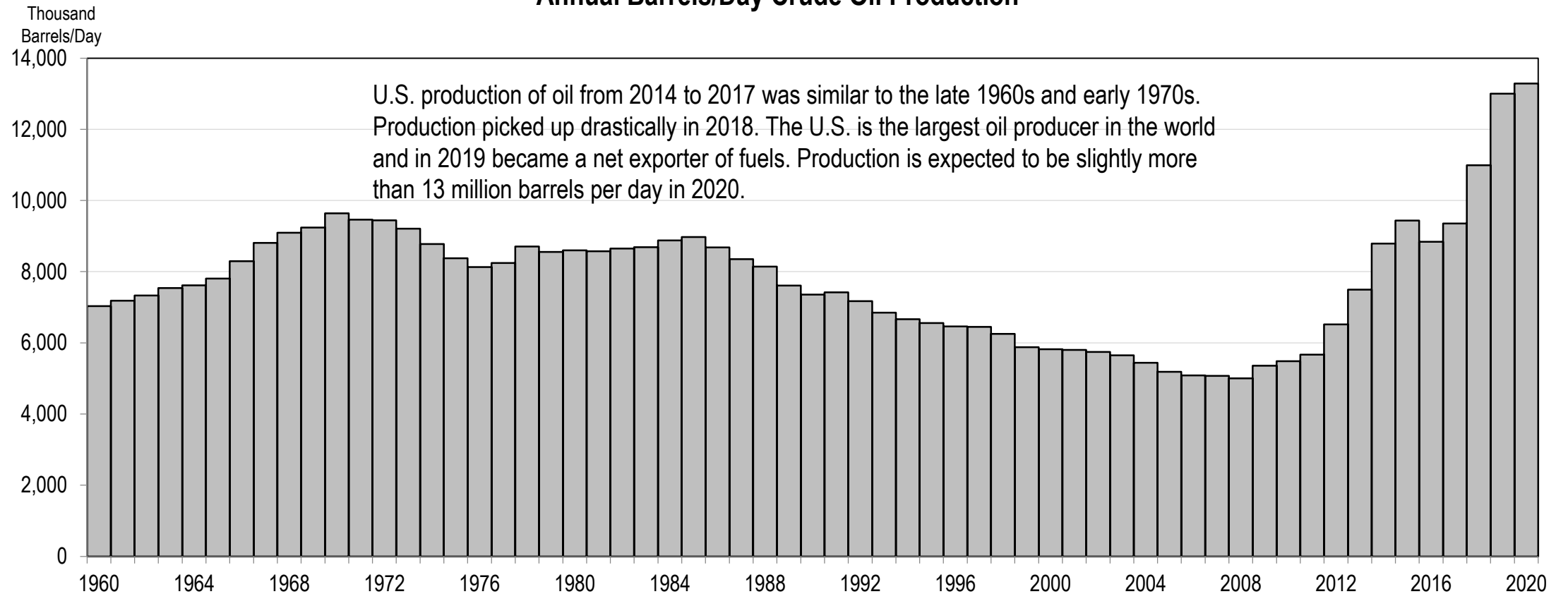
Crude Oil, Coal, Natural Gas, Sources of Energy for Electricity, Photovoltaics, and Motor Vehicles

The United States is the leader in the production of crude oil and natural gas. Over the past three decades, the mix of sources for production of electricity have changed drastically. Between 1990 and 2018 there have been 1,140 billion KWH added. Of that natural gas has added 1,095 billion KWH. Renewables and nuclear sources have captured market share from coal and petroleum and other sources. Electric vehicles are slowly capturing market share, although growth is hampered by high prices and issues related to their batteries.

Annual U.S. Crude Oil Production

Thousand Barrels/Day

Annual Barrels/Day Crude Oil Production

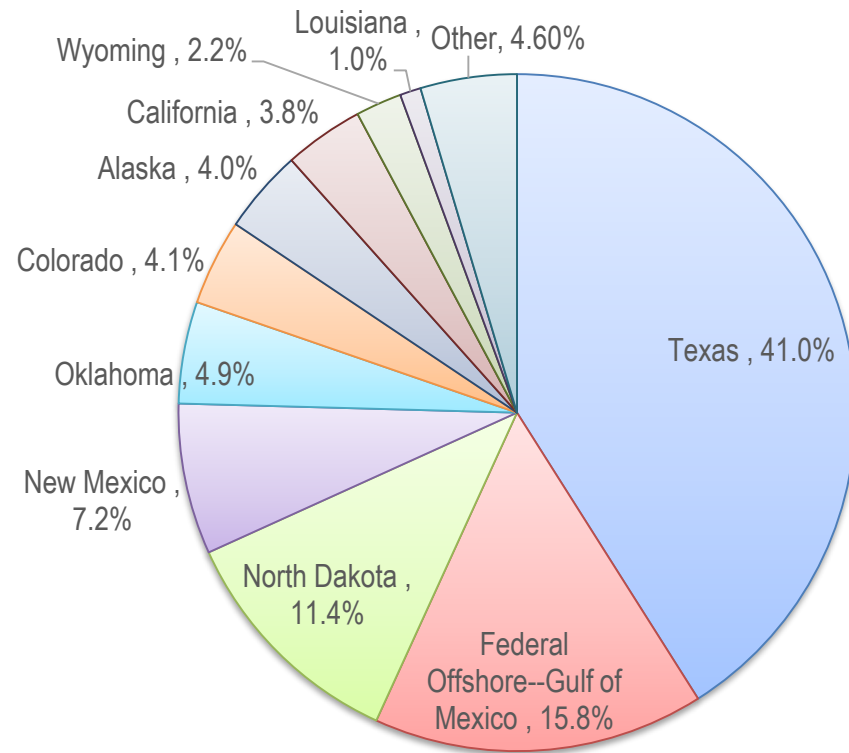


Source: EIA, cber.co.

Crude Oil Production by State

January - June 2019

Percent of U.S. Production, 2019



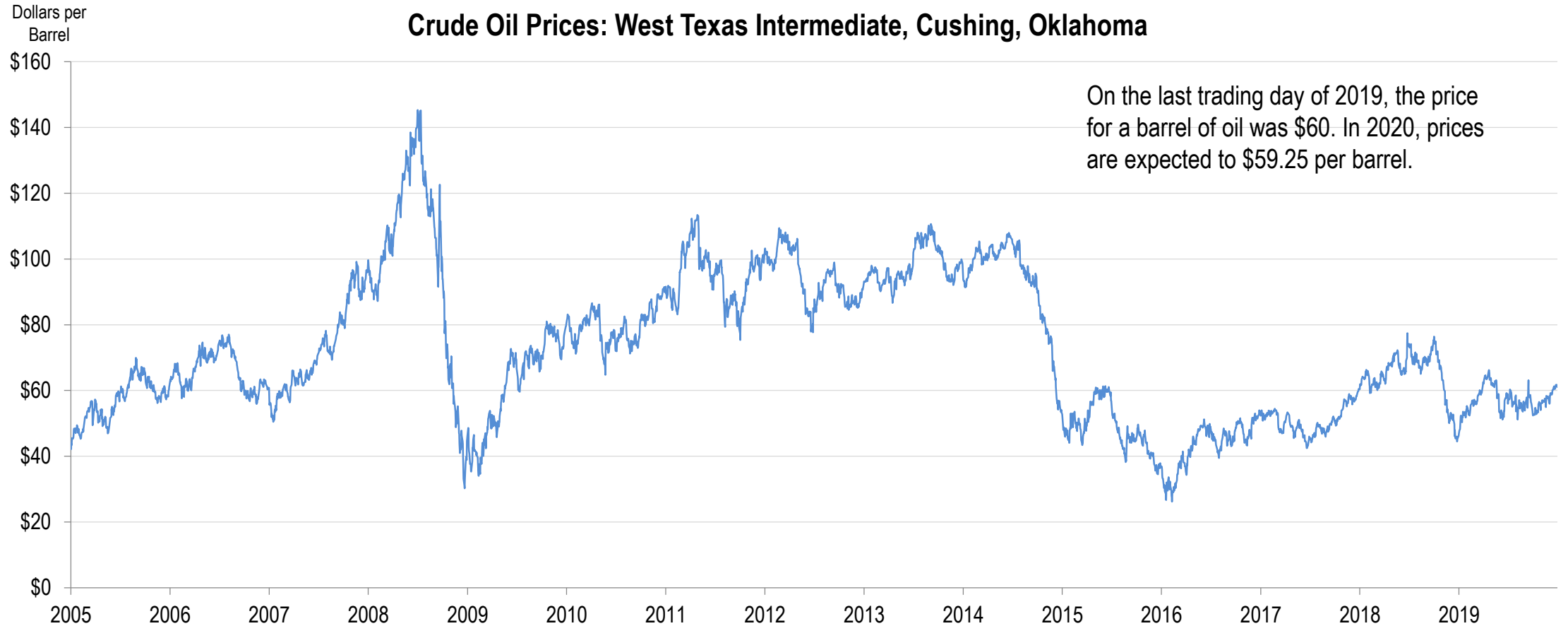
Percent of Oil Production by State

Oil is produced in 32 states plus two federal offshore regions (Gulf of Mexico and West Coast). Over the course of a year, there is very little change in the ranking of the top 10 oil-producing states or regions. Colorado accounted for 4.1% of the total oil produced during this period. The production of oil is critical to the U.S. and Colorado economies and the country's efforts to be energy independent.

Source: EIA, cber.co.

Crude Oil Prices

West Texas Intermediate

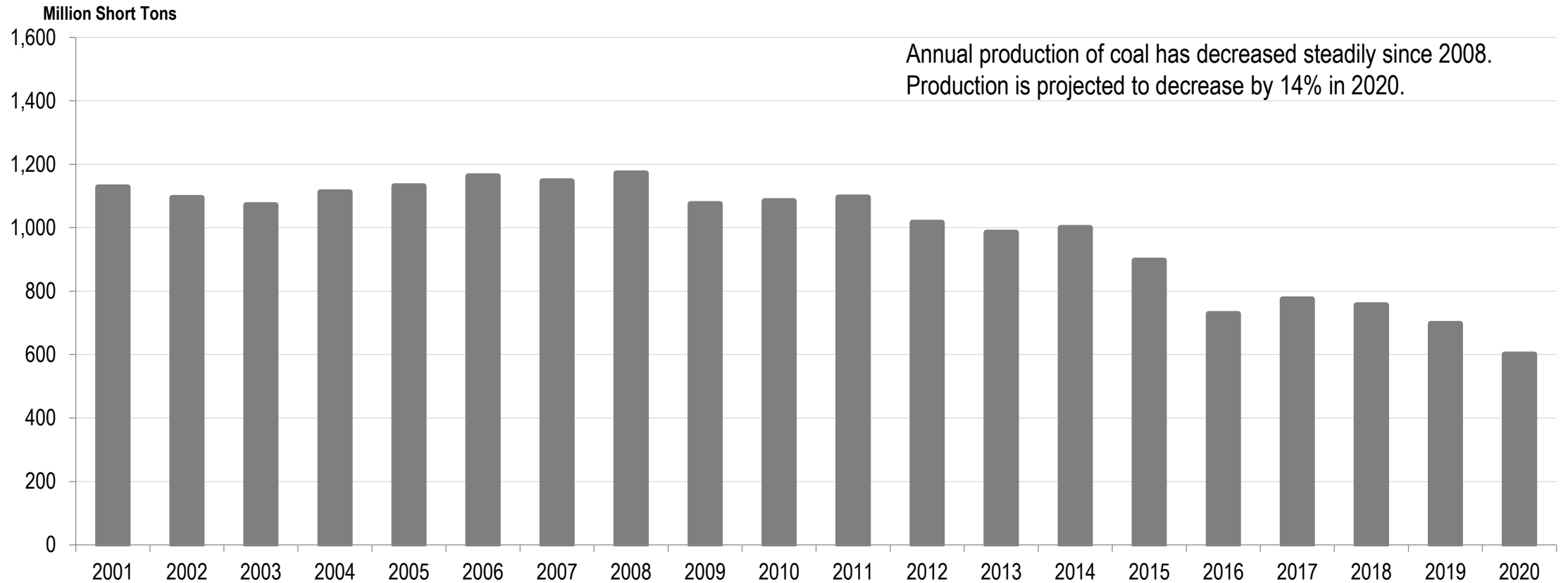


Source: FRED, EIA, cber.co.

Annual U.S. Production of Coal

Million Short Tons

U.S. Annual Production of Coal

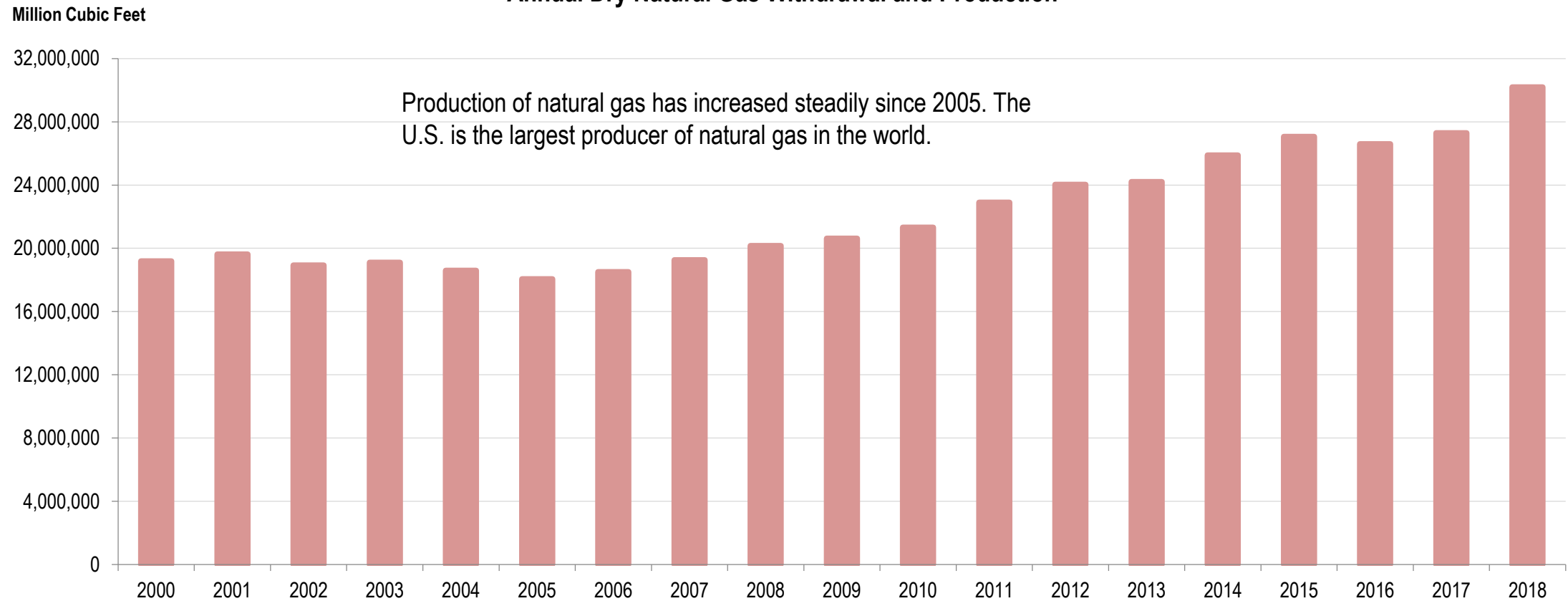


Source: EIA, cber.co.

Annual U.S. Dry Natural Gas Withdrawal and Production

Million Cubic Feet

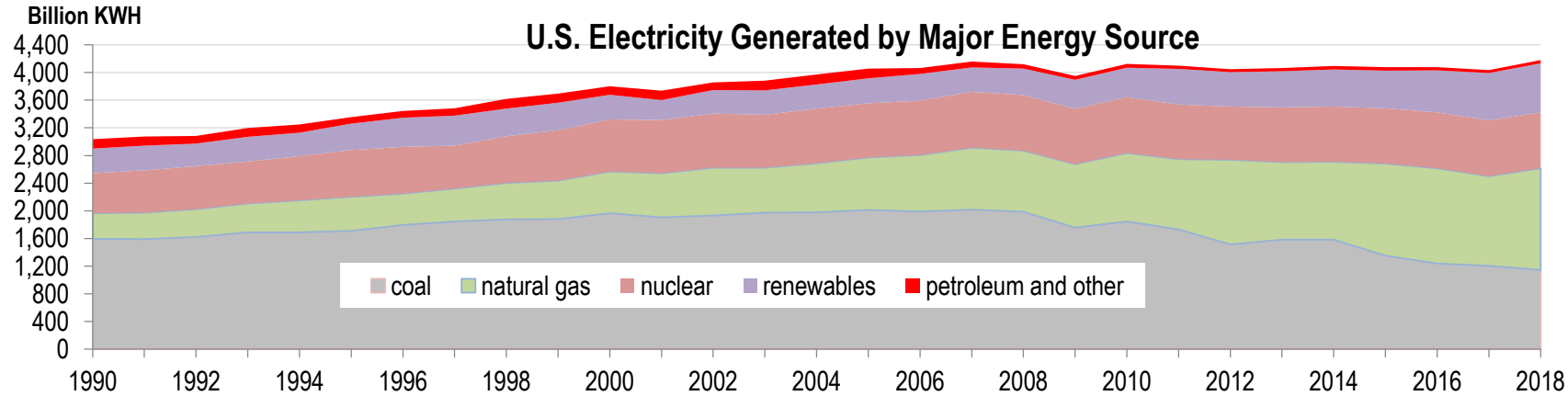
Annual Dry Natural Gas Withdrawal and Production



Source: EIA, cber.co.

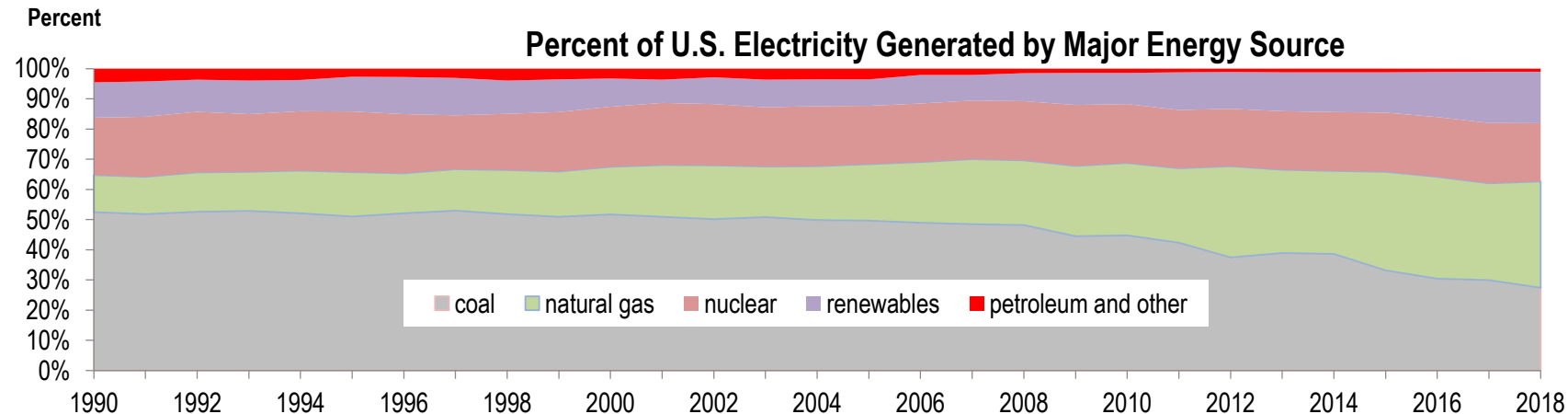
U.S. Electricity Generated by Major Energy Source

1990 to 2018 (Billion Kilowatt Hours)



Change in Electricity Generated by Major Source (1990 to 2018)

- Coal -1.2% CAGR; -448 B KWH
- Natural Gas 5.0% CAGR; 1,095 B KWH
- Nuclear 1.2% CAGR; 230 B KWH
- Renewables 2.5% CAGR; 356 B KWH
- Petro & Other -4.0% CAGR; -93 B KWH
- Total, 1.1% CAGR; 1,140 B KWH



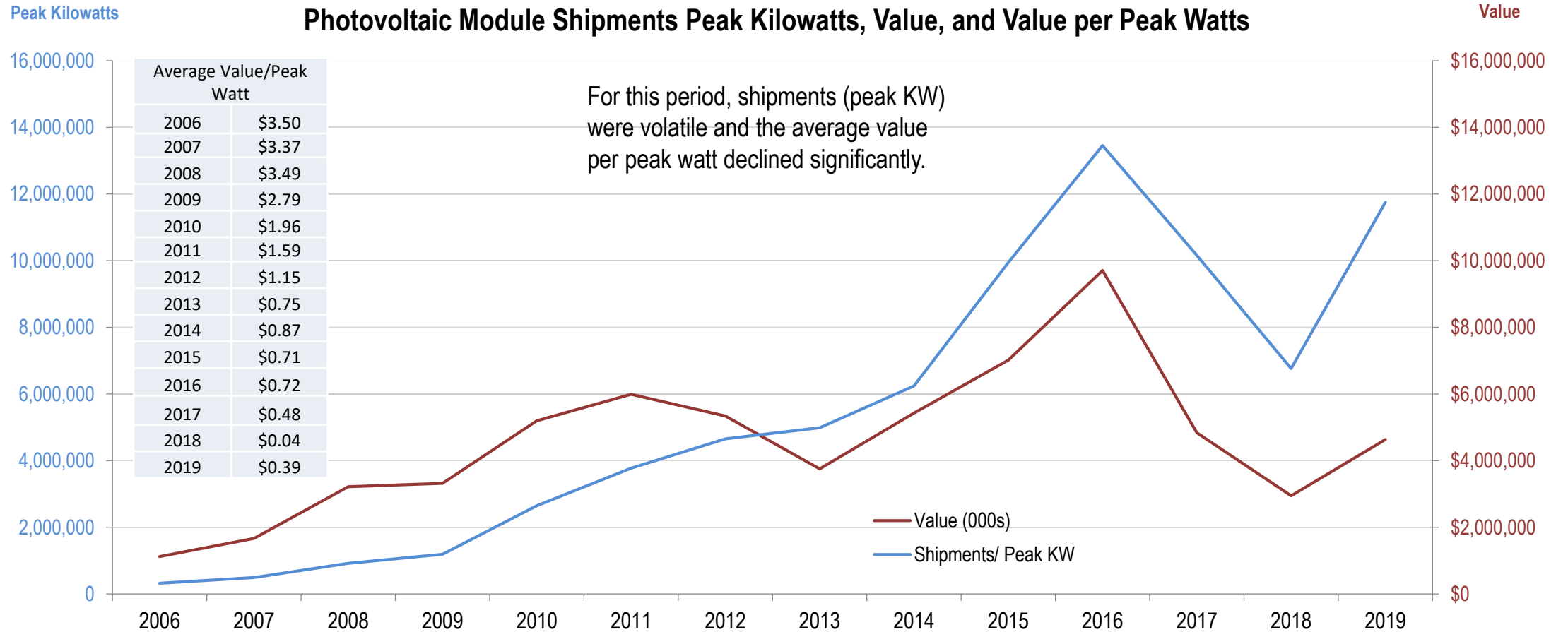
Change in Share Electricity Generated by Source (1990 to 2018)

- Coal 52.5% to 27.4%
- Natural Gas 12.3% to 35.1%
- Nuclear 19.0% to 19.3%
- Renewables 11.8% to 17.8%
- Petro and Other 2.5% to 1.1%

Source: EIA, cber.co.

Photovoltaic Module Shipments

Peak Kilowatts, Value, and Value per Peak Watts

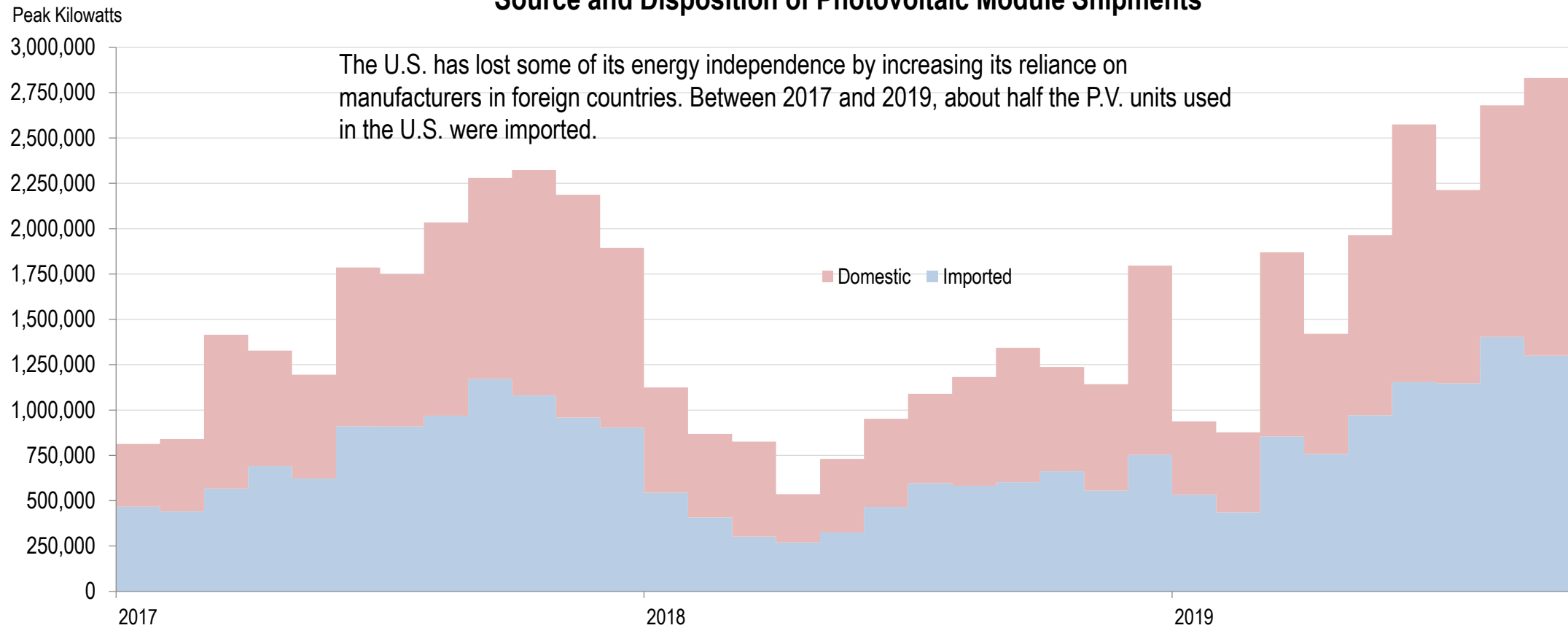


Source: EIA, cber.co. Note: 2019 is estimated based on YTD shipments.

Colorado-based Business and Economic Research <https://cber.co>

Source and Disposition of Photovoltaic Module Shipments

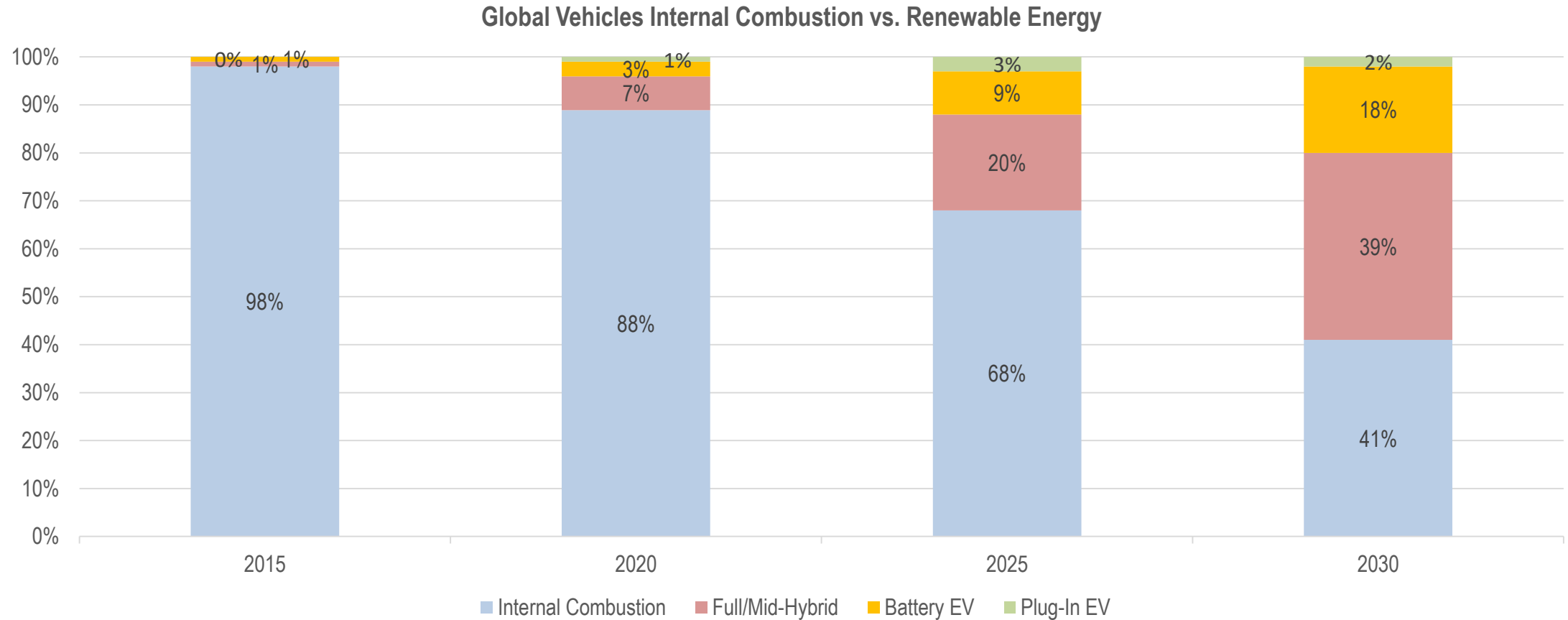
Source and Disposition of Photovoltaic Module Shipments



Source: EIA, cber.co.

Global Vehicles

Internal Combustion vs. Renewable Energy



Source: J.P. Morgan (October 2018) cber.co.

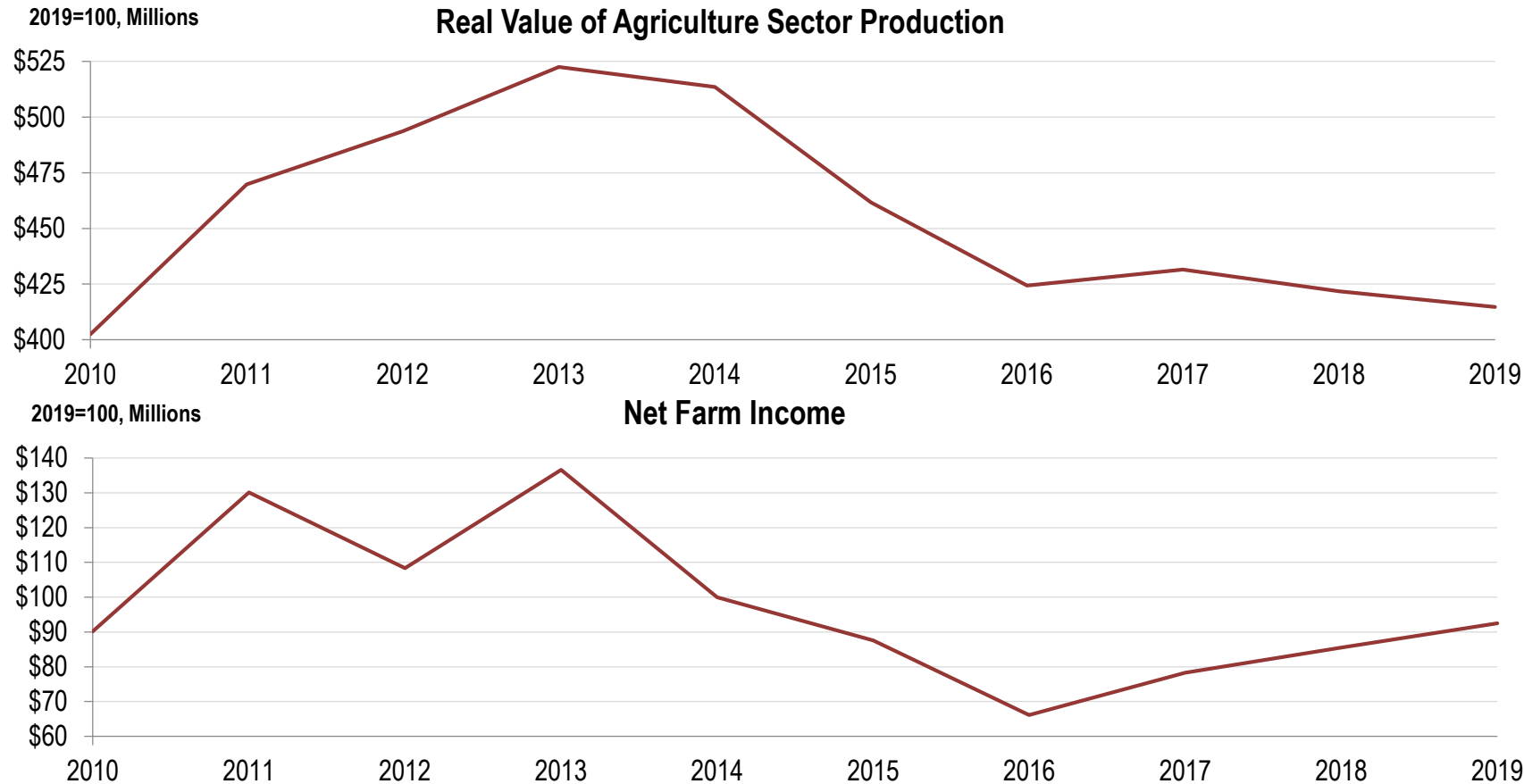
The U.S. Economy - Agriculture

Agriculture – Crops and Livestock Index and Exports

Agriculture is critical to the economy because everyone eats. Farmers and ranchers face a variety of challenges that make it difficult for them to make their operations profitable.

U.S. Agriculture

Real Value of Production and Net Income



Real Value of Agriculture Production

The real value of production in the agriculture sector changed very little in the 2000s.

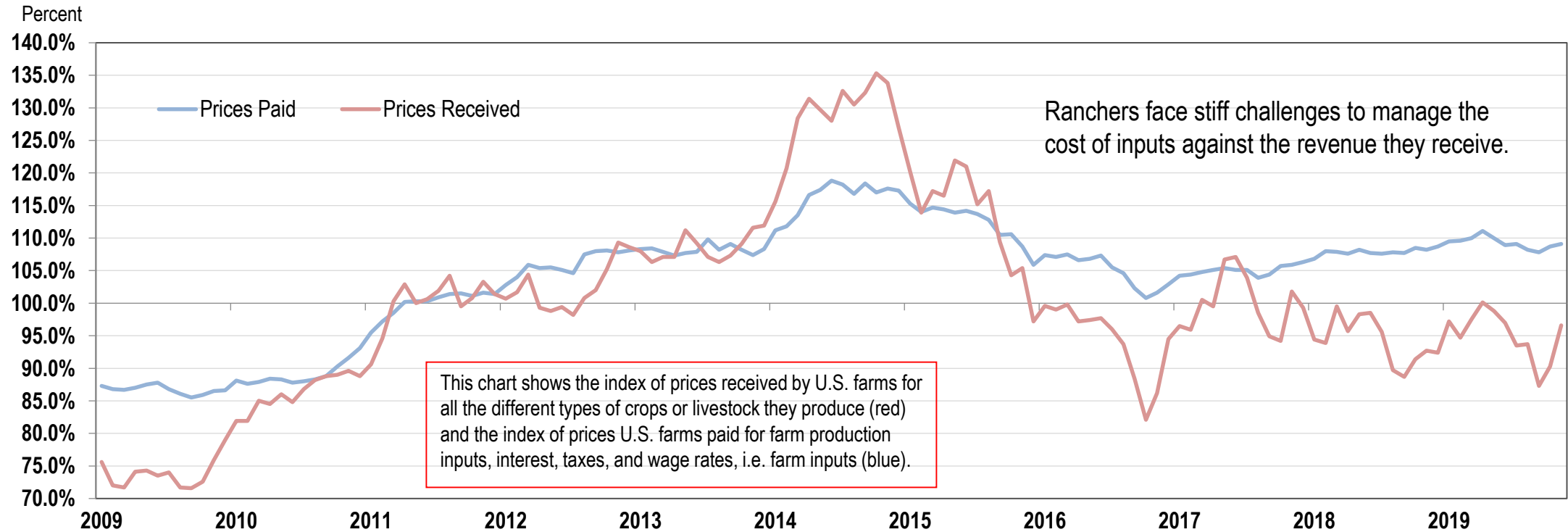
Net Farm Income

NFI trended downward between 2013 and 2019.

Source: cber.co. USDA, ERS. Note: Chained on 2019.

Farm Received and Paid Indexes Livestock

Livestock Farm Received and Paid Indexes

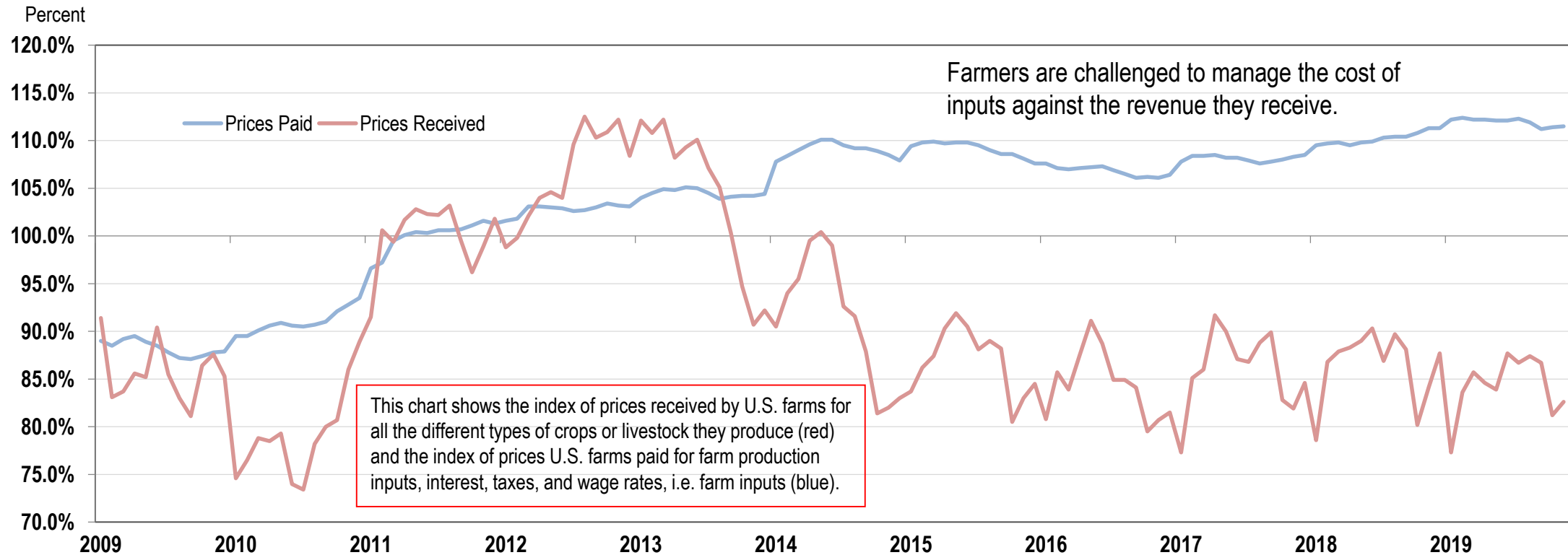


Source: NASS, cber.co, https://www.nass.usda.gov/Charts_and_Maps/Agricultural_Prices/cropfarm.php.

Farm Received and Paid Indexes

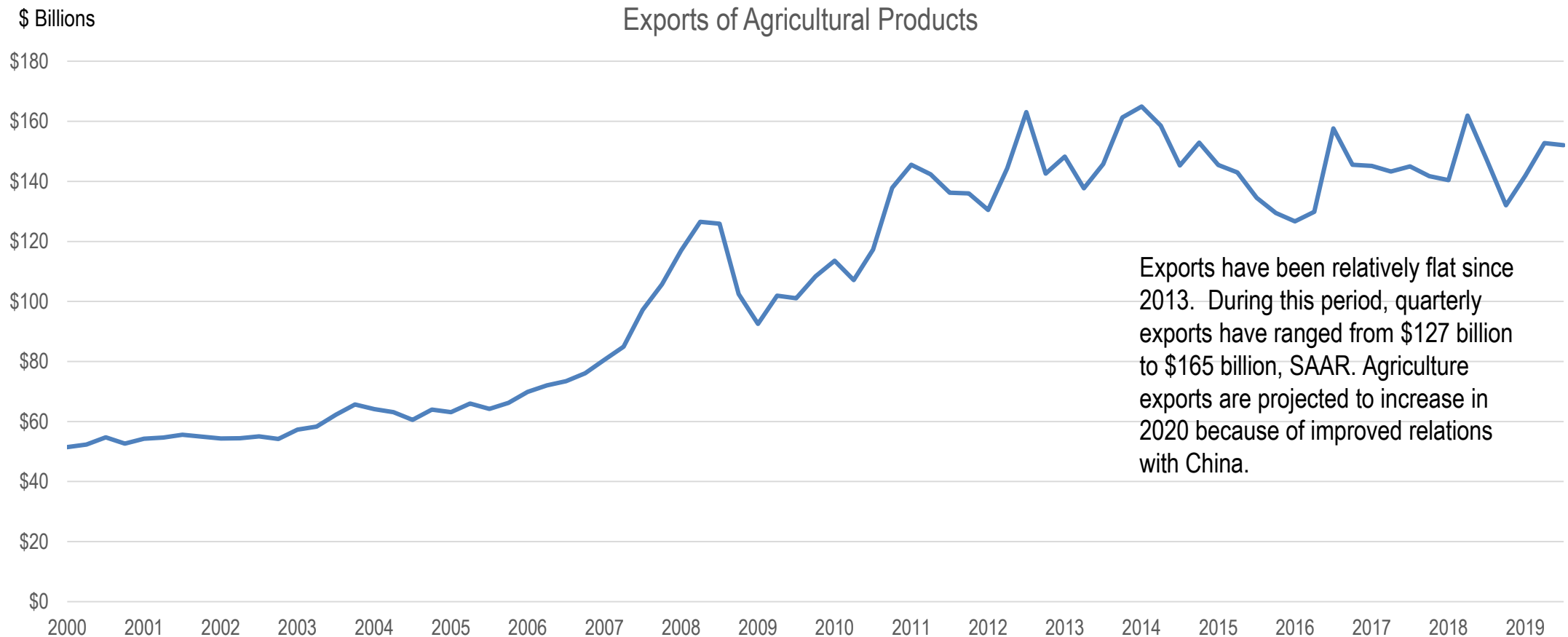
Crops

Crops Farm Received and Paid Indexes



Source: NASS, cber.co, https://www.nass.usda.gov/Charts_and_Maps/Agricultural_Prices/cropfarm.php.

Exports of Agricultural Products



Source: FRED, BEA, SAAR, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

The U.S. Economy

Summary

Review of 2019 and Outlook for 2020

Highlights of the United States Economy

1. There will be solid, but slower global and U.S. real GDP growth.
2. Most leading indicators and metrics point to continued economic growth, albeit at a pace that will be similar to 2019 or slightly slower. The low unemployment rate will stymie growth in many states and occupations.
3. Employment will be steady, but fewer jobs will be added at a slower pace than in 2019. The PST sector will be a source of strong job creation. Health care and construction will post modest job gains. Agriculture, manufacturing, and the extractive industries will face challenges in 2020.
4. There will be modest gains in wages and income. Inflation will remain near the Fed's target rate in 2020.
5. The growth of public debt is on an unsustainable path.
6. The equities market had a banner year in 2019. A repeat performance is unlikely in 2020.
7. Most indicators for industrial performance reflect solid growth.
8. The rate of growth in 2020 retail sales will be slower than 2019. New car sales will be challenged by prices and a strong used car market.
9. Manufacturing is in a slump caused by a strong dollar, trade policies (or the lack of them), and a slowing global economy. PST will continue to add high paying jobs that support technology advancement.
10. Low interest rates should support growth in the housing market. Builders are optimistic about the future.
11. The country's energy continues to be driven by fossil fuels, although renewable sources are slowly gaining market share. Electric vehicles are challenged by high prices and issues related to their batteries.
12. Agriculture is everyone's favorite industry because they have to eat. Unfortunately, it continues to be faced with a number of challenges ranging from trade policies to input costs.

This forecast does not take into account wildcard activities such as natural disasters, international disputes, wars, attacks or unexpected policies that may have numerous unintended consequences.

The Colorado Economy



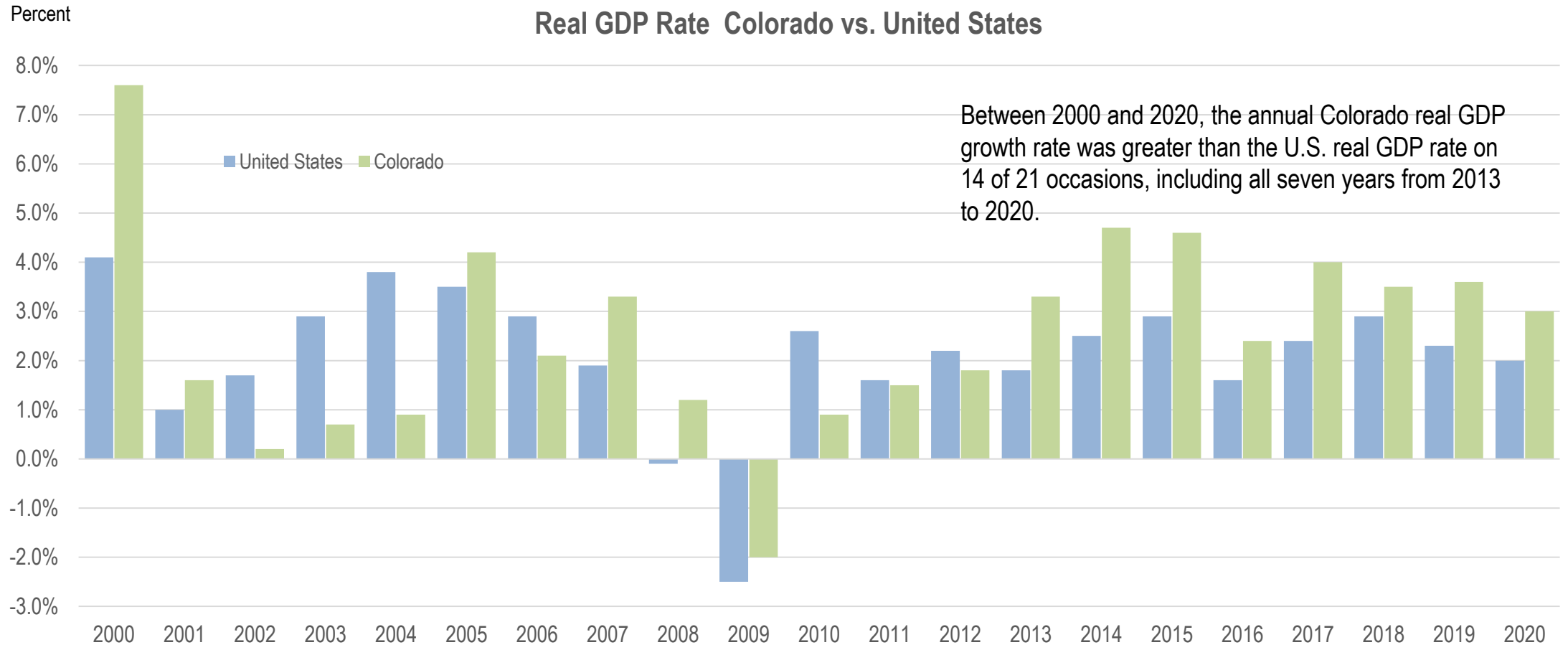
The Colorado Economy – GDP

Colorado vs. U.S. Real GDP, Change in GDP, Concentration of GDP by Industry, GDP by Region

Between 2010 and 2018 the rate of growth in the Colorado GDP will be greater than the rate for the U.S. About 89% of the state's GDP is concentrated in the state's 7 MSAs. Since 2010 the change in GDP has been driven by real estate and finance; PST, construction, and state and local government. Colorado has a GDP competitive advantage in the extractive industries, tourism, PST, construction, real estate, and transportation and warehousing.

Real Gross Domestic Product

Colorado vs. United States (Annual)

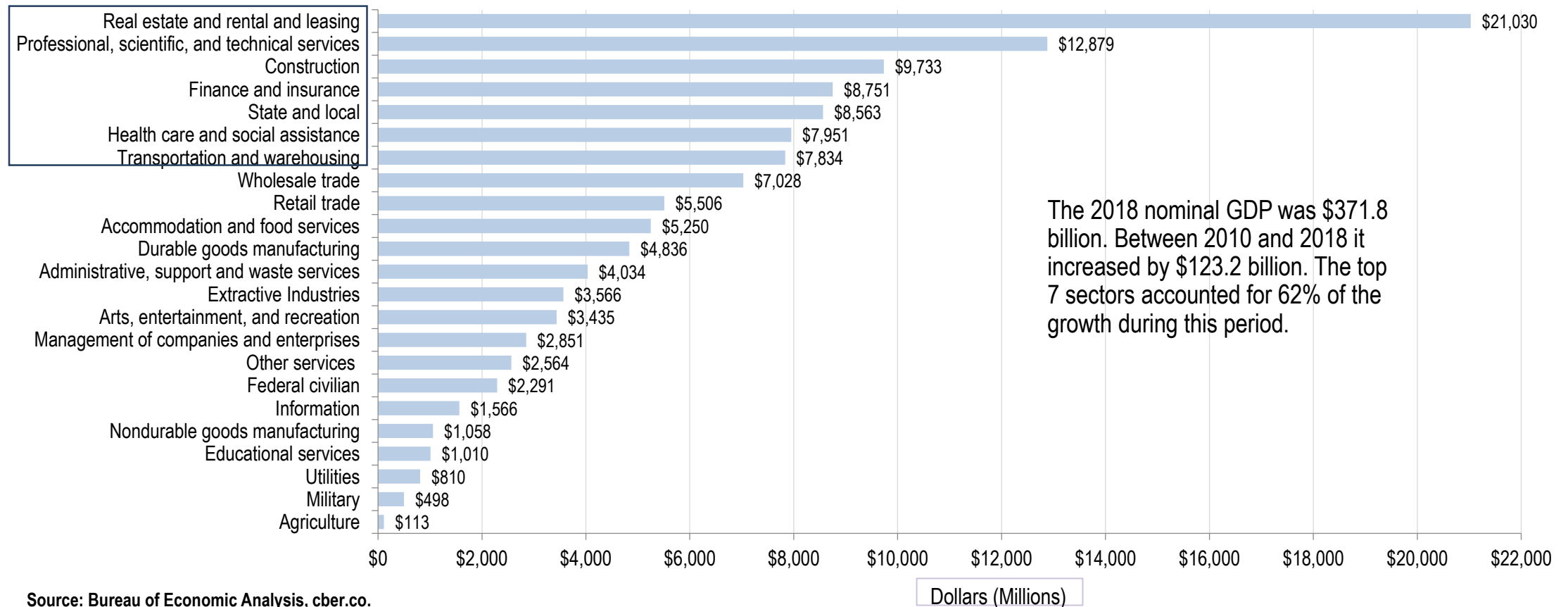


Source: BEA, cber.co.

Change in Gross Domestic Product by Sector

Colorado 2009 to 2018

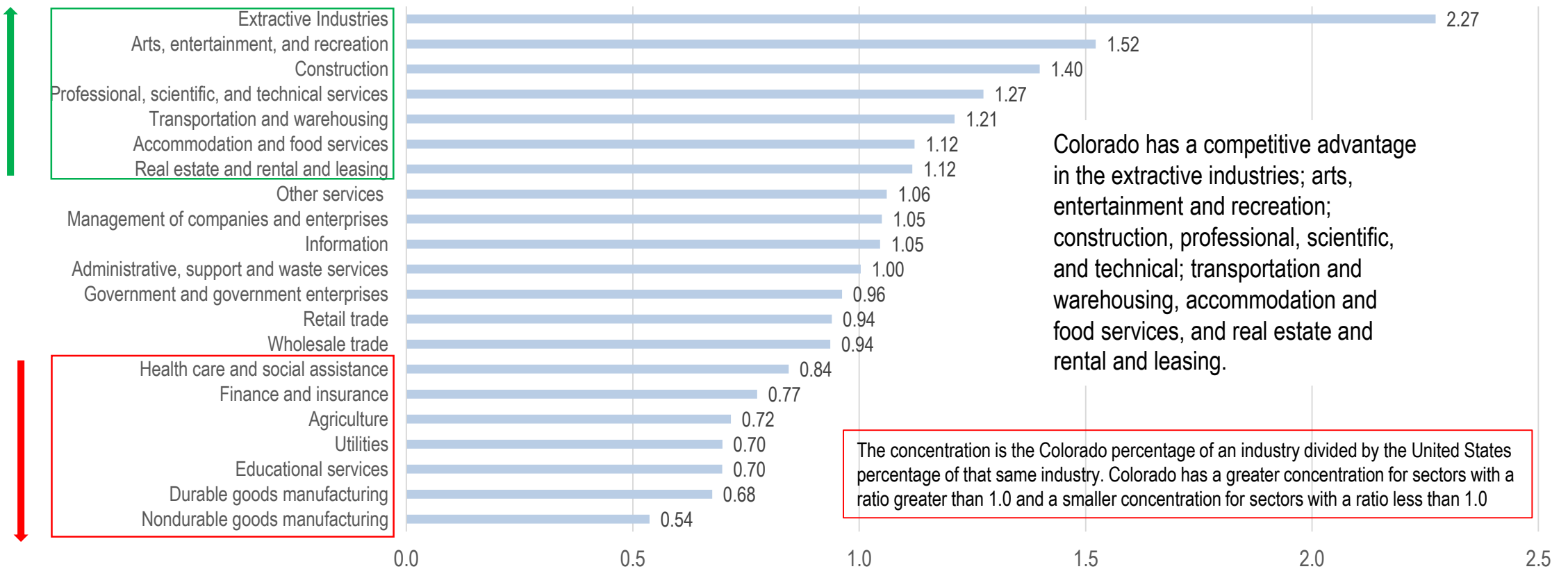
Change in Colorado GDP from 2010 to 2018



Source: Bureau of Economic Analysis, cber.co.

2018 Nominal Gross Domestic Product Concentration or Location Quotient

Concentration of Colorado GDP by Industry Sectors



Source: Bureau of Economic Analysis, cber.co.

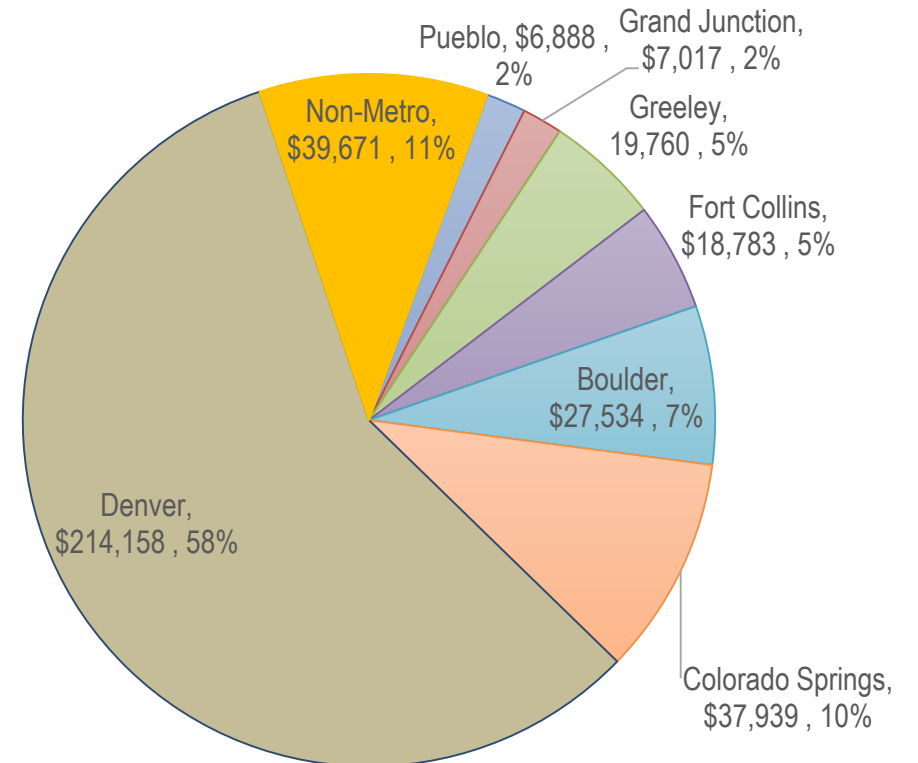
Gross Domestic Product

Colorado MSAs and Nonmetro

CAGR Change in Current Dollar 2010 to 2018

MSA	CAGR 2010 vs. 2018
Greeley	7.8%
Fort Collins	4.9%
Denver	4.8%
Colorado Springs	3.9%
Boulder	3.7%
Grand Junction	2.9%
Nonmetro	1.8%
Pueblo	1.7%

2018 Colorado MSA GDP (millions)



Source: Bureau of Economic Analysis, current dollars, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

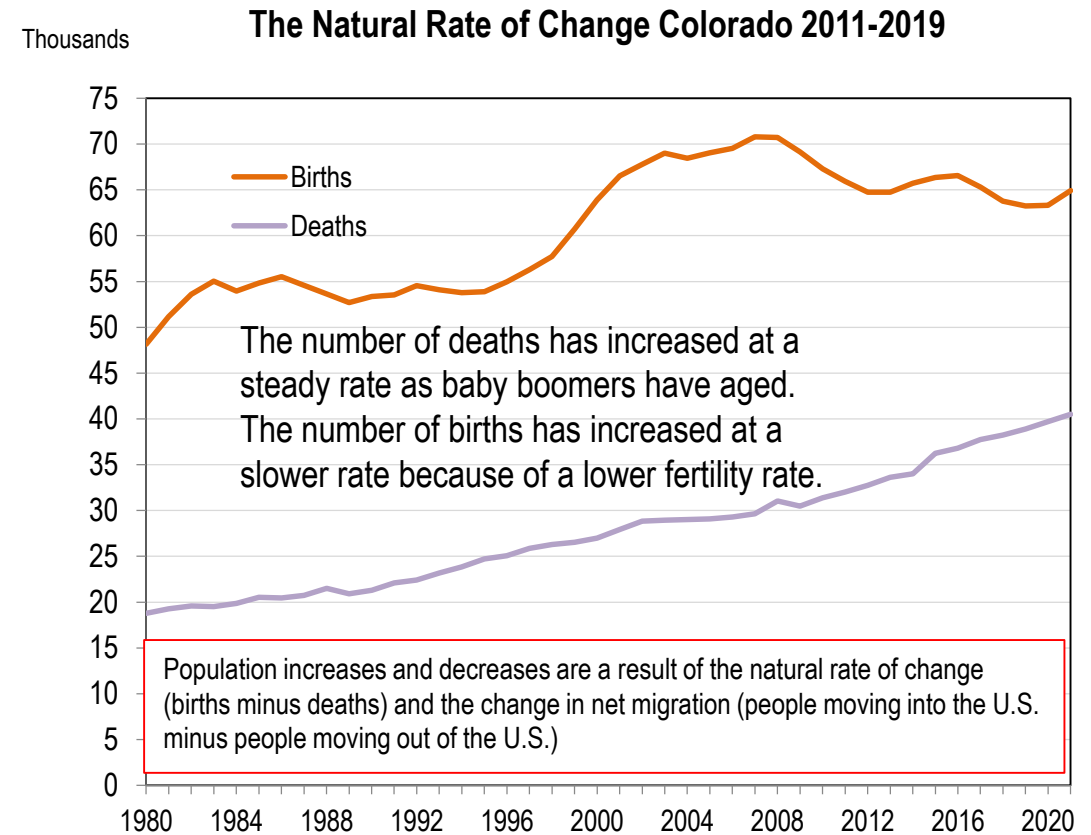
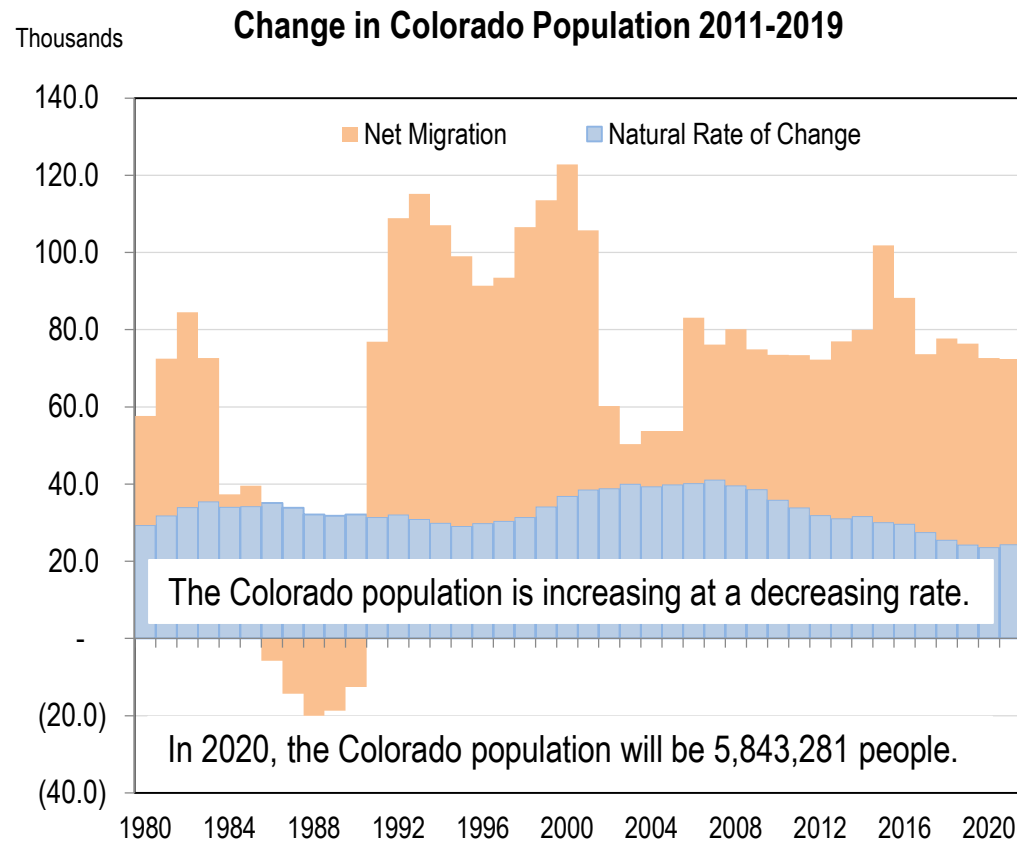
The Colorado Economy – Population

Total Population and Components of Change

In 2020 the Colorado population will be 5,843,281. The population will increase by 72,400 in 2020, with 48,000 from net migration and 24,400 from the natural rate of change. The lower rate of fertility is preventing the population from increasing at a faster rate.

Colorado Population

Components of Change



Sources: State Demography Office and cber.co.

Colorado-based Business and Economic Research <https://cber.co>

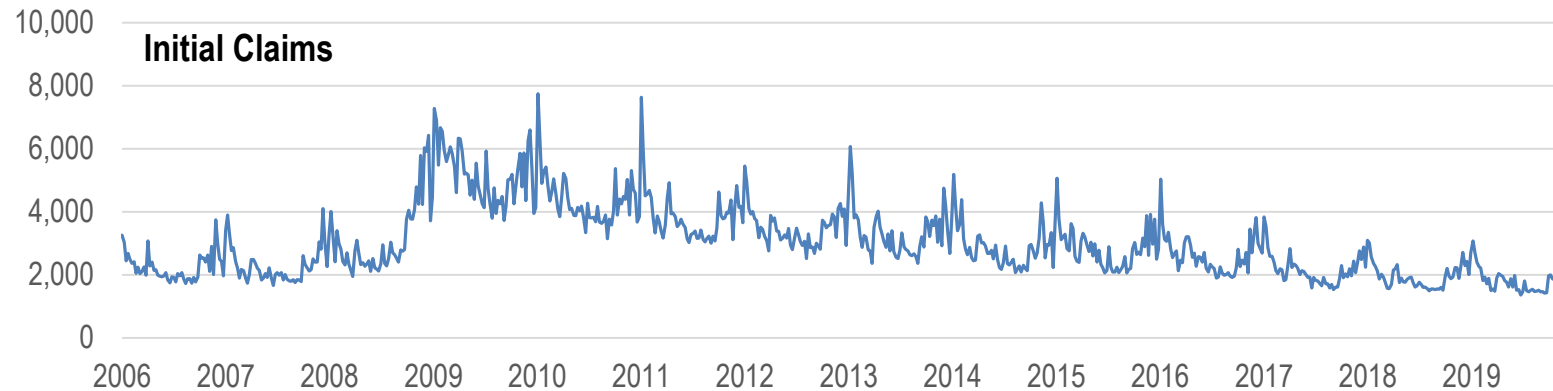
The Colorado Economy – Unemployment

Initial Claims Unemployment, LFPR, Change in the Size of the Labor Force, Supply of Workers, Earnings

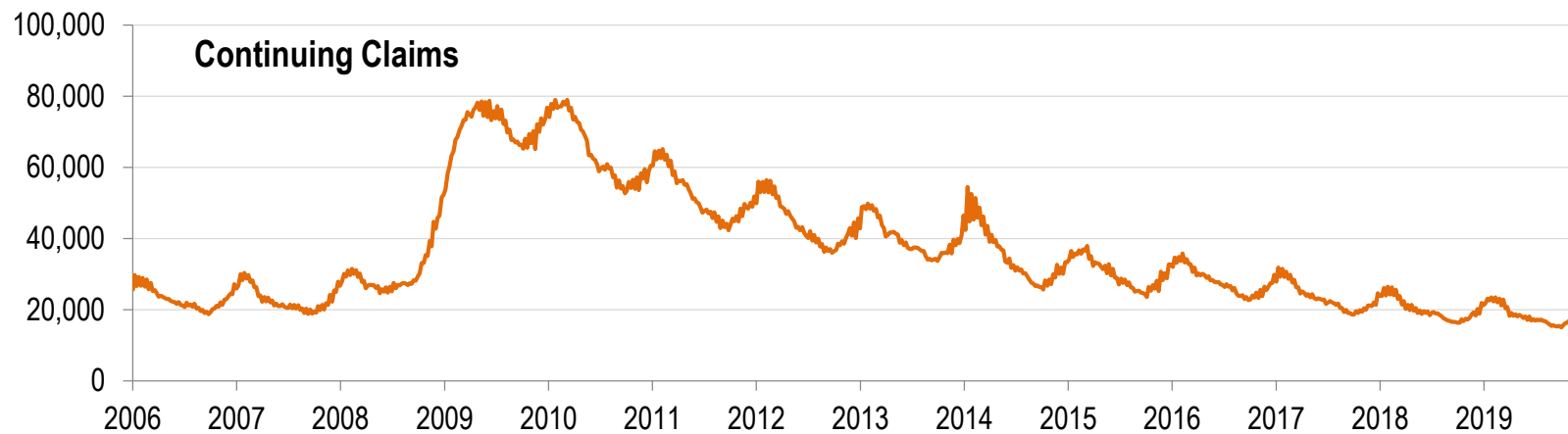
The LFPR has improved over the past year; however, the size of the labor force is increasing at a slower rate because the demand for workers exceeds the supply. There was a strong increase in hourly earnings in 2018 and 2019. There will be a solid increase in earnings in 2020.

Initial and Continuing Unemployment Claims

Colorado 1990 to 2006



Initial Claims
The number of initial claims was steady during 2019, although there was a spike at the end of 2019.



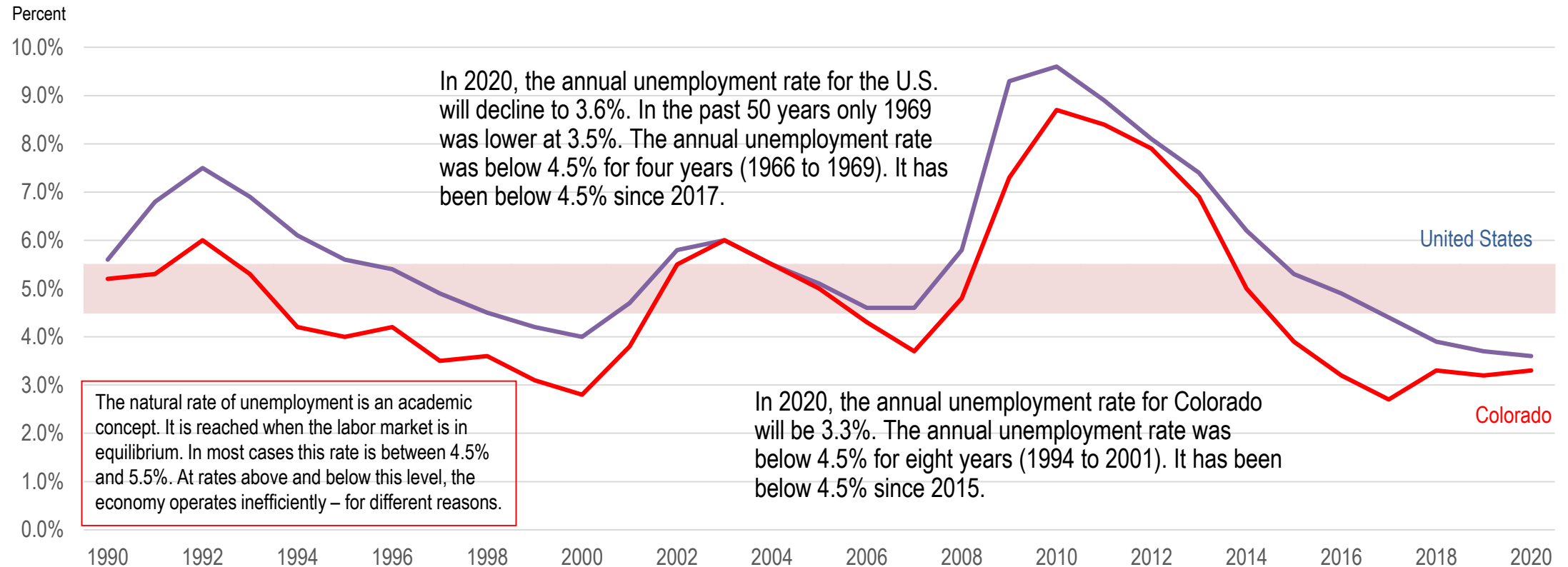
Continuing Claims
During 2019, the number of continuing claims trended downward.

Source: FRED, Department of Labor, cber.co.

Annual Change in Unemployment

Colorado vs. United States

Annual Change in Unemployment – Colorado vs. United States

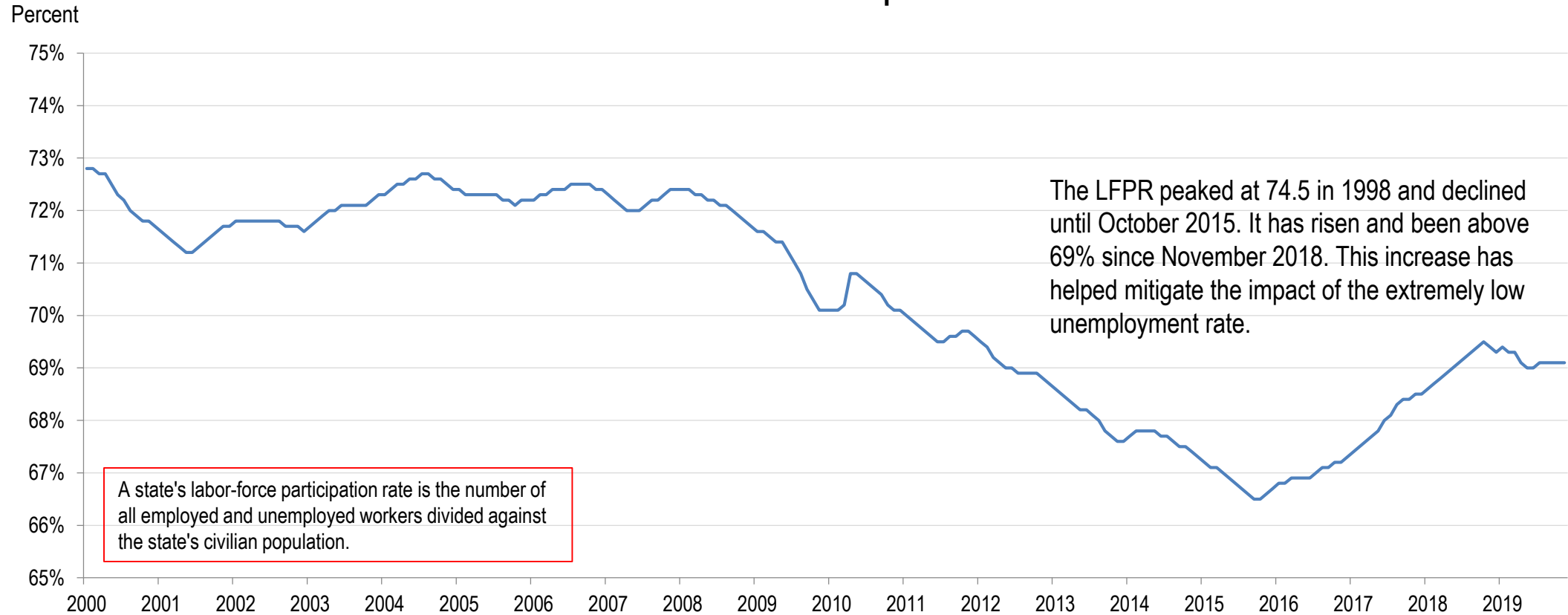


Source: Bureau of Labor Statistics, NSA; cber.co.

Labor Force Participation Rate

Colorado

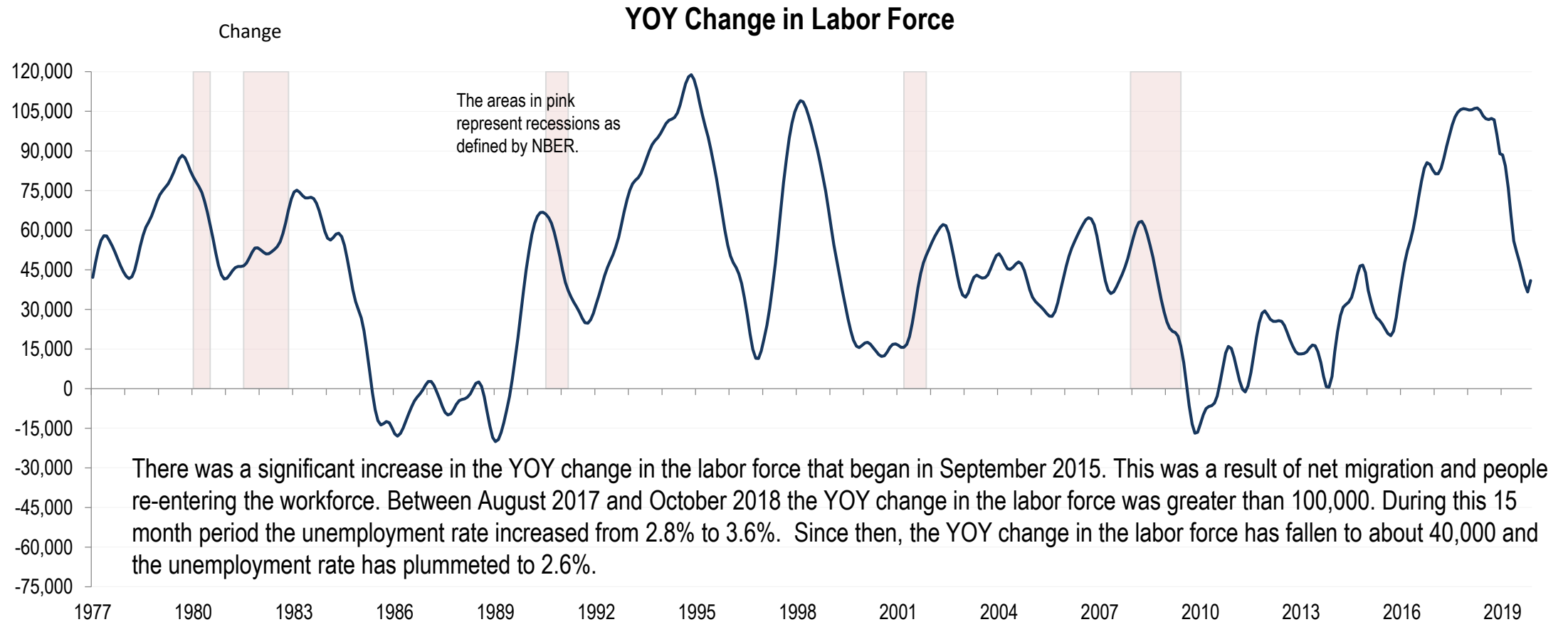
Labor Force Participation Rate



Source: FRED, BLS, cber.co.

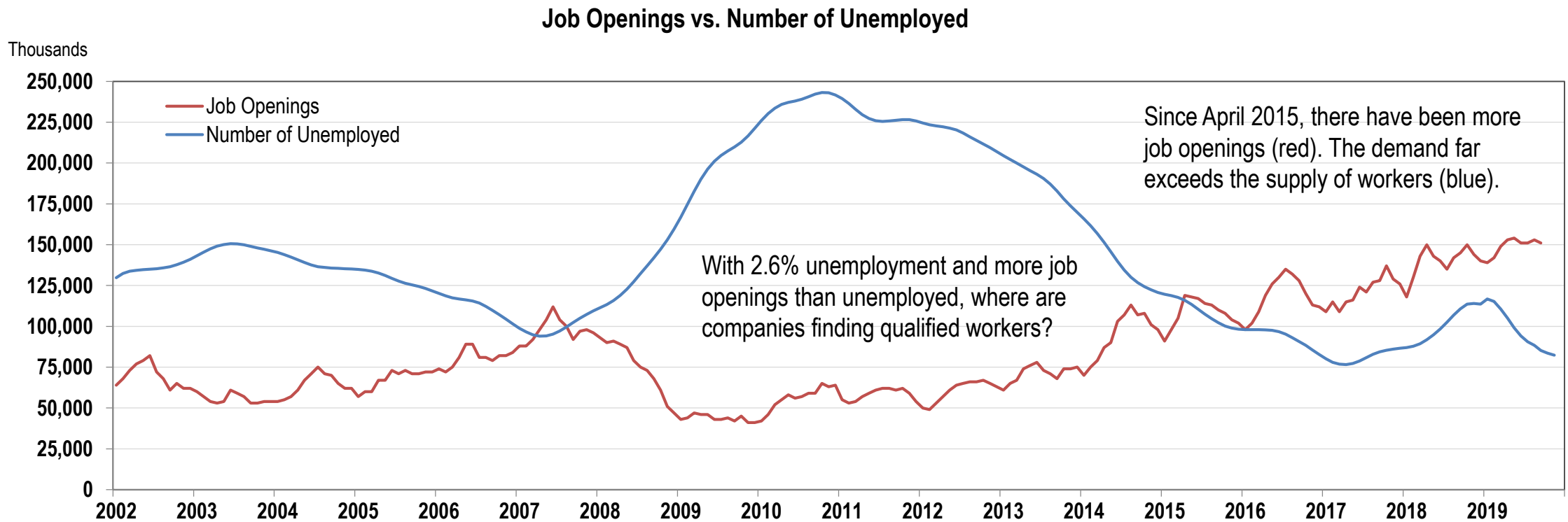
YOY Change in the Labor Force

Colorado



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

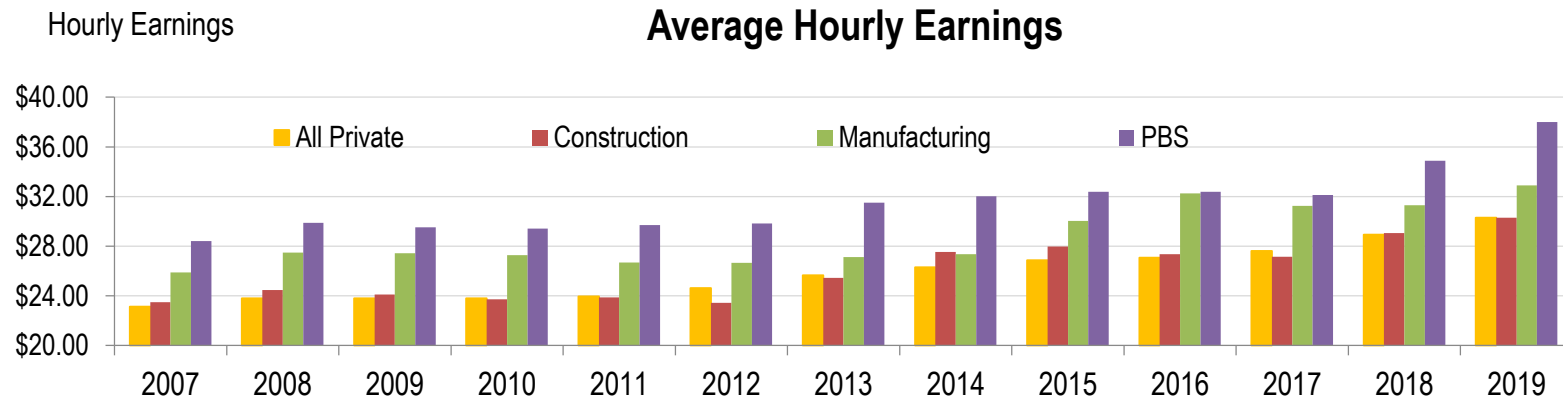
Job Openings vs. Number of Unemployment



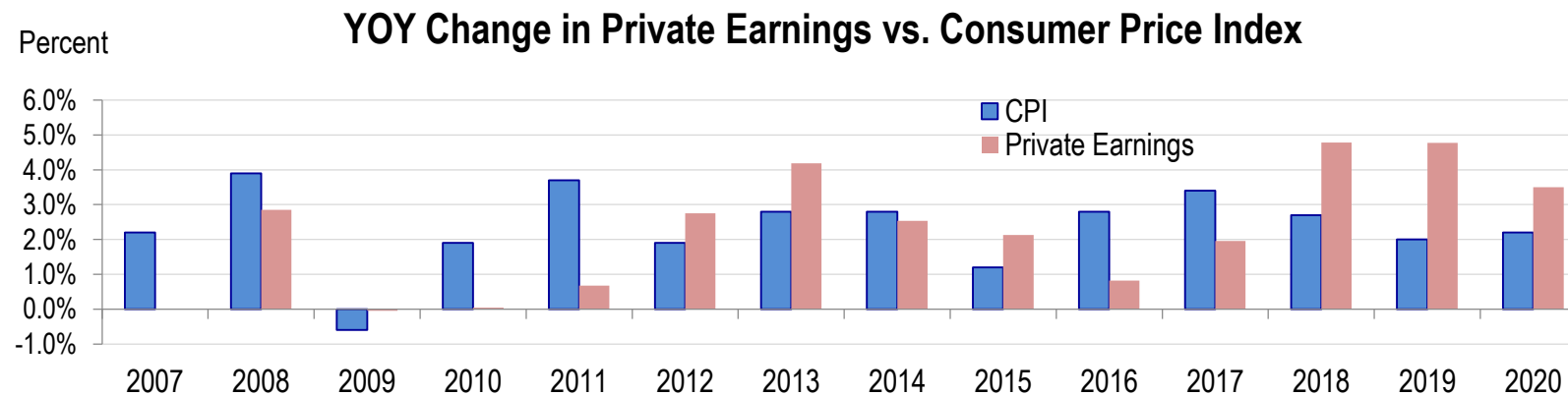
Source: Bureau of Labor Statistics, SA, cber.co. Note: Colorado JOLTS data is an experimental data set.

Average Hourly Earnings and CPI

Colorado



Average Hourly Earnings
Between 2007 and 2019, private wages increased at an annualized rate of 2.3%, construction earnings increased by 2.1%, manufacturing by 2.0%, and PBS by 2.5%.



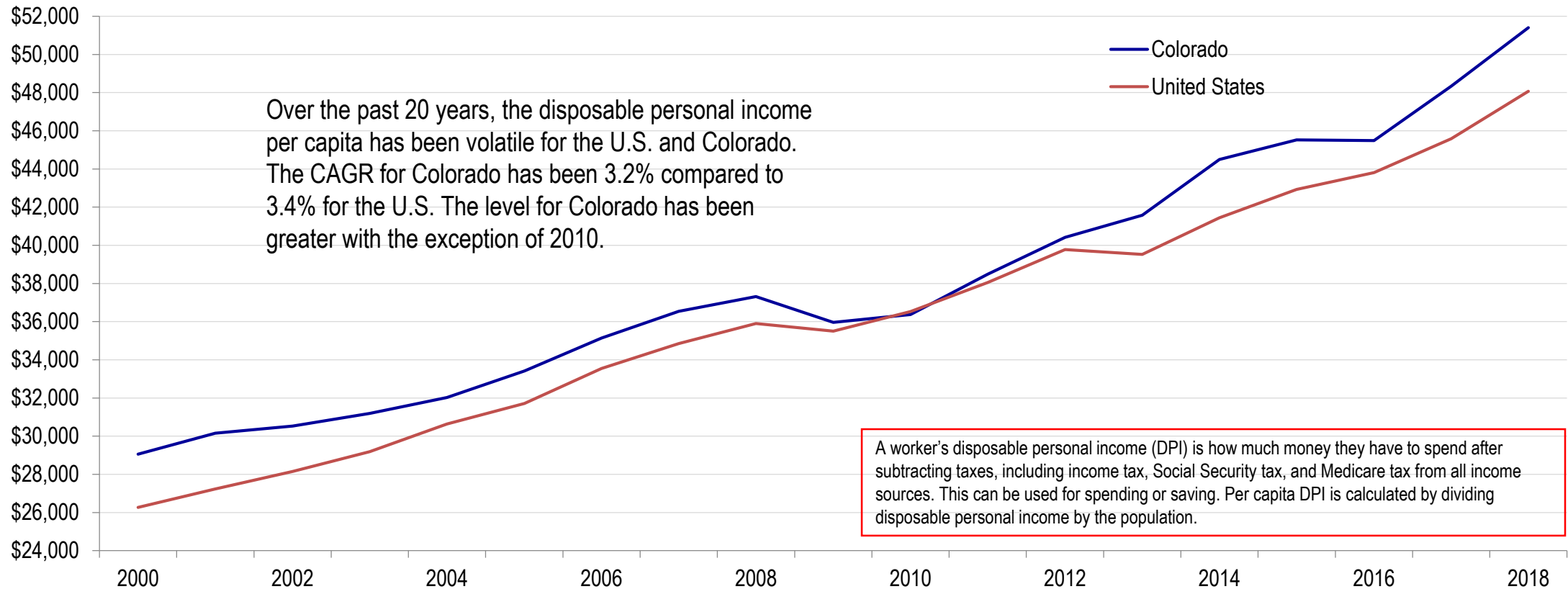
YOY Change in Private Hourly Earnings vs. Consumer Price Index
In 2020 private earnings are projected to increase by 3.5%, while the CPI increases by 2.2%.

Source: BLS, cber.co.

Annual Disposable Personal Income Per Capita

Colorado vs. United States

Disposable Personal Income Per Capita



Source: BEA, cber.co Note: Not adjusted for inflation.

The Colorado Economy – Employment

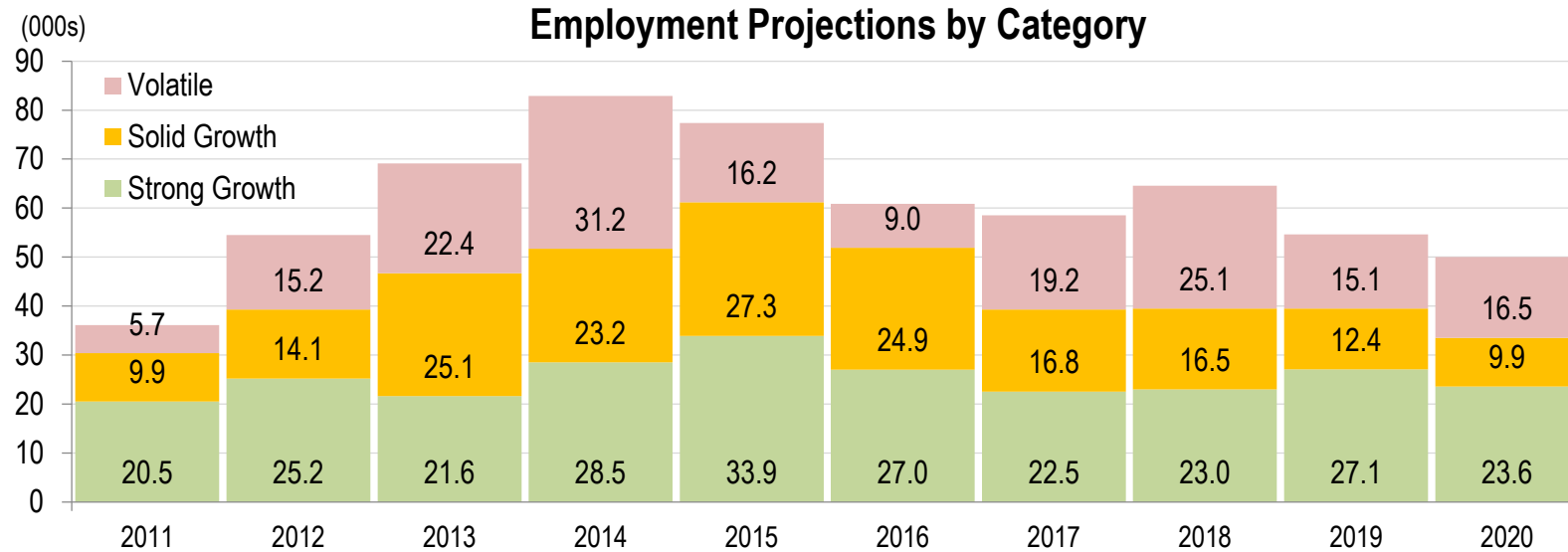
Employment Forecast, Employment Changes by Sector, Total Employment Forecast vs. Historical Changes

Colorado will add 50,000 jobs in 2020, an increase of 1.8%. The top sectors for job growth will be PST, health care, construction, and transportation and warehousing. This level of job growth will be weaker than over half the years between 1990 to 2020.

There is a 20% chance that Colorado will add more than 52,000 jobs, a 50% chance it will add between 48,000 to 52,000 jobs and a 30% chance that it will add less than 48,000 jobs.

Employment Projections 2019 and 2020

By Category



Employment Projections

Colorado will add 54,500 jobs in 2019 and 50,000 jobs in 2020. The growth rates are 2.0% and 1.8% respectively.

The sectors in the growth category (green) will add jobs at a 2.4% rate, led by PST and health care.

The sectors in the solid growth (yellow) category will add jobs at a 1.0% rate. Most of the jobs will be added in local government and retail.

Finally, employment in the sectors in the volatile category will increase at a 2.0% rate, led by construction, transportation and warehousing, and the federal government. About 2,000 temporary workers will be hired to help with the Census.

Strong Growth

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

Solid Growth

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

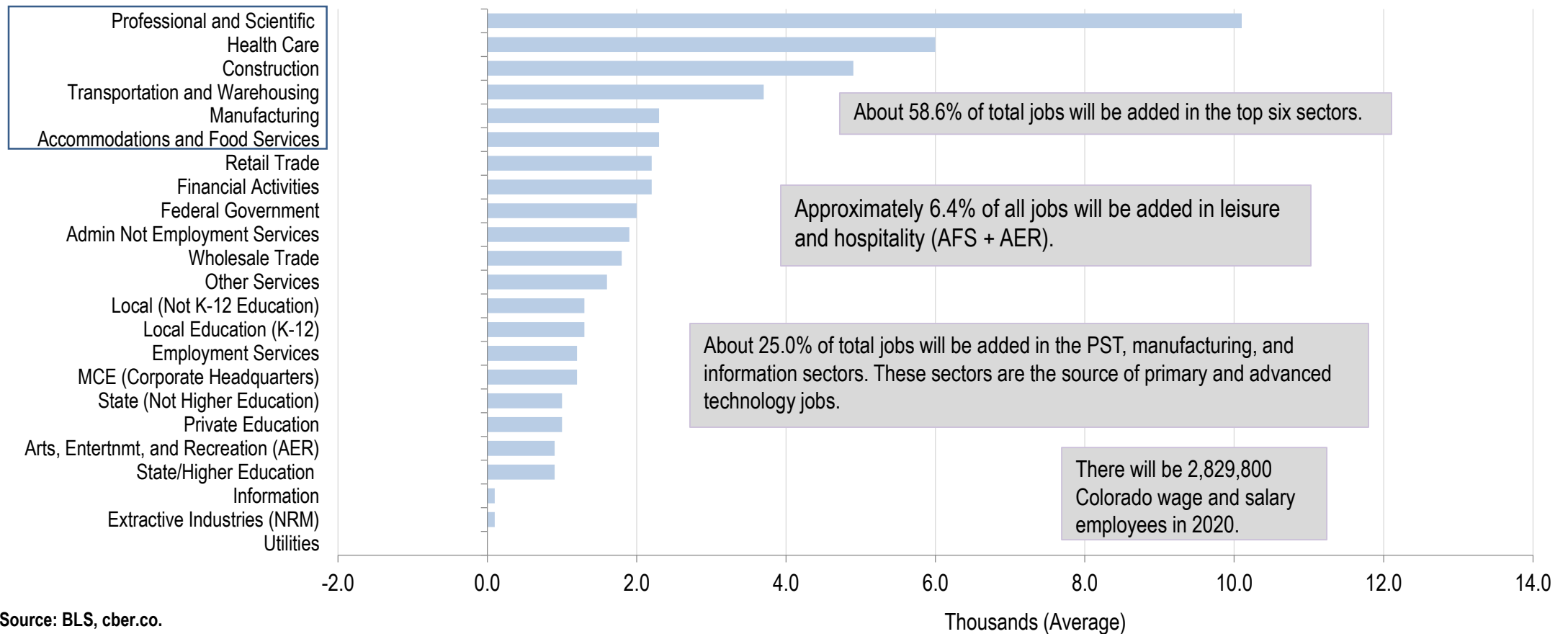
Volatile

- Extractive Industries (NRM)
- Construction
- Manufacturing
- Transportation and Warehousing
- Utilities
- Employment Services
- Financial Activities
- Information
- Federal Government

Projected Job Changes by NAICS Sector

2020 Forecast

Change in Colorado Wage and Salary Employment in 2020



About 58.6% of total jobs will be added in the top six sectors.

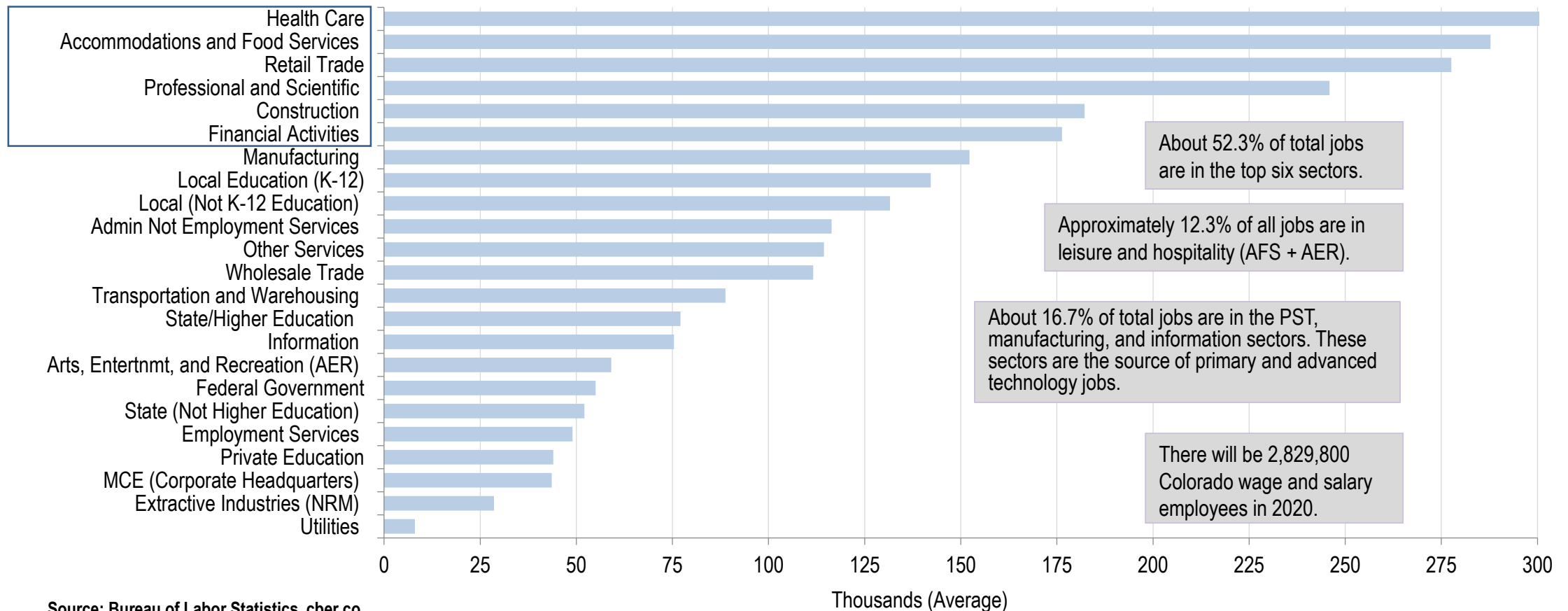
Approximately 6.4% of all jobs will be added in leisure and hospitality (AFS + AER).

About 25.0% of total jobs will be added in the PST, manufacturing, and information sectors. These sectors are the source of primary and advanced technology jobs.

There will be 2,829,800 Colorado wage and salary employees in 2020.

Colorado Wage and Salary Employment 2020 Forecast

Colorado Wage and Salary Employment



About 52.3% of total jobs are in the top six sectors.

Approximately 12.3% of all jobs are in leisure and hospitality (AFS + AER).

About 16.7% of total jobs are in the PST, manufacturing, and information sectors. These sectors are the source of primary and advanced technology jobs.

There will be 2,829,800 Colorado wage and salary employees in 2020.

Change in Colorado Employment 1990 to 2020

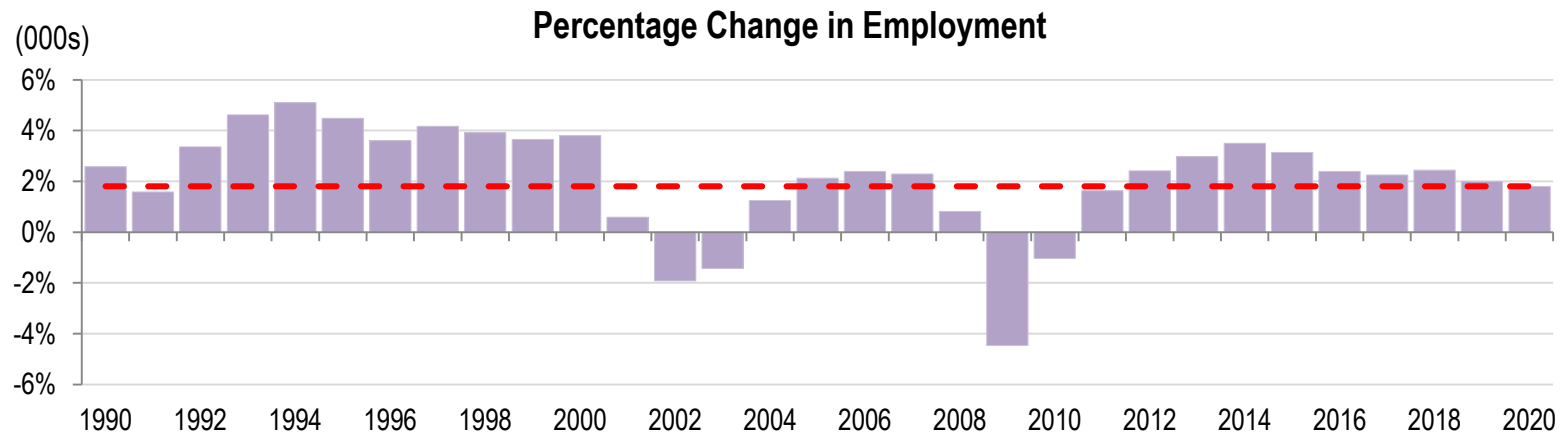
Change in Employment vs. Percentage Change in Employment



There are two ways to evaluate the change in employment.

Change in Employment (Level)

In 2020, the employment forecast is expected to increase by 50,000. This level of job growth is greater than only 11 of 31 years (red dotted line).



Percent Change in Employment (Rate)

The projected rate of growth for 2020, 1.8%, is greater than only 9 of 31 years (red dotted line).

Source: Bureau of Labor Statistics, cber.co.

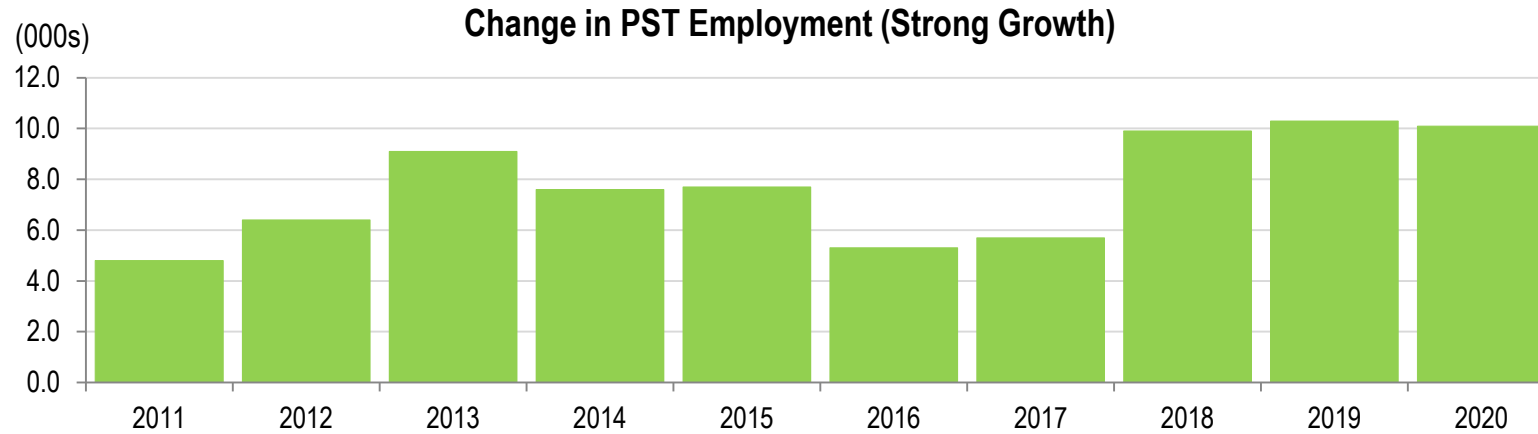
The Colorado Economy

Sectors to Watch in 2020

Employment growth in 2020 will depend on strong growth in the PST and health care sectors and solid growth in construction and transportation and warehousing. More modest growth is projected from manufacturing, accommodations and food services and retail. The federal government will temporarily expand because of the 2020 Census. Employment growth for state and local governments, K-12 schools, and higher education will be constrained by their budgets.

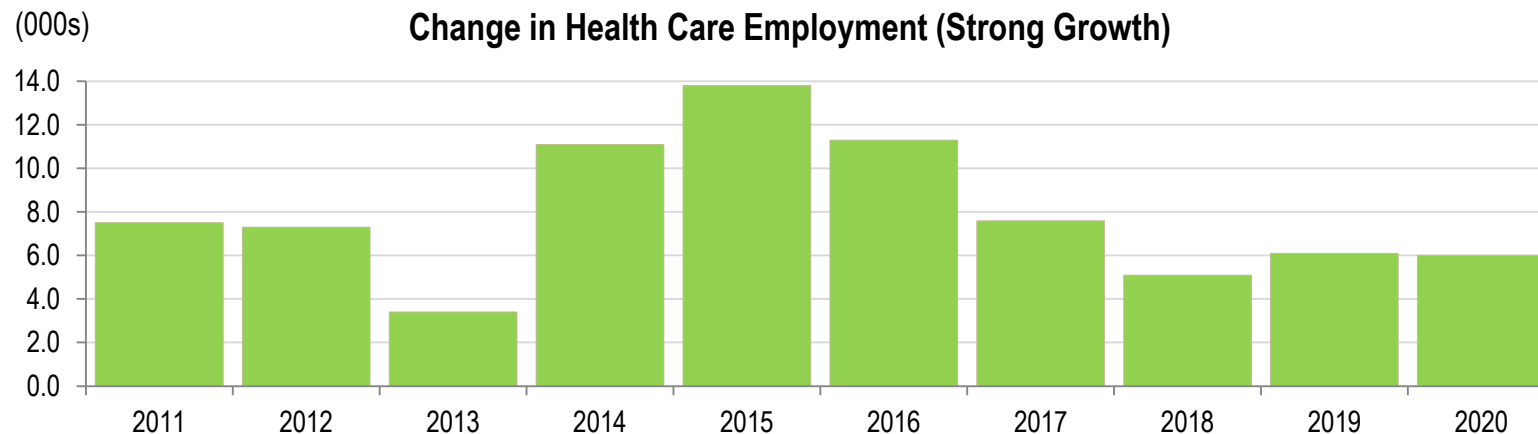
Change in Employment

Colorado Professional, Scientific, and Technical Services and Health Care



Professional, Scientific, and Technical
(\$97,812, AAW)

The PST sector led Colorado out of the Great Recession with jobs and wages. In 2020 PST is projected to add about 20% of total jobs. Time will tell if that forecast is too aggressive.



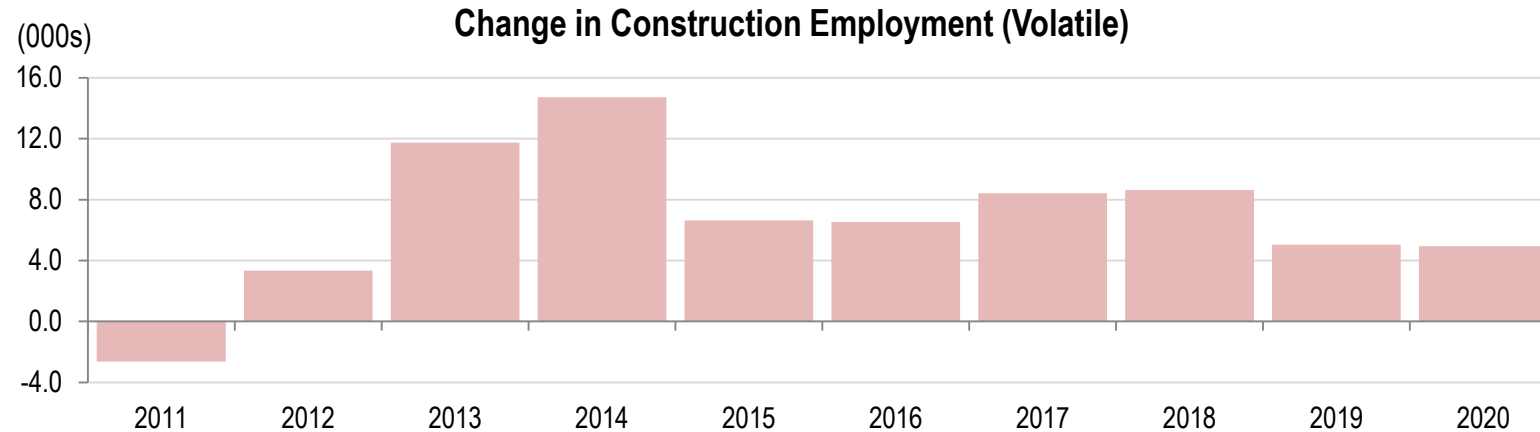
Health Care
(\$53,352 AAW)

The health care sector has been recession-proof. Jobs have been added in the sector every year since 1990. With the number of aging baby boomers, concerns about a health care bubble are not an immediate concern. Modest employment growth is expected for 2020.

Source: Bureau of Labor Statistics, cber.co. Note: 2018 Average Annual Wage (AAW), state average \$58,916.

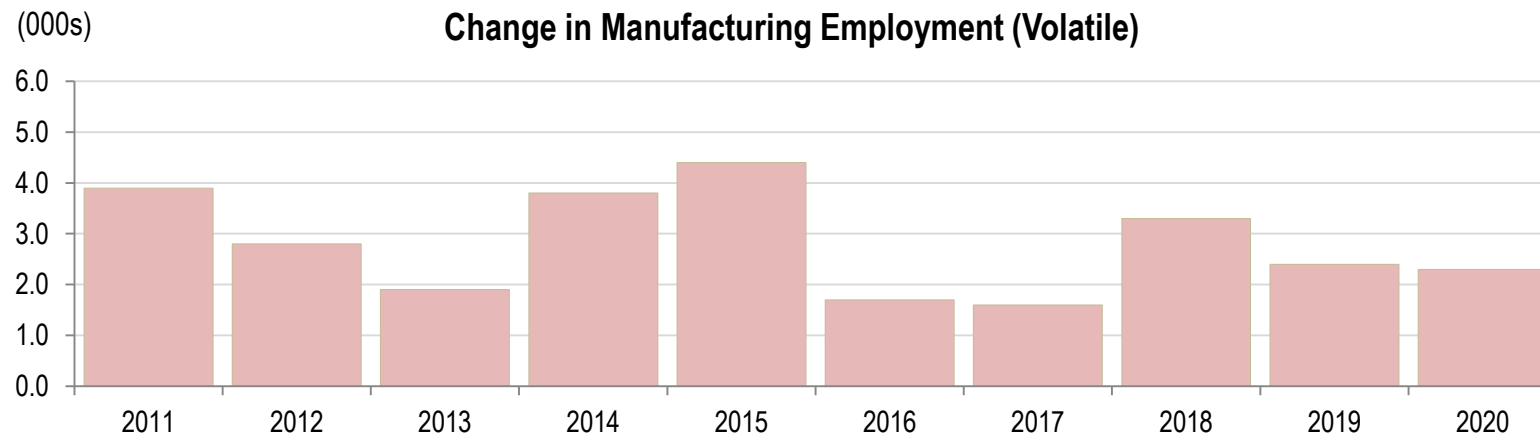
Change in Employment

Colorado Construction and Manufacturing



Construction
(\$66,452 AAW)

The outlook for construction is positive; interest rates are low, the rate of appreciation has slowed, wages are increasing, there is solid demand, millennials are entering the market, and builder sentiment is high. The sector will see modest growth in 2020.



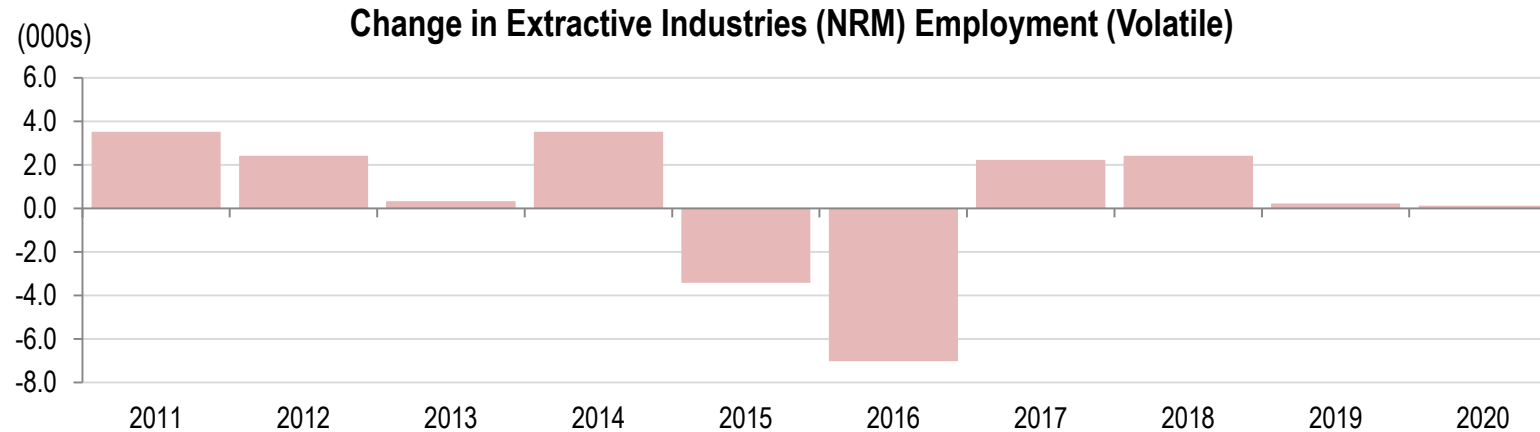
Manufacturing
(\$70,720 AAW)

U.S. manufacturing is in a slump. On the other hand, Colorado manufacturing posted gains between 2011 and 2019. Although Colorado has a low concentration, or location quotient, of manufacturers, it has been resilient because of the strength of manufacturers in aerospace, renewable energy, and beverages.

Source: Bureau of Labor Statistics, cber.co. Note: 2018 Average Annual Wage (AAW), state average \$58,916.

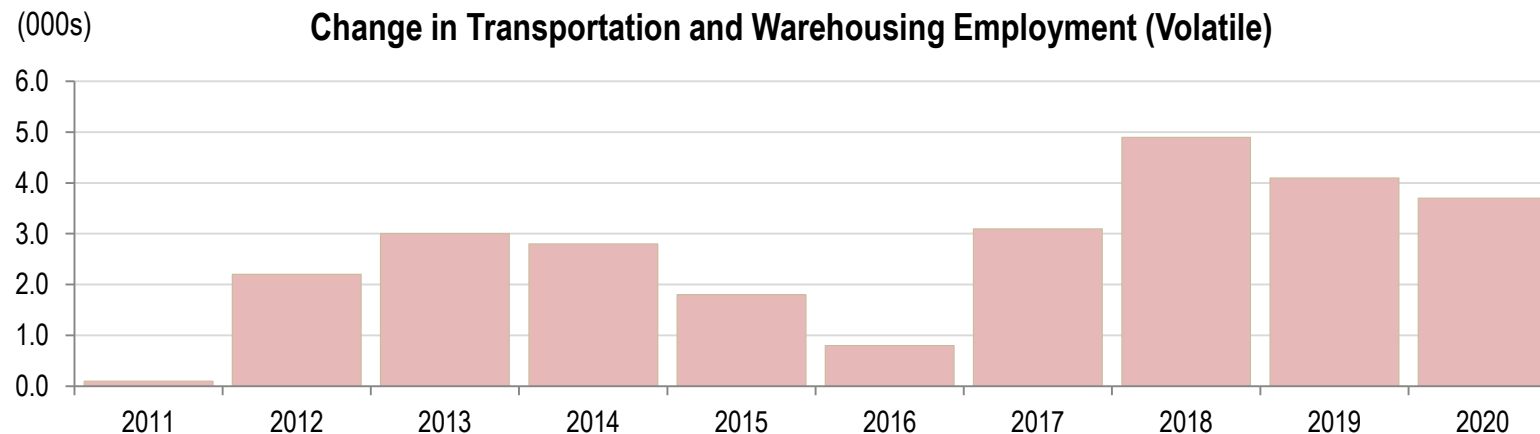
Change in Employment

Colorado Extractive Industries (NRM) and Transportation and Warehousing



Natural Resources and Mining (\$120,796 AAW)

The extractive industries are volatile because of wide swings in prices for coal, oil, gas, and minerals. More recently that volatility has been exacerbated by efforts within the industry to become more efficient. In addition, government policy and legislation has been developed with the intent of eliminating the drilling and production of fossil fuels in Colorado.



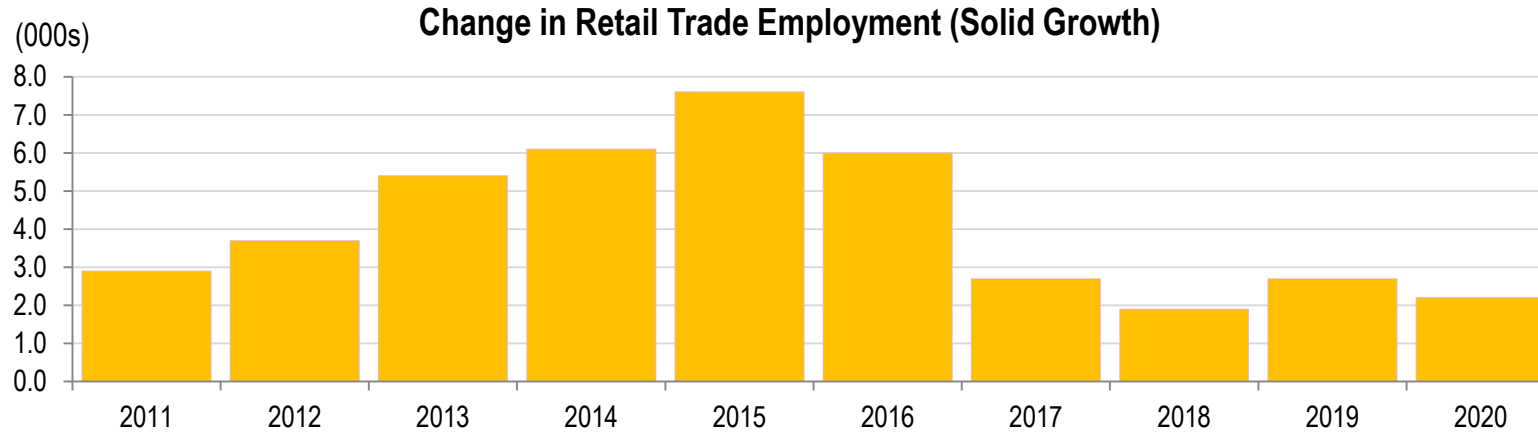
Transportation and Warehousing (\$57,928 AAW)

Colorado has seen a strong increase in its warehousing operations in the past three years. In addition there has been growth in air courier, transportation support, and USPS employment. Changes in employment are more erratic for urban transit and trucking employment. Continued T&W growth is anticipated given the expansion of DIA and the area surrounding the airport.

Source: Bureau of Labor Statistics, cber.co. Note: 2018 Average Annual Wage (AAW), state average \$58,916.

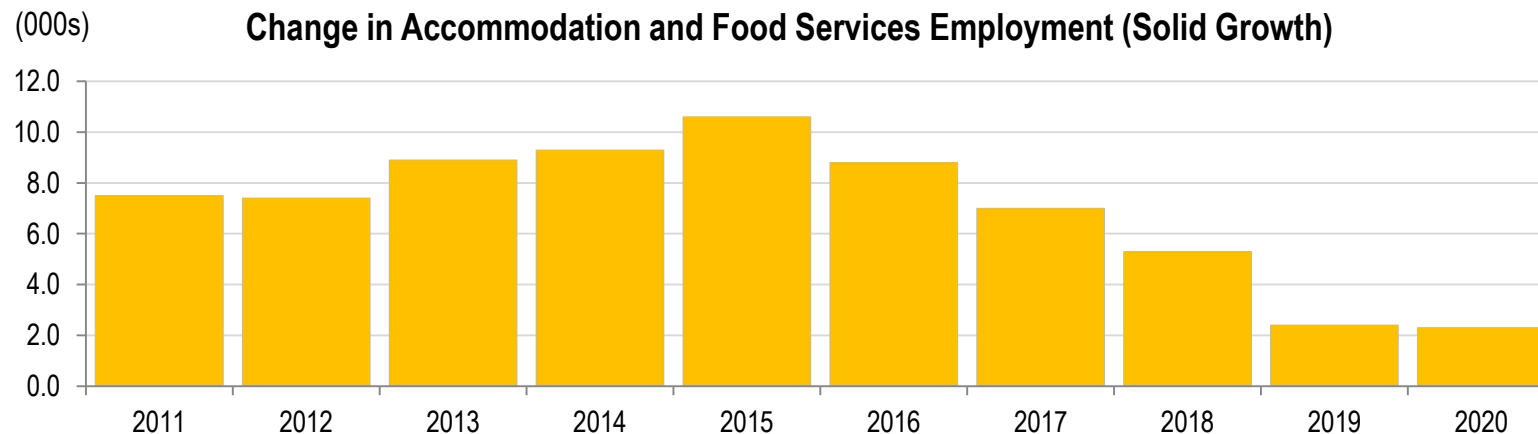
Change in Employment

Colorado Retail and Accommodations and Food Services



Retail (\$32,448 AAW)

In 2006 Colorado had more than 19,100 retail establishments. That number declined as a result of the Great Recession and was slightly above 17,800 between 2016 and 2018. A slight decline from that level is expected in 2019. This is an indication Colorado may be overbuilt in retail establishments. Retail employment growth is expected to remain weak as the industry continues to evolve.



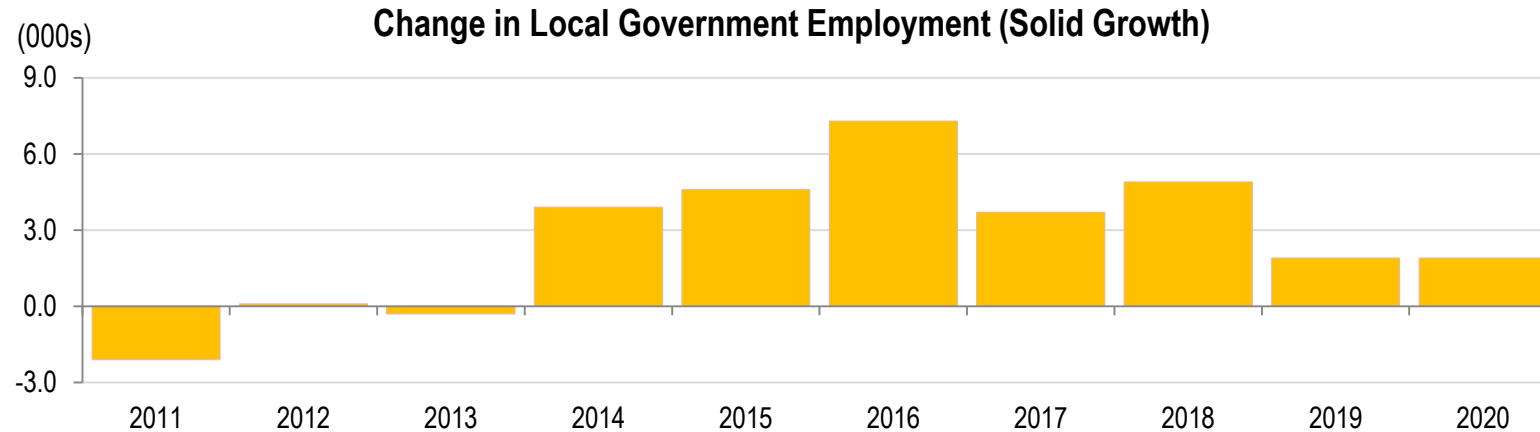
Accommodations and Food Services (\$23,452 AAW)

Historically, the AFS sector has been a source of steady employment growth. In 2019, the number of accommodation and food services establishments dropped off significantly, suggesting the state may be saturated with some types of AFS establishments.

Source: Bureau of Labor Statistics, cber.co. Note: 2018 Average Annual Wage (AAW), state average \$58,916.

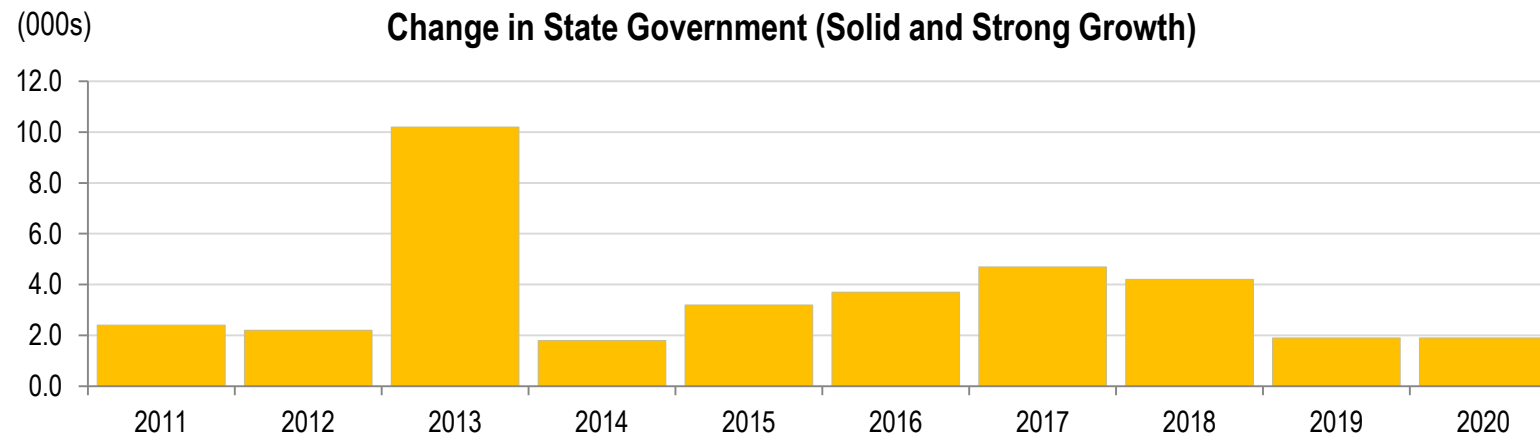
Change in Employment

Colorado Government



Local Government

The peak in 2016 was a function of strong hiring by local governments and school systems as part of the recovery from the Great Recession. Hiring has tapered off for both groups since 2016. Job gains will be contingent upon local budgets.



State Government

Higher education employment is part of the Strong Growth category. It is a job creation machine, having added jobs in every year but one between 1990 and 2020. General state government employment began adding jobs at a much higher pace in 2017. The forecast for general employment gains in 2020 may be understated.

Federal Government

About 2,000 temporary federal workers will be hired to work on the 2020 Census (not shown).

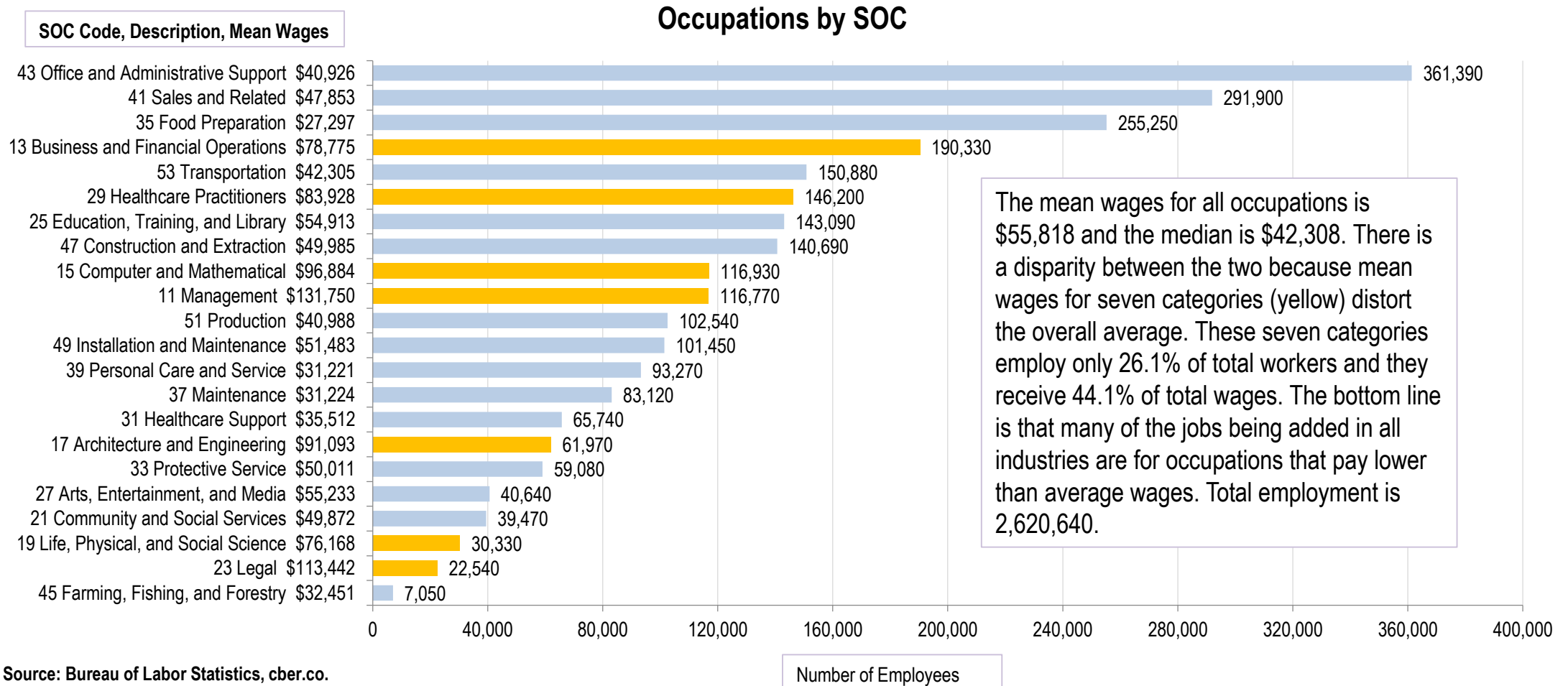
Source: Bureau of Labor Statistics, cber.co.

The Colorado Economy – Occupations

About 35% of Colorado workers are employed in the top 3 occupation categories: office support, sales, and food preparation. Average wages for these categories are less than \$50,000. Seven of 22 occupation categories have average annual wages greater than the mean for all occupations, \$55,818. They employ about 26% of all workers and receive about 44% of all wages. Many of the occupations in these 7 SOC categories require a college degree or post secondary certification or training, whereas many of the jobs in the other 15 SOC categories have less stringent training requirements.

Occupations by SOC

Colorado 2018



Source: Bureau of Labor Statistics, cber.co.

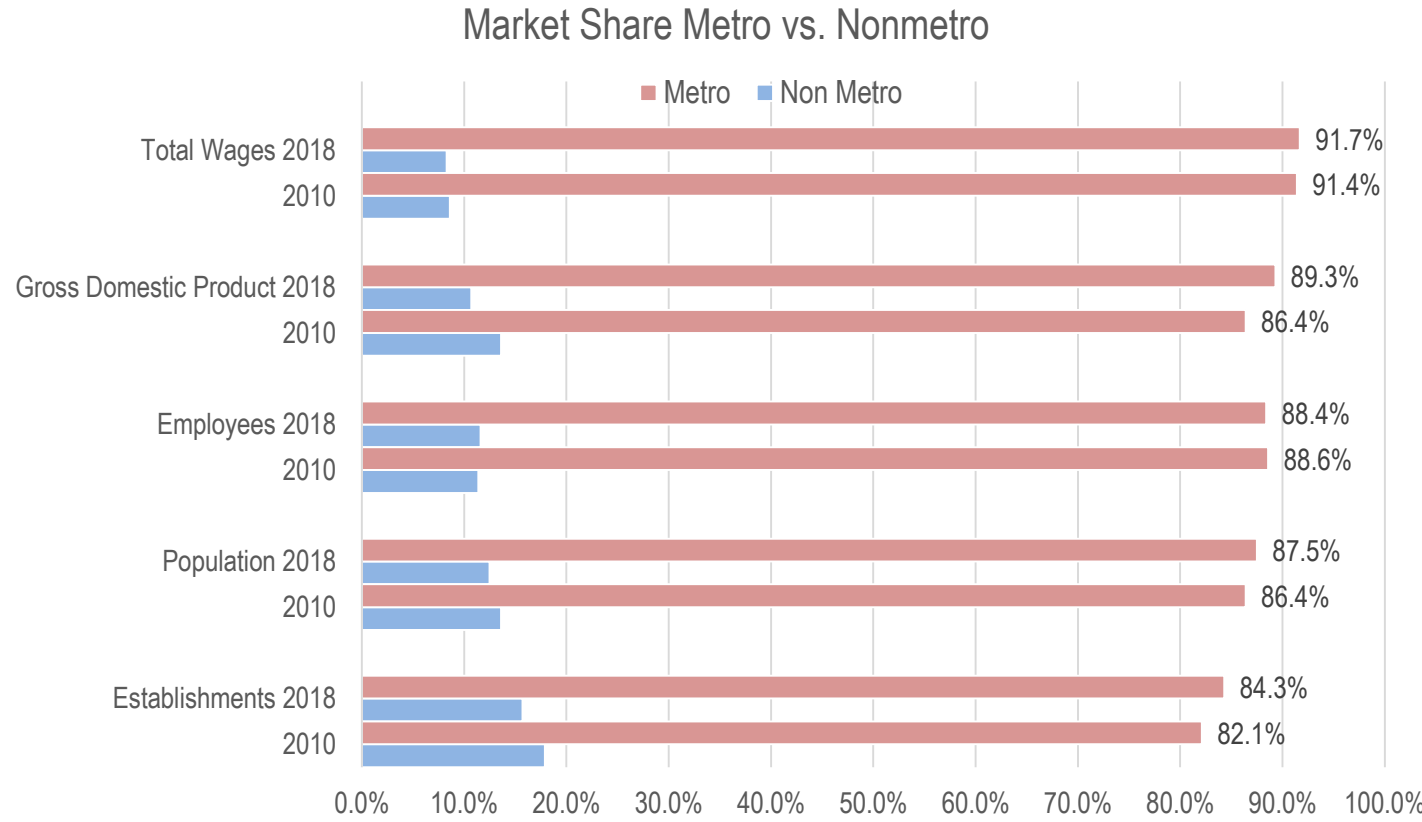
The Colorado Economy – The Colorado Divide

Metro and Nonmetro Wages, GDP, Employment, Population, and Establishments

There is a significant difference between the economies of the 17 metro counties and the 47 nonmetro counties. The percentage of GDP, population, employment, establishments and wages is at least four times greater in the metro counties than the nonmetro counties. In addition, the mix of industries in the metro counties favors growth in those areas. Within the 17 metro counties, there are 10 counties that are more prosperous than the other seven counties. From an economic standpoint, Colorado is a state of “haves” and “have nots”. Having said that, the nonmetro counties are appealing to many Coloradans for a number of reasons.

The Colorado Divide

Wages, GDP, Employees, Population, Establishments



The Divide

In Colorado, there is a great divide between the metro and nonmetro counties in the state. In most cases that divide has increased with time. For example, in 2010 91.4% of the state's GDP was concentrated in the state's 7 MSAs, or 17 of 64 counties, in 2018 that concentration had risen to 91.7%.

Wages – In 2018, average annual wages were 103.2% of the state average for the metro areas and 71.8% for nonmetro areas.

GDP – In 2018, 57.6% of Colorado's GDP was in the Denver MSA.

Employees – 33 of 64 counties have fewer than 5,000 employees.

Population – The population of 18 of 64 counties was less in 2018 than 2010. Thirty-nine counties added fewer than 1,000 people between 2010 and 2018.

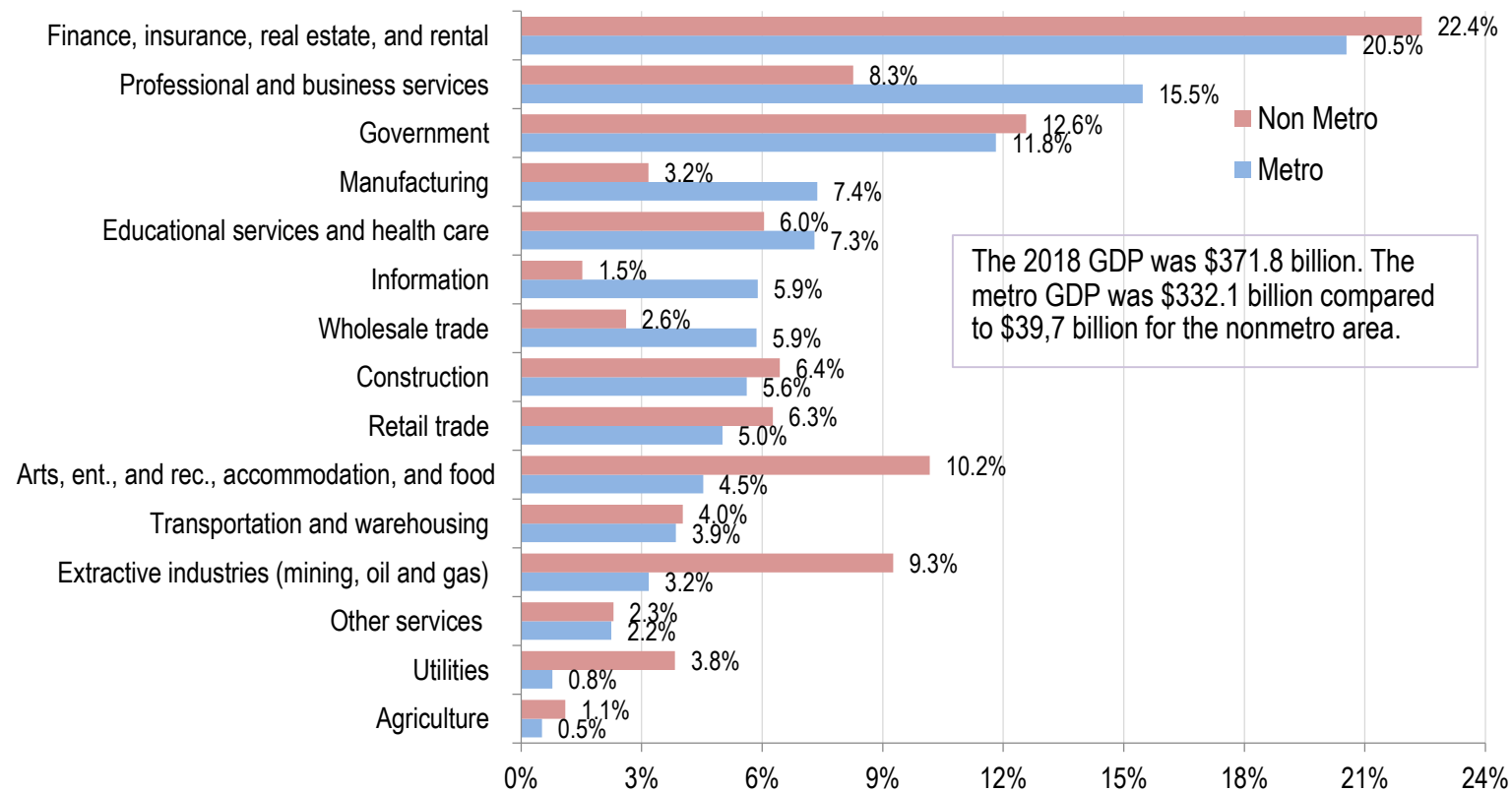
Establishments - 33 of 64 counties have fewer than 600 establishments.

Source: BLS, BEA, State Demography Office, cber.co.

Percent of 2018 Gross Domestic Product by Sector

Colorado Metro Area (MSA) vs. Nonmetro Area

Percent of 2018 GDP Colorado Metro Area vs. Nonmetro Area



Metro vs. Nonmetro Economies.

There are significant differences in the GDP/economy for the metro (blue) and nonmetro (red) counties.

Most notably, 28.7% of the GDP for the metro areas is in PBS, information, and manufacturing compared to 13.0% for the nonmetro counties. These sectors include the state's high-tech companies. The metro area also has a greater share in health care and wholesale trade.

On the other hand, the nonmetro area has a noticeable difference in its share of extractive industries, utilities, and tourism related sectors.

Source: BLS, cber.co.

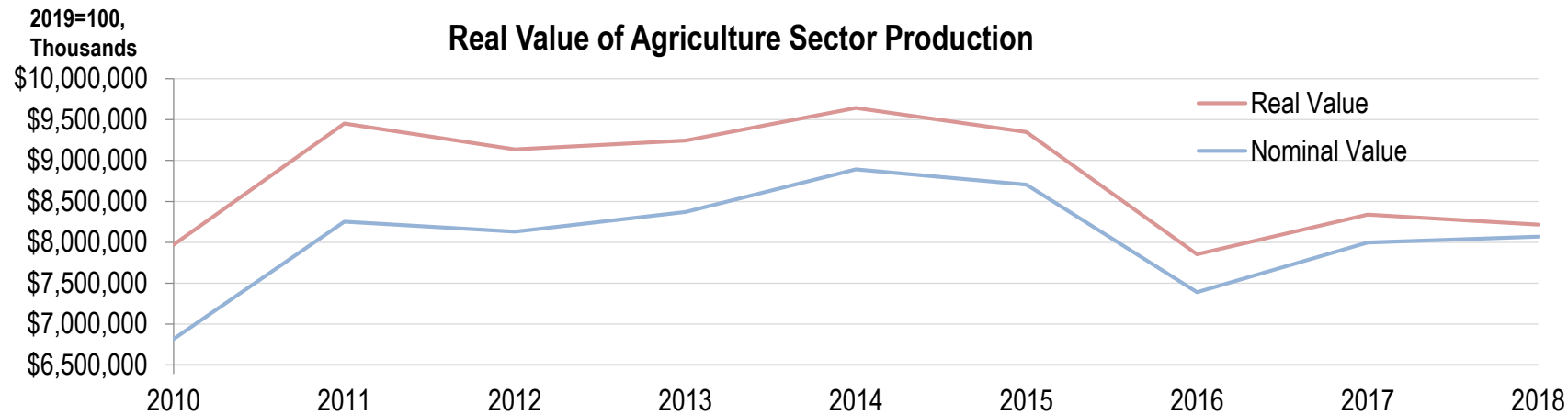
The Colorado Economy – Agriculture

Production and Net Income, Crop Production, Animal Production

The real value of agriculture production has been flat in recent years. The real value of crop production was down during the past decade, whereas, the real value of animal production increased.

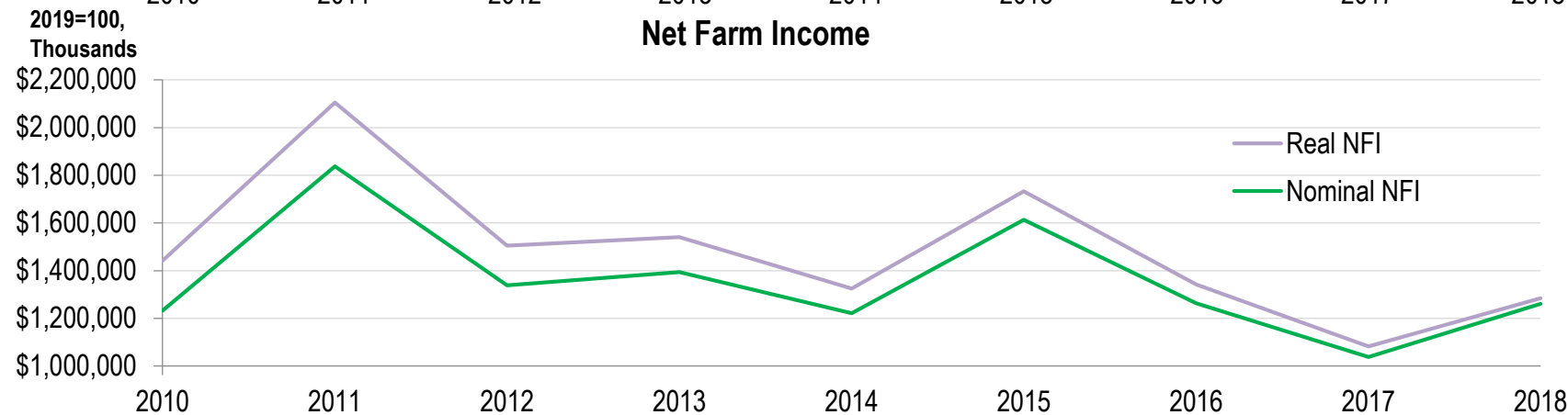
Colorado Agriculture

Real Value of Production and Net Income



Real Value of Agriculture Production

The real value of production in the agriculture sector trended downward during the 2010s.



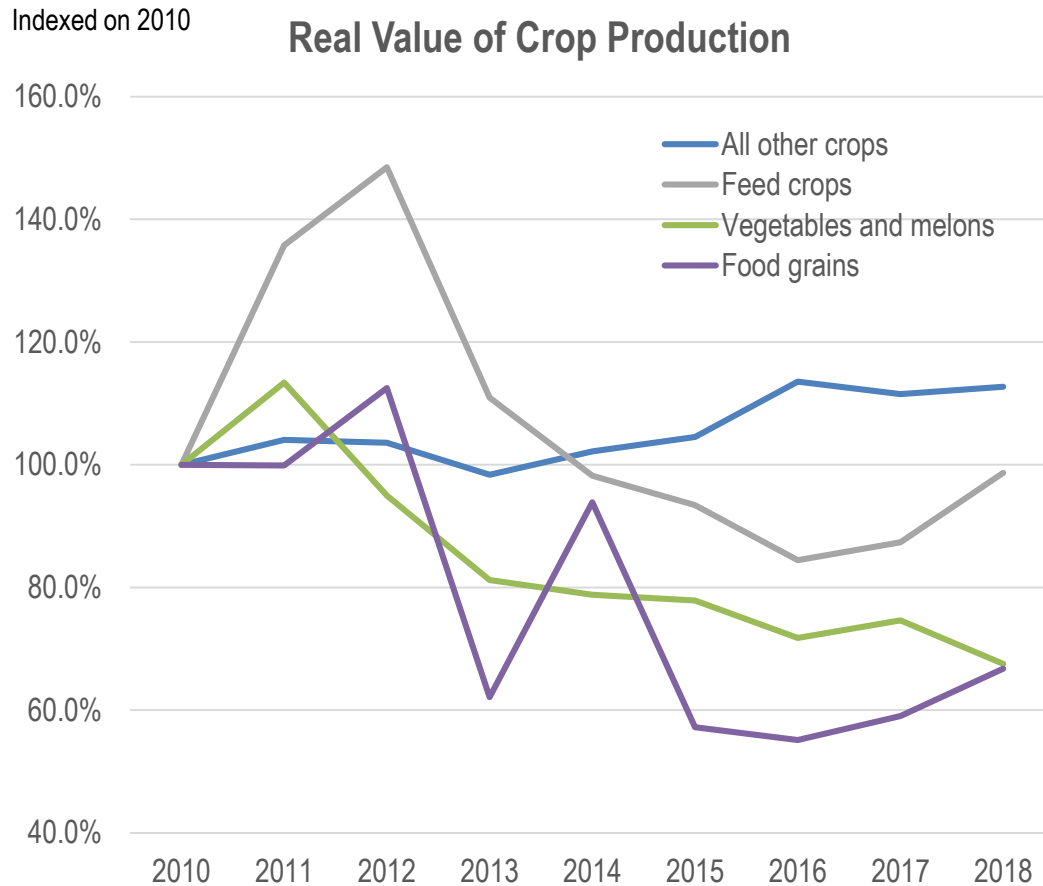
Net Farm Income

After peaking in 2011, NFI trended downward through 2018. This illustrates the risk in being a producer of agriculture goods and services.

Source: cber.co. USDA, ERS. Note: Chained on 2019.

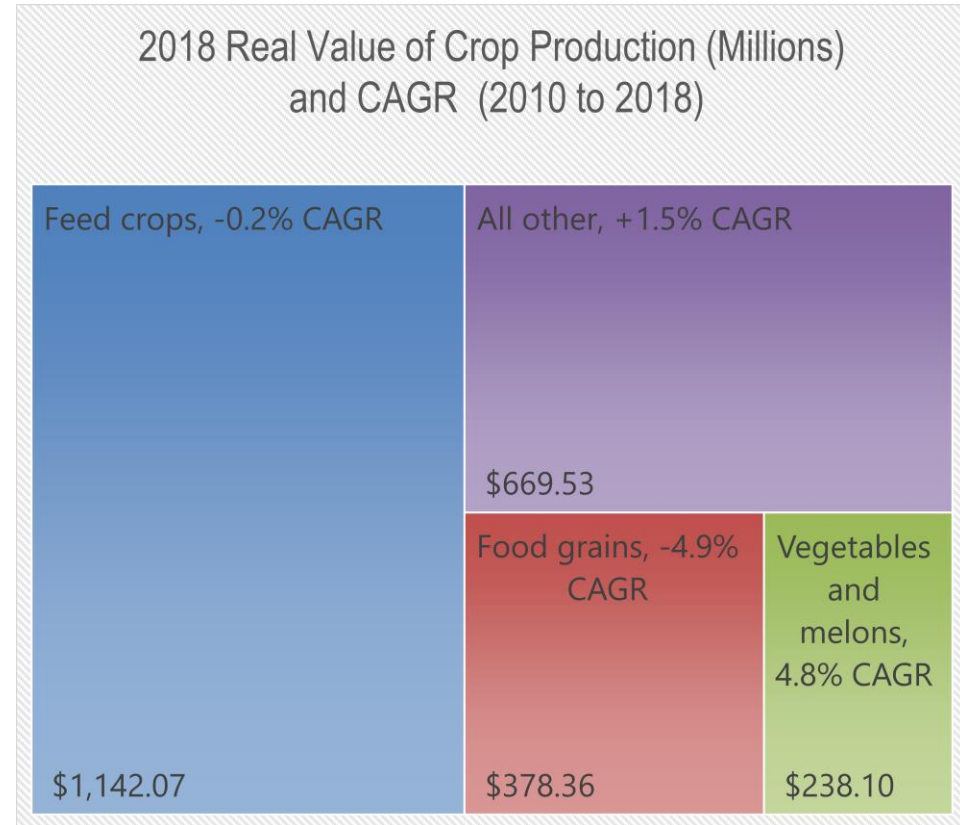
Colorado Cash Receipts

Value of Crop Production



Source: cber.co. USDA, ERS. Note: Chained on 2019.

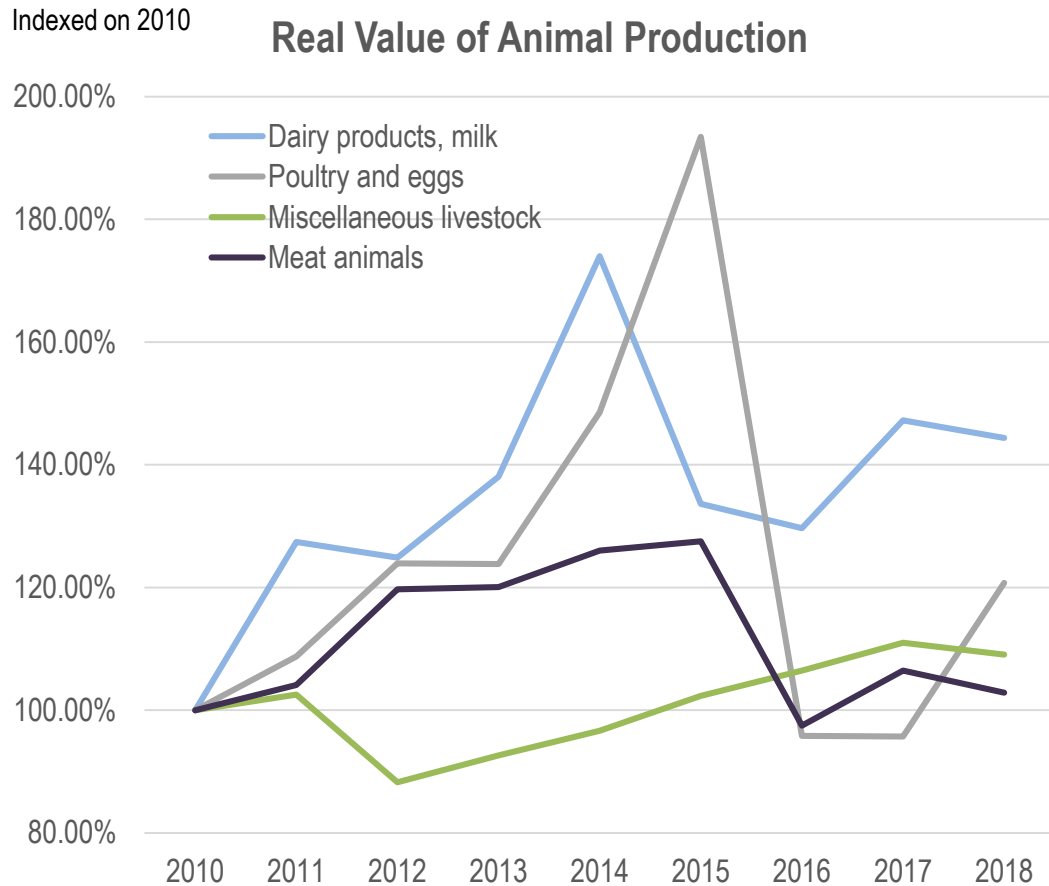
Colorado-based Business and Economic Research <https://cber.co>



The value of crop production in 2018 was \$2.43 billion.

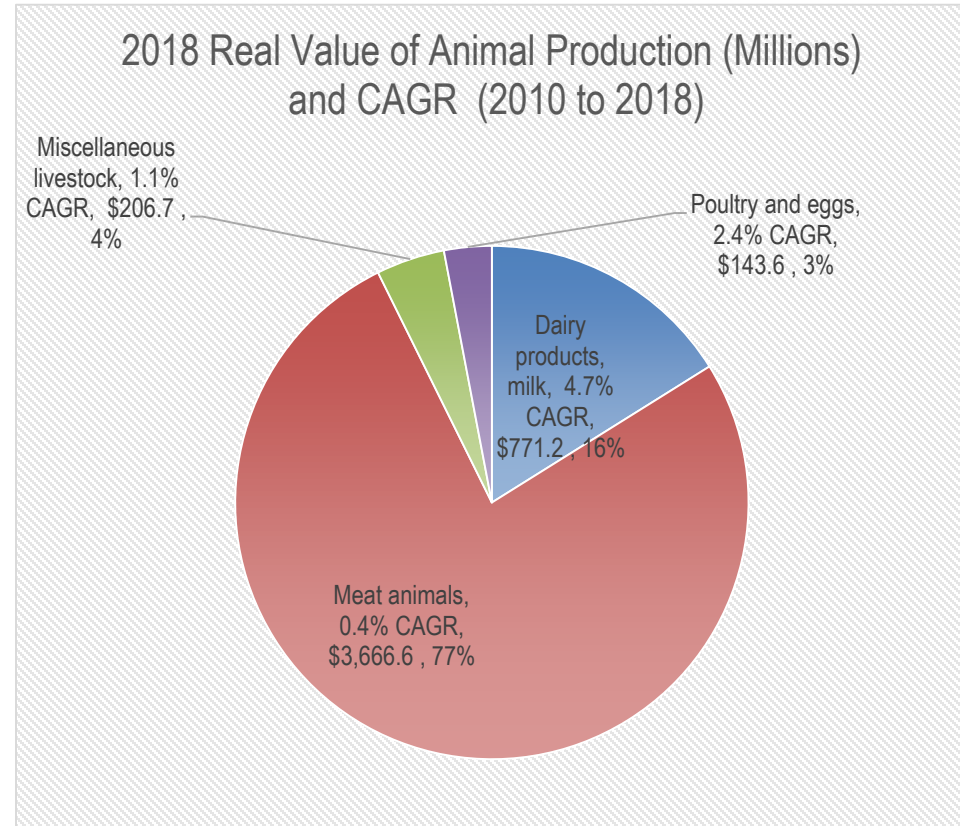
Colorado Cash Receipts

Value of Animal Production



Source: cber.co. USDA, ERS. Note: Chained on 2019.

Colorado-based Business and Economic Research <https://cber.co>



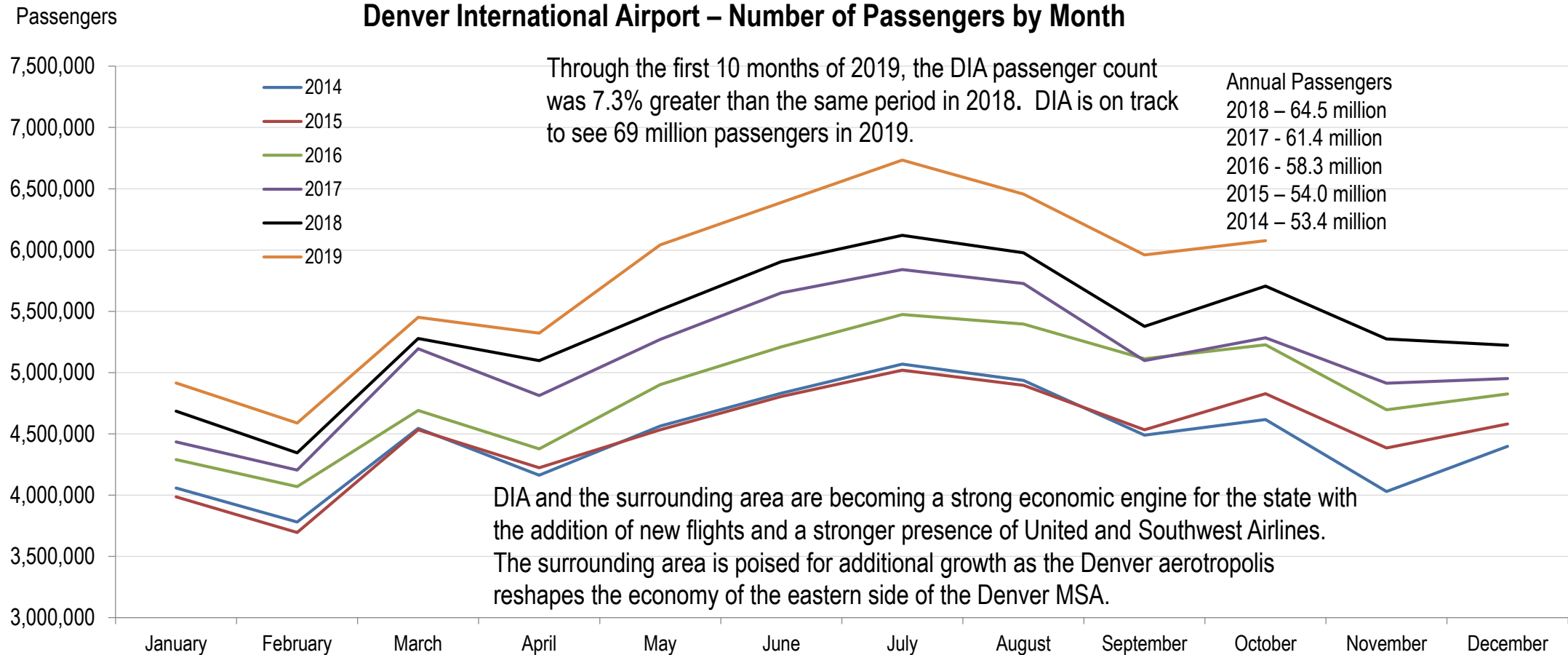
The value of animal production in 2018 was \$4.80 billion.

The Colorado Economy – Other Activity

DIA Passengers, Vehicle Registrations, and Venture Capital

DIA continues to be an economic juggernaut. Current construction projects at DIA will increase passenger traffic. New auto registrations are down compared to last year but used car sales (7 years or newer) are greater than last year. Finally, venture capitalists saw Colorado as a place to invest in 2019.

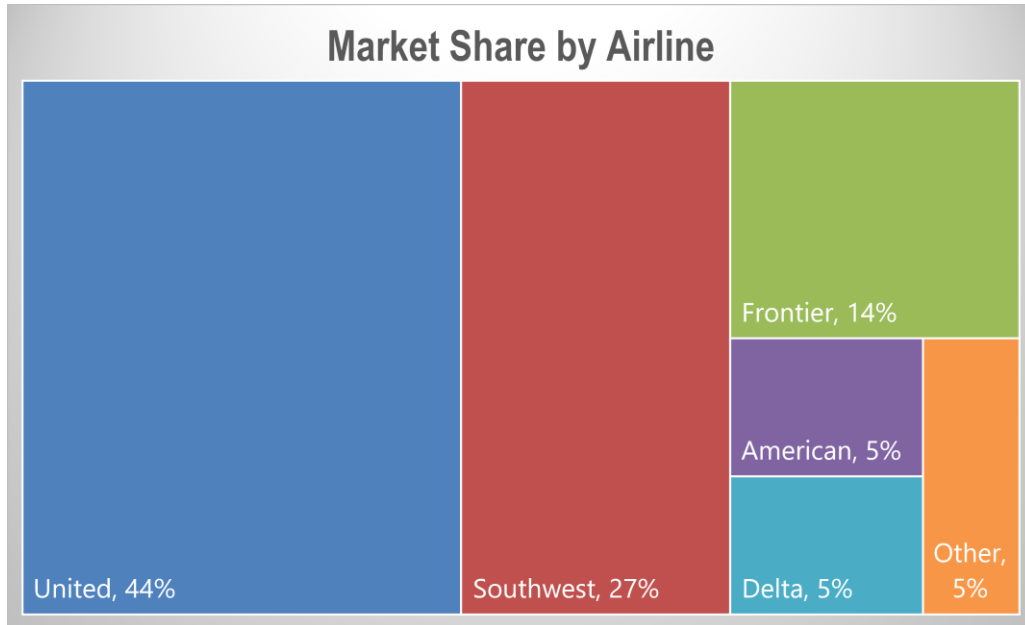
Denver International Airport Passengers



Source: FlyDenver.com, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

DIA Construction Continues



The \$1.5 billion DIA gate expansion project is moving forward on schedule.

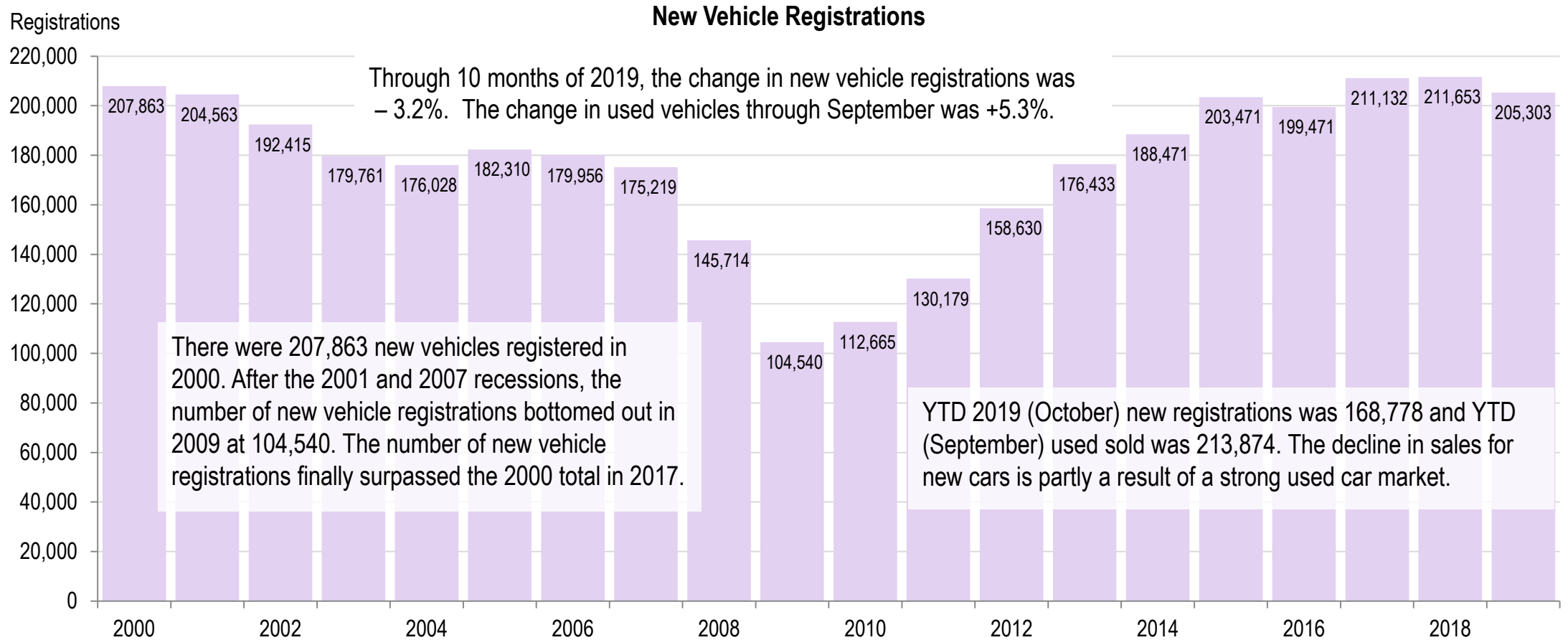


Source: FlyDenver.com, cber.co.

Colorado-based Business and Economic Research <https://cber.co>

New Vehicle Registrations

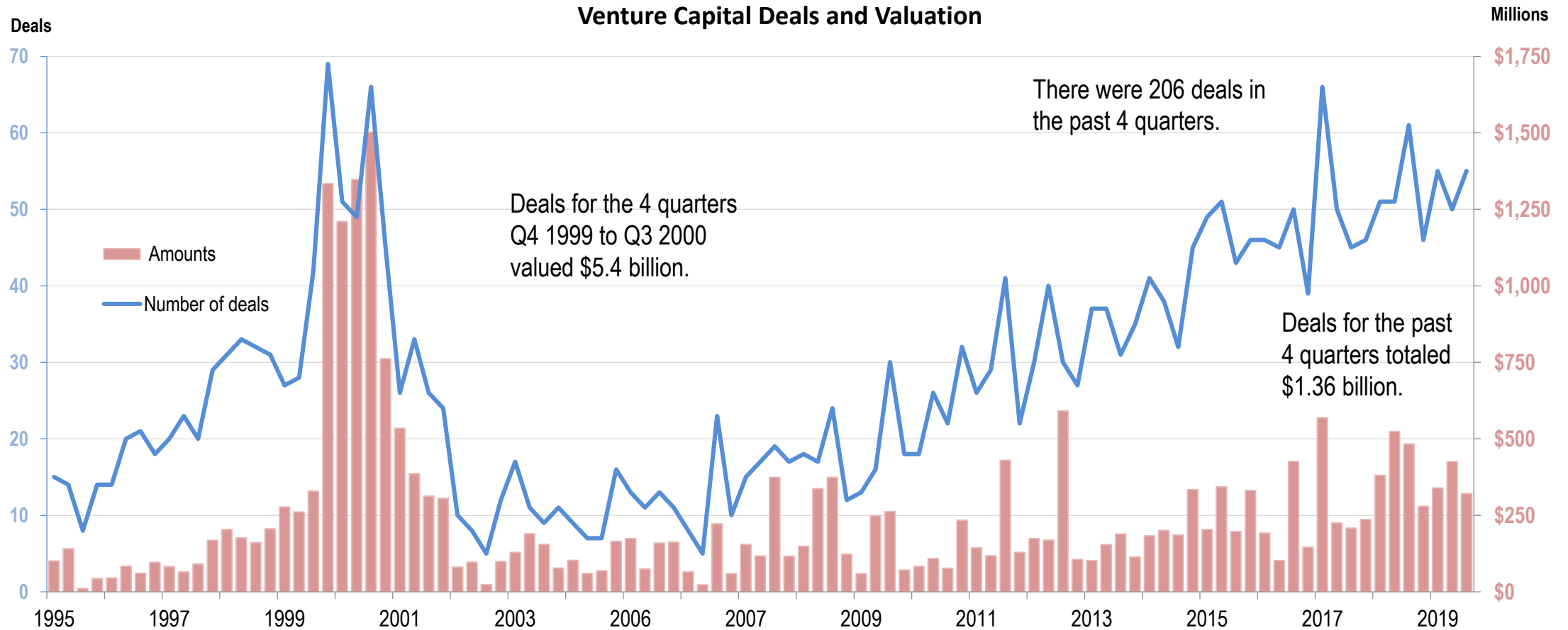
Colorado



Source: Colorado Auto Dealers Association, cber.co.

PWC Venture Capital Deals and Value

Colorado



Source: PWC, cber.co.

The Colorado Economy – Housing and Construction

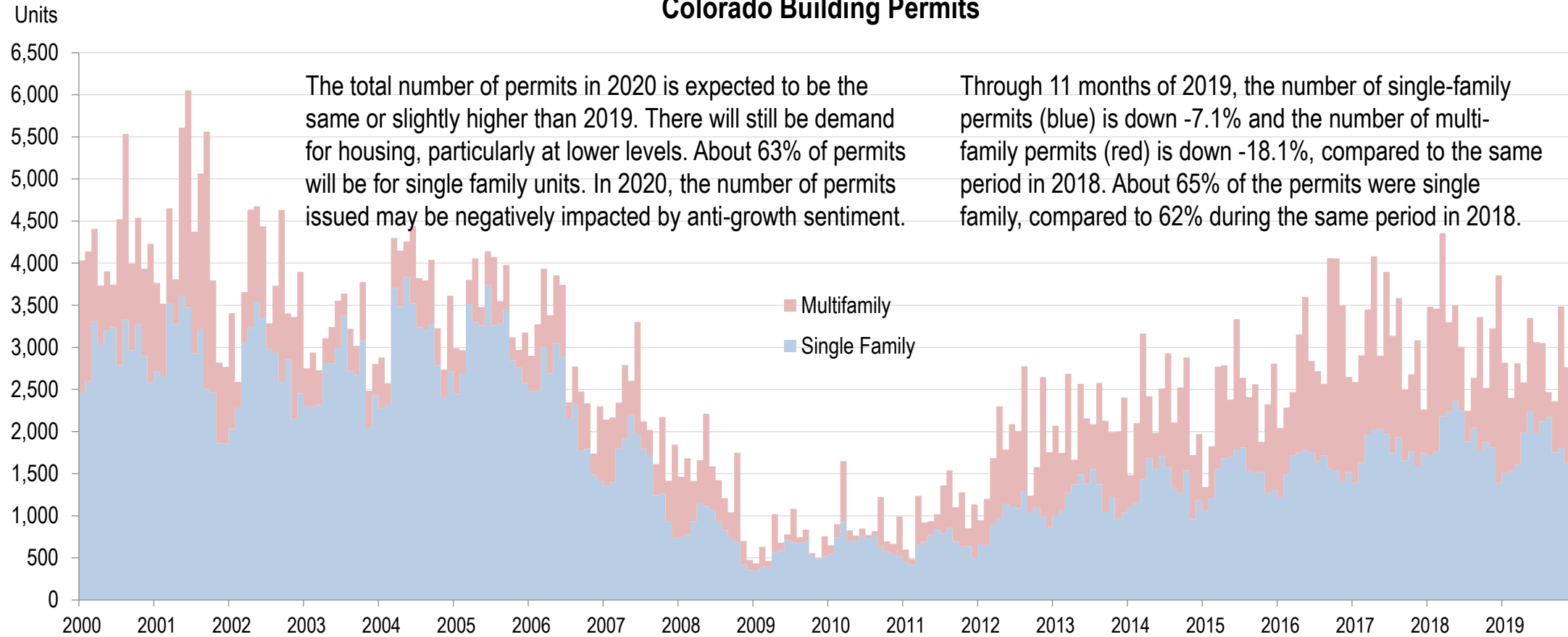
Building Permits, Valuation, and Case Shiller

There was a decrease in the number of building permits and their valuation in 2019. The number of permits in 2020 is expected to be similar to 2019. In addition, housing price appreciation has slowed in the Denver area, which is a mixed blessing.

Colorado Residential Building Permits

Units

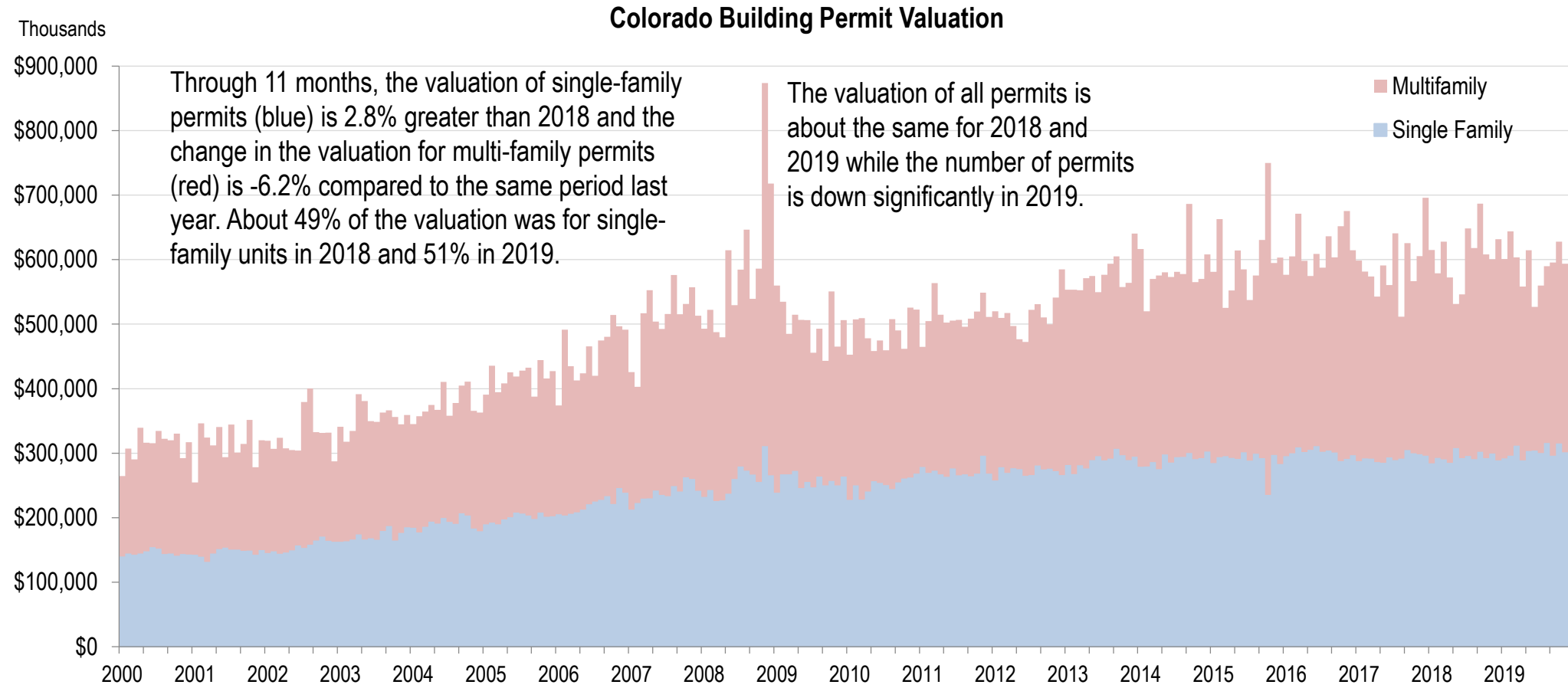
Colorado Building Permits



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

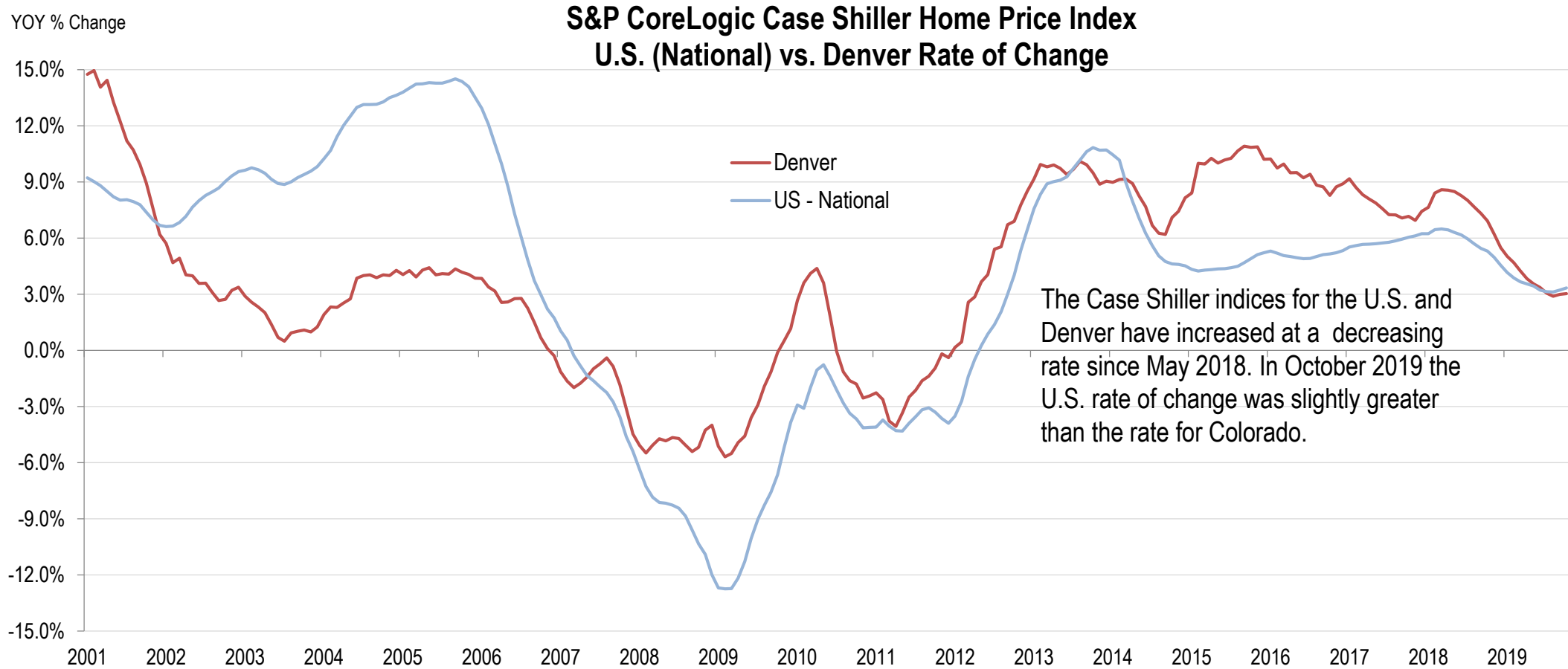
Colorado-based Business and Economic Research <https://cber.co>

Colorado Residential Building Permits Valuation



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

Case Shiller Home Price Index National vs. Denver Rate of Change (YOY)



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

Colorado-based Business and Economic Research <https://cber.co>

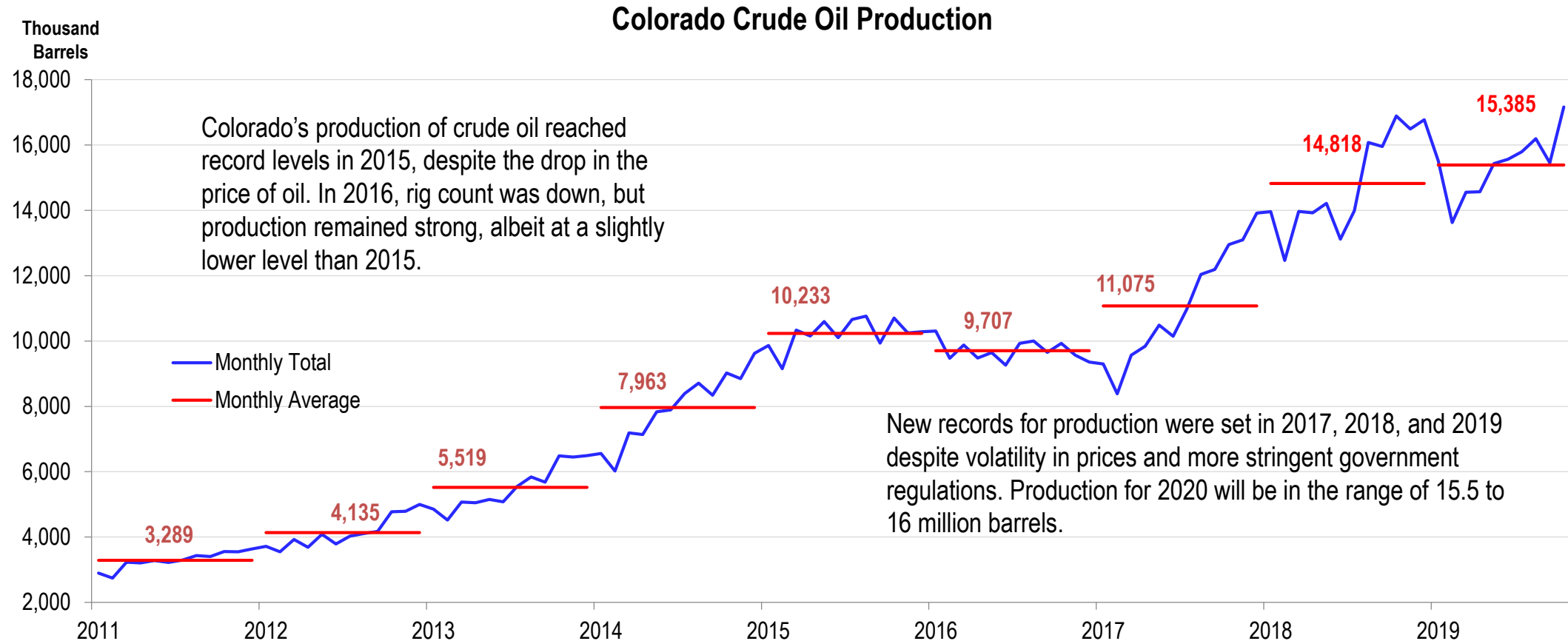
The Colorado Economy – Oil Production

Oil Production and Production by County

Colorado's extractive industries provide the state with a competitive advantage. Recent policies and regulations by local and state governments have threatened these industries and the revenue they generate for state and local coffers.

Colorado Field Production of Crude Oil

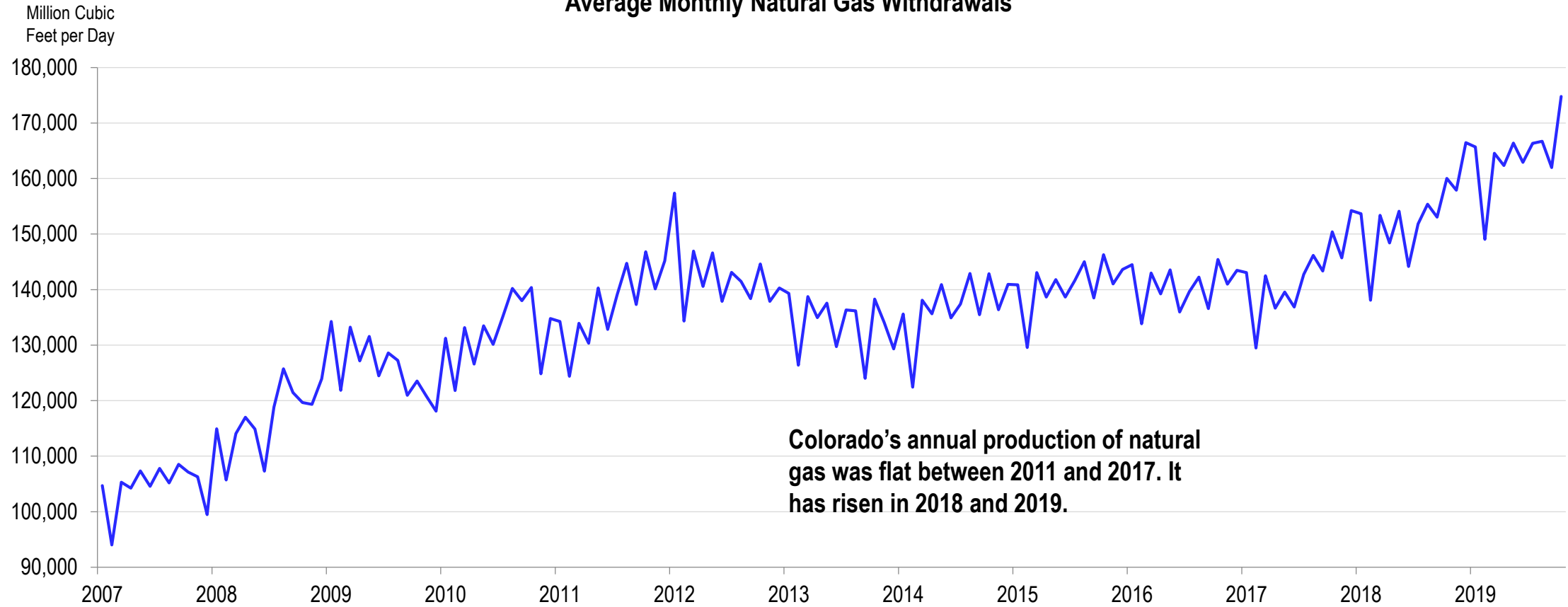
2011 to 2019 (Thousand Barrels)



Source: EIA, cber.co.

Monthly Colorado Natural Gas Withdrawals and Production

Average Monthly Natural Gas Withdrawals



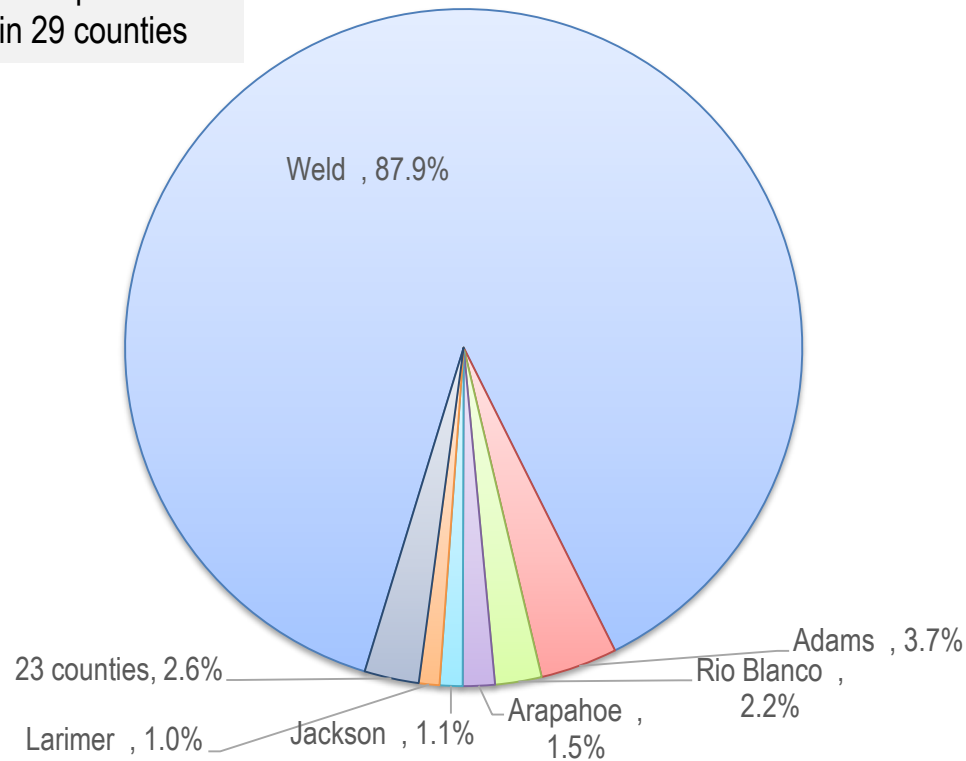
Source: EIA, cber.co.

Production of Colorado Oil and Gas by County

2019

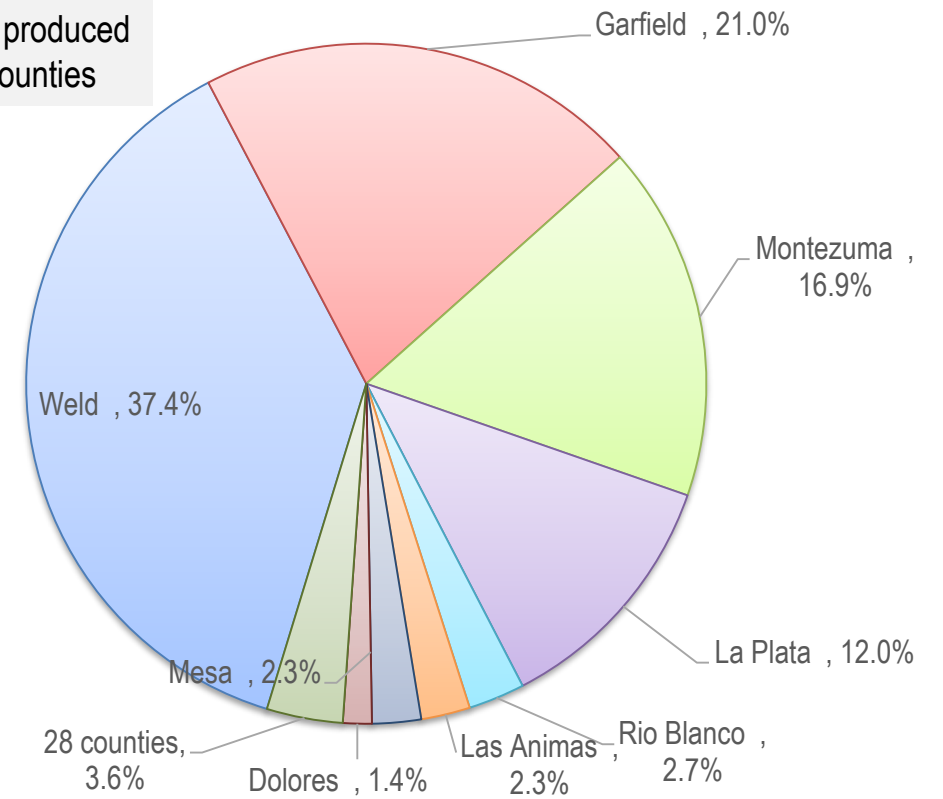
Percent of Oil Production 2019

Oil is produced in 29 counties



Percent of Gas Production 2019

Gas is produced in 36 counties



Source: COGCC, cber.co.

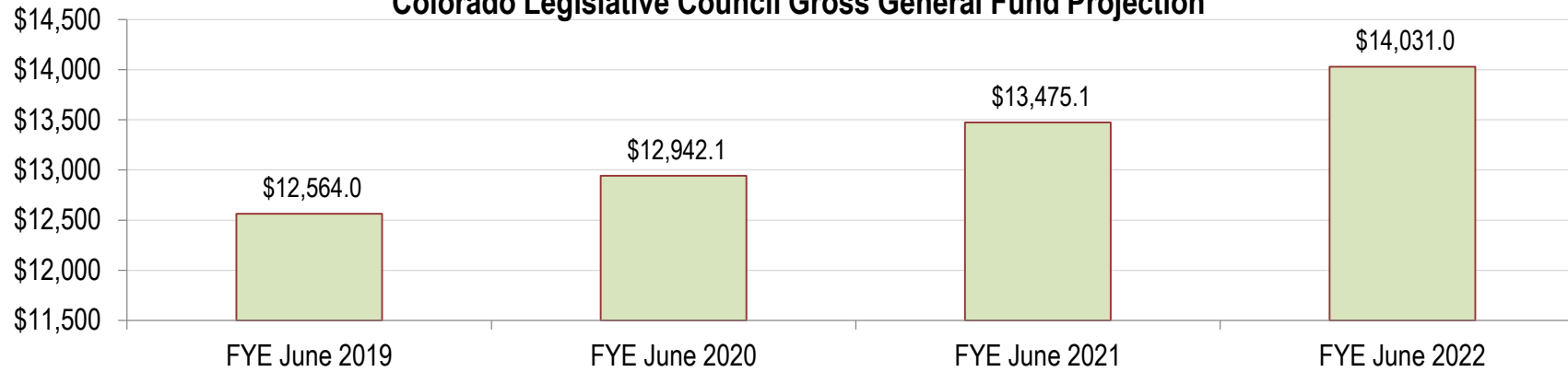
The Colorado Economy - State Government

The 73rd Colorado General Assembly will be challenged by projections of reduced revenue, and the need to address a major backlog of transportation projects, rising health care costs, anti-growth sentiment, and an education system that feels unappreciated and underfunded.

Colorado Gross General Fund

OSPB and CLC Projections

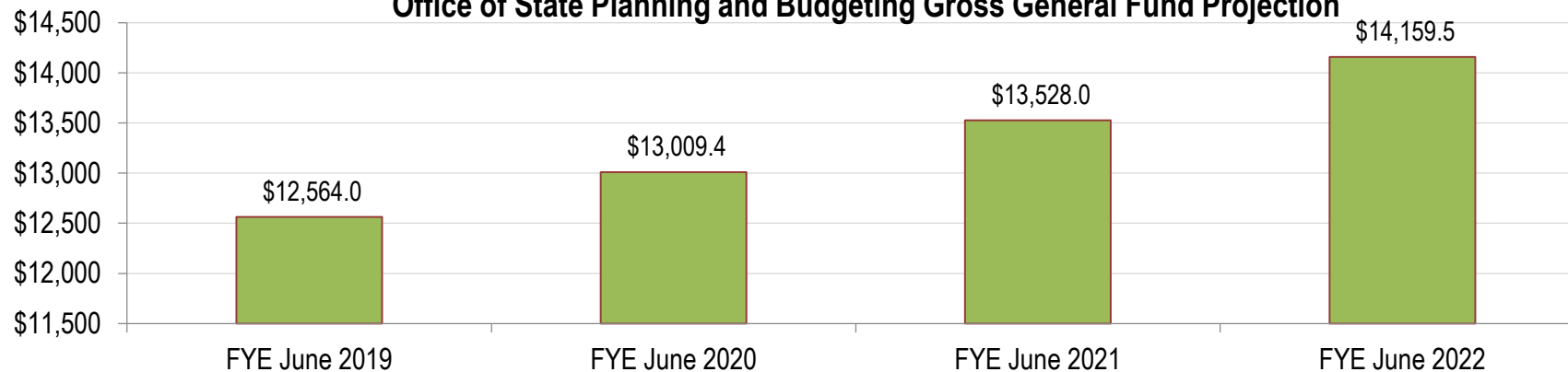
Colorado Legislative Council Gross General Fund Projection



CLC Gross General Fund

The changes from year-to-year are:
 FYE 2019 +7.2%
 FYE 2020 +3.0%
 FYE 2021 +4.1%
 FYE 2022 +4.1%
 CLC sees a greater slowdown and a weaker “recovery” than OSPB.

Office of State Planning and Budgeting Gross General Fund Projection



OSPB Gross General Fund

The changes from year-to-year are:
 FYE 2019 +7.2%
 FYE 2020 +3.5%
 FYE 2021 +4.0%
 FYE 2022 +4.7%
 OSPB sees a slowdown over the next six months and gradual recovery.

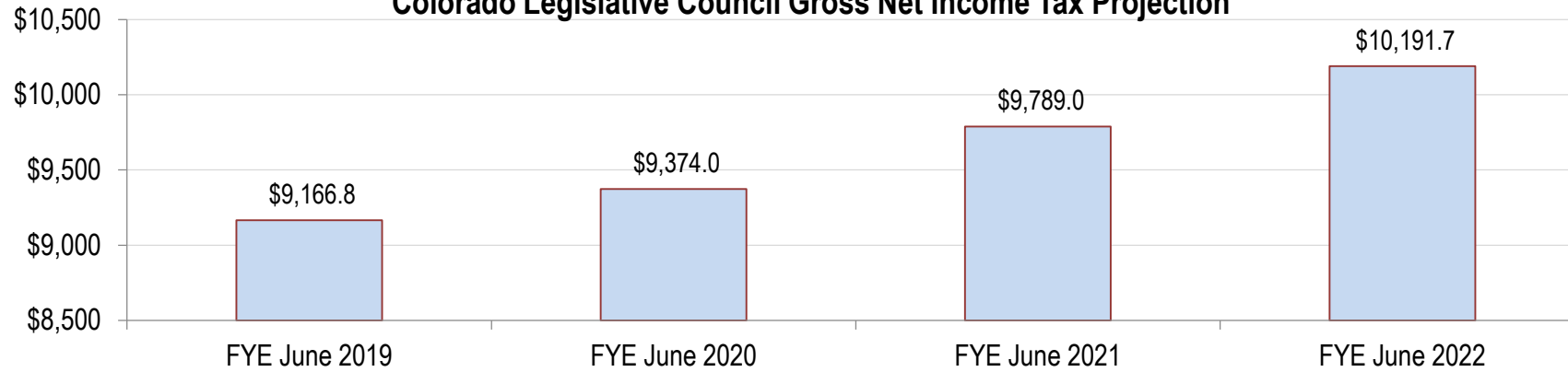
About two-thirds of all revenue is net income taxes; approximately 30% is from excise taxes and 3% to 4% is from other sources.

Source: Quarterly reports, OSPB and CLC, December 2019, cber.co

Colorado Net Income Tax

OSPB and CLC Projections (Dollars in Millions)

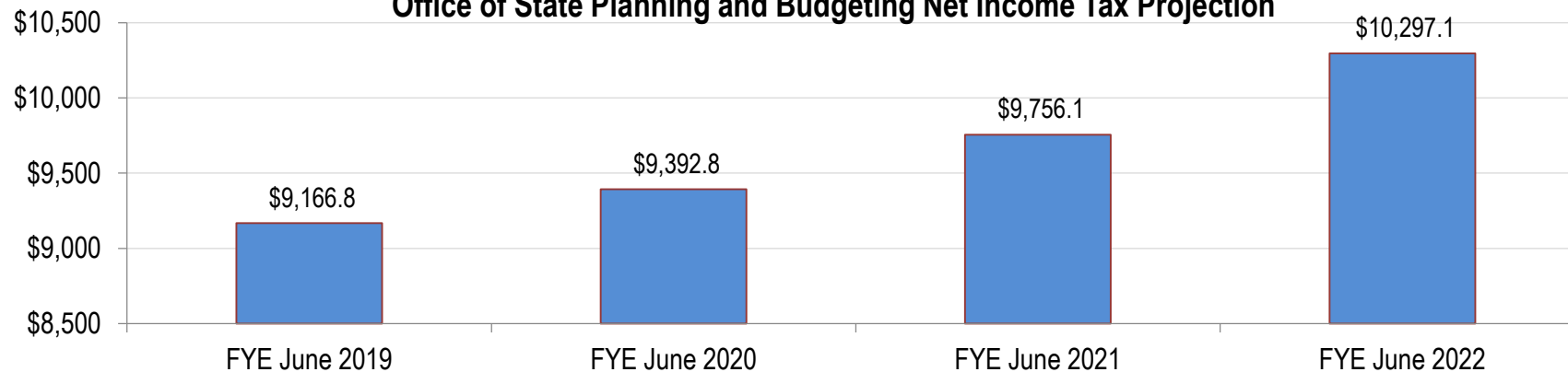
Colorado Legislative Council Gross Net Income Tax Projection



CLC Net Income Taxes

The changes from year-to-year are:
 FYE 2019 +9.7%
 FYE 2020 +2.3%
 FYE 2021 +4.1%
 FYE 2022 +4.1%
 CLC sees a greater slowdown and a weaker “recovery” than OSPB.

Office of State Planning and Budgeting Net Income Tax Projection



OSPB Net Income Taxes

The changes from year-to-year are:
 FYE 2019 +9.7%
 FYE 2020 +2.5%
 FYE 2021 +3.9%
 FYE 2022 +5.5%
 OSPB sees a slowdown over the next six months and quick recovery.

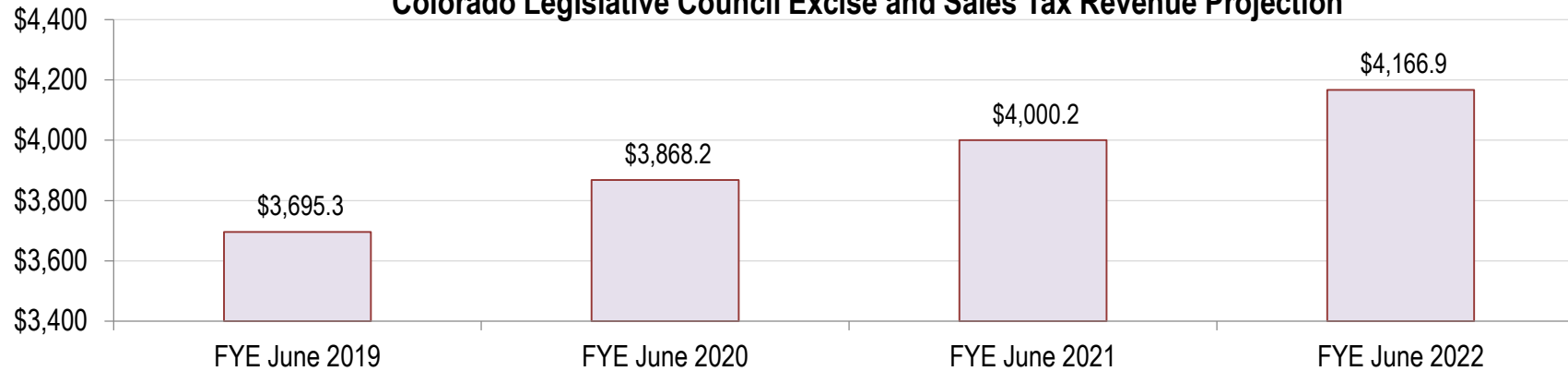
Individuals pay 90% to 92% of total income taxes collected. Businesses pay the other 8% to 10%.

Source: Quarterly reports, OSPB and CLC, December 2019, cber.co

Colorado Excise and Sales Tax Revenue

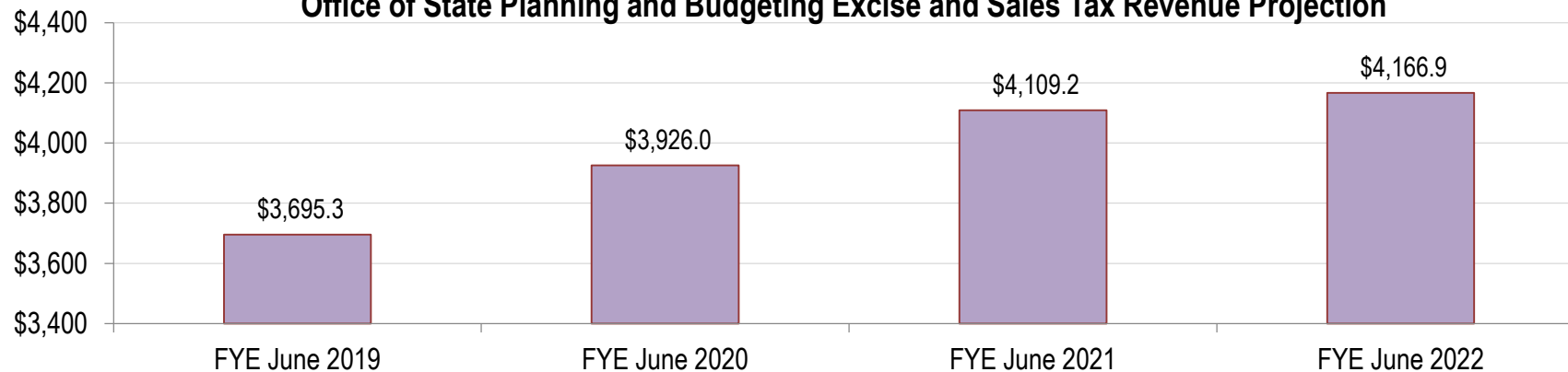
OSPB and CLC Projections (Dollars in Millions)

Colorado Legislative Council Excise and Sales Tax Revenue Projection



CLC Excise and Sales Taxes
 The changes from year-to-year are:
 FYE 2019 +5.5%
 FYE 2020 +4.7%
 FYE 2021 +3.4%
 FYE 2022 +4.0%
 CLC sees a slowdown and “recovery” in sales and excise taxes.

Office of State Planning and Budgeting Excise and Sales Tax Revenue Projection



OSPB Excise and Sales Taxes
 The changes from year-to-year are:
 FYE 2019 +5.5%
 FYE 2020 +6.2%
 FYE 2021 +4.7%
 FYE 2022 +2.8%
 OSPB sees an extended deceleration in retail sales taxes.

About 90% of excise and sales tax revenue is sales tax revenue; about 8% is excise tax revenue and 3% is from other sources.

Source: Quarterly reports, OSPB and CLC, December 2019, cber.co

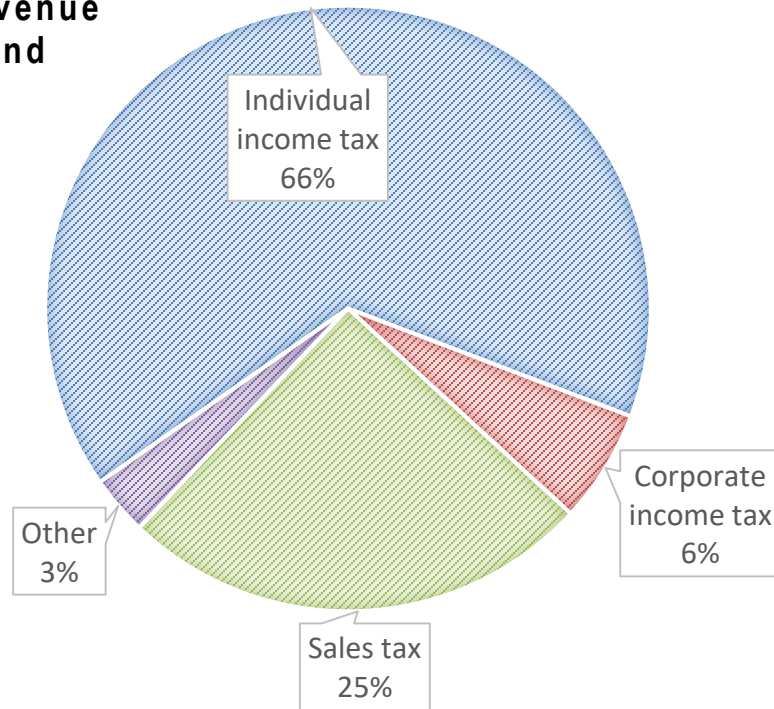
General Fund and State Budget

Sources of Funding

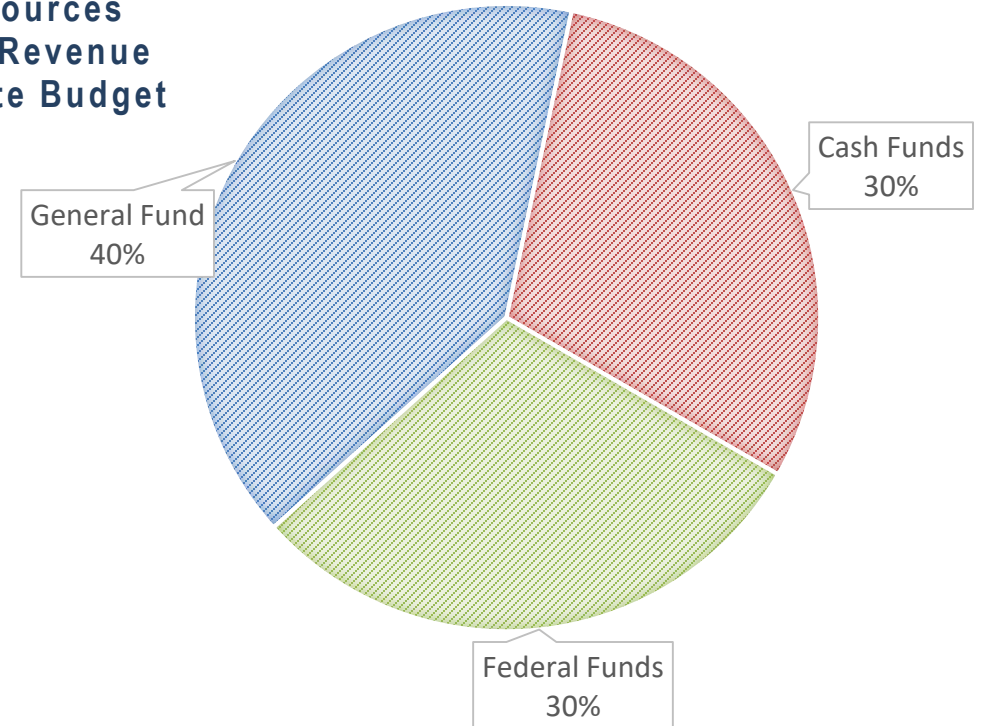
The legislature has little control over 75% of the General Fund (K-12 education, health care, and corrections). About 68% of the fund's revenue is derived from income taxes and 25% from sales taxes. The General Fund is budgeted to be about \$12.6 billion and the state budget is about \$30 billion in 2019-2020.

Federal funds must be used for a designated purpose, such as transportation. Some federal funds must be matched, such as Medicaid, and others are passed through to local governments. Cash funds are generated by specific state services and are restricted to fund those services or prescribed program area. The largest source of cash funds, about 60% of the total, is college tuition. General funds, pay for core services.

**Sources of Revenue
General Fund**



**Sources
of Revenue
State Budget**



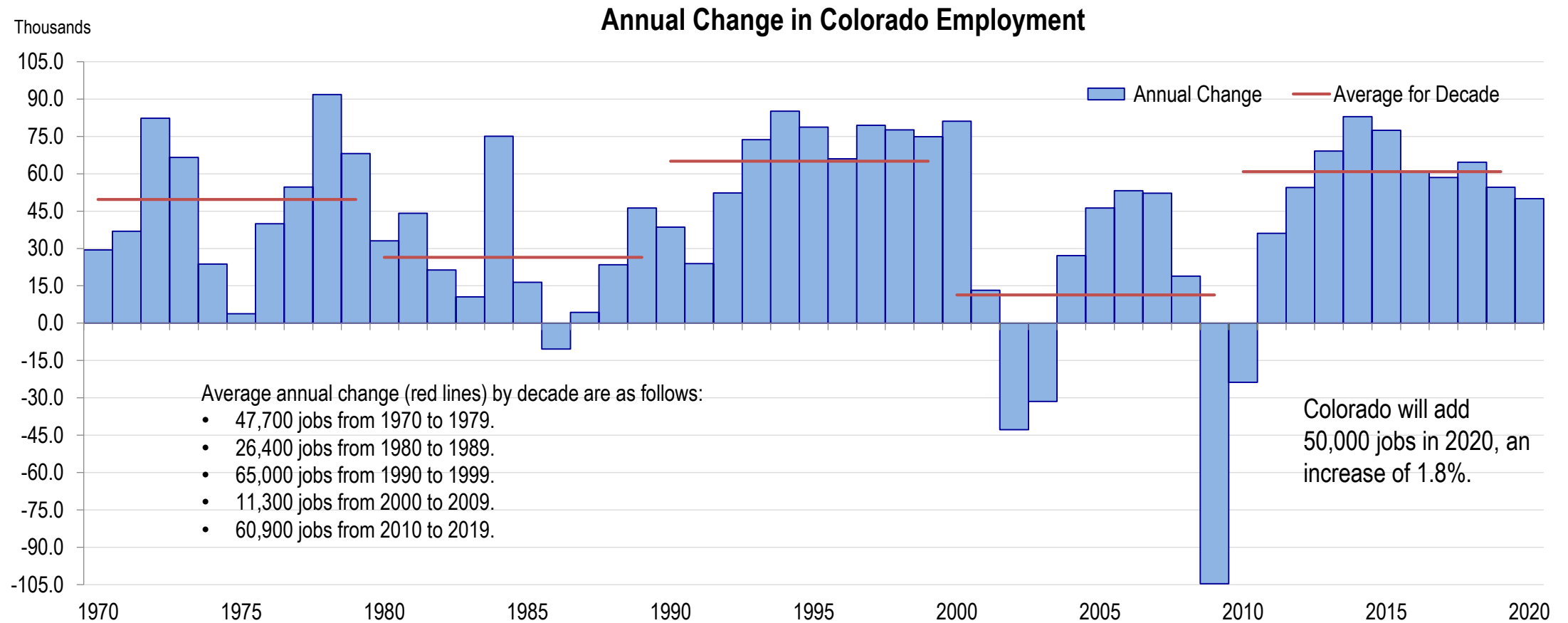
Source: Quarterly reports, OSPB and CLC, December 2019, cber.co

Colorado-based Business and Economic Research <https://cber.co>

The Colorado Economy

Summary

Annual Change in Colorado Employment



Source: Bureau of Labor Statistics, cber.co

Colorado-based Business and Economic Research <https://cber.co>

Review of 2019 and Outlook for 2020

Highlights of the Colorado Economy

1. Since 2013, the rate of growth in the Colorado GDP has been greater than the U.S. About 89% of the state's GDP is concentrated in the 7 MSAs. Since 2010 the change in GDP has been driven by real estate and finance; PST, construction, and state and local government.
2. In 2020 the Colorado population will be 5,843,281. The population will increase by 72,400 jobs added in 2020, with 48,000 from net migration and 24,400 from the natural rate of increase. The lower rate of fertility will prevent the population from increasing at a faster rate.
3. The median wage for all occupations is \$42,308, i.e. half the workers in the state have wages below that amount. The top occupations are office support, sales, and food preparation.
4. In 2019, the annual unemployment rate was 3.2%, with monthly rates much lower. Even though the LFPR has improved over the past year, the size of the labor force is increasing at a slower rate because the demand for workers exceeds the supply.
5. There was a strong increase in hourly earnings in 2018 and 2019. A solid increase is projected for 2020.
6. Colorado will add 50,000 jobs in 2020, an increase of 1.8%. Employment growth in 2020 will be in the PST and health care sectors. Solid growth is expected from construction and transportation and warehousing.
7. From an economic standpoint, Colorado is a state of "haves" and "have nots". The percentage of GDP, population, employment, establishments, and wages is at least four times greater in the metro counties than the nonmetro counties.
8. The real value of agriculture production and net farm income has trended downward since 2011.
9. DIA continues to set records for passenger traffic. New auto registrations are down compared to last year but used car sales (7 years or newer) are greater than last year. Finally, venture capitalists see Colorado as a place to invest in 2019.
10. There was a decrease in the number of building permits and their valuation in 2019. The number of permits issued in 2020 is expected be similar to the level in 2020. Housing prices will appreciate at a slower rate than in the past.
11. Recent policies and regulations by the local and state governments have threatened the extractive industries and the revenue they generate for state and local coffers.
12. The 73rd Colorado General Assembly will be challenged by projections of reduced revenue, and the need to address a major backlog of transportation projects, rising health care costs, anti-growth sentiment, and an education system that feels unappreciated and underfunded.

cber.co
Economic Review of 2019 and Outlook for 2020

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 2019 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 <https://cber.co>.

For additional information contact cber.co at cber@cber.co or gary@garyhorvath.com.

ACKNOWLEDGEMENTS

A special thank you to Ana and Allyson Horvath for the review and comments of this publication.

ABOUT THE AUTHOR

Gary Horvath has produced 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.

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 in OEDIT’s early stage and proof of concept grant program.