



# Division of the Budget

## The Bullwhip Effect and U.S. Economic Forecasting Uncertainty

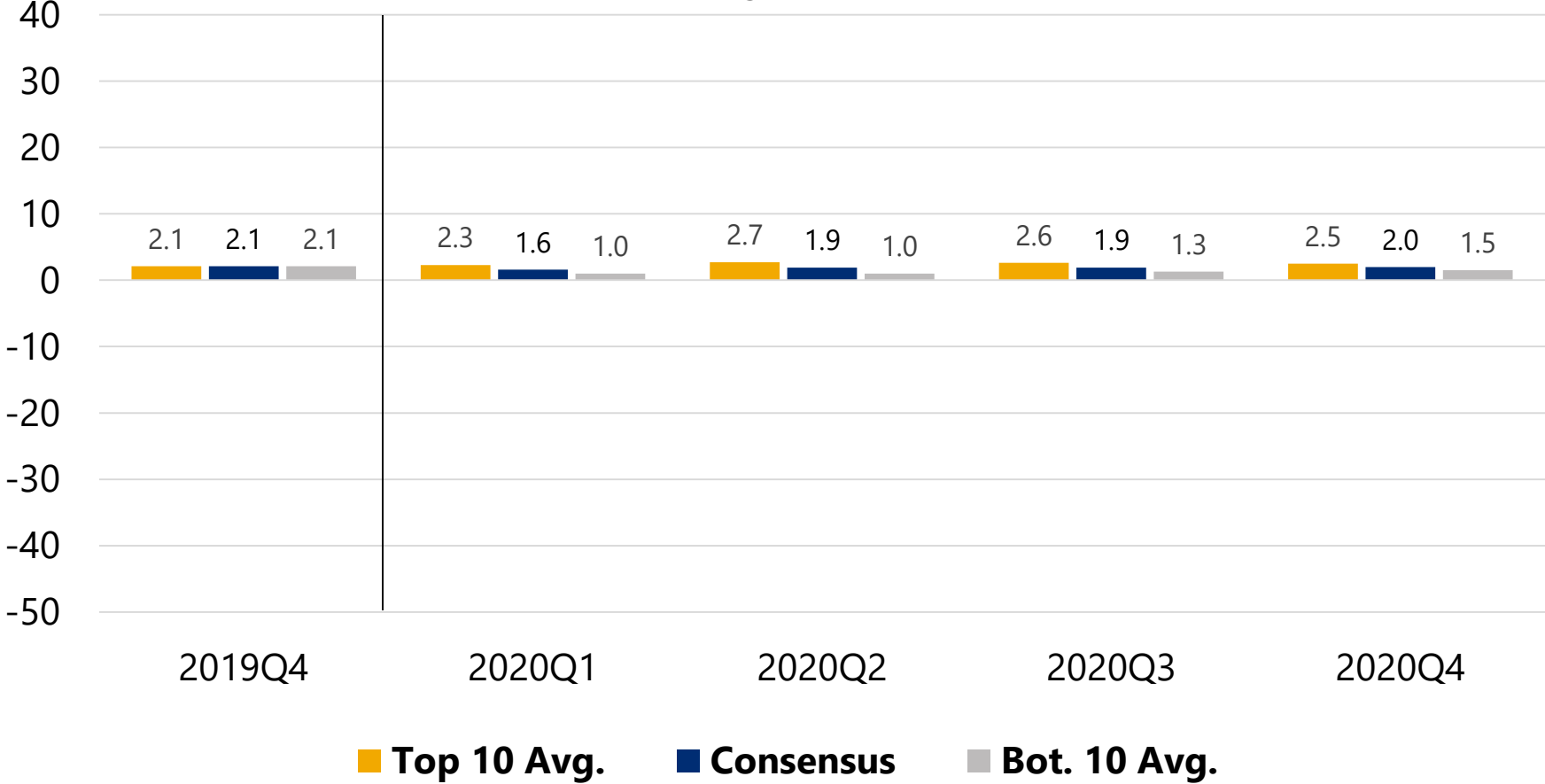
2020 REMI Conference  
October 28, 2020

Chris G. Christopher, Jr., PhD, CBE  
Chief Economist  
Economics and Revenue Unit  
New York State Division of the Budget  
[chris.christopher@budget.ny.gov](mailto:chris.christopher@budget.ny.gov)

# **Blue Chip Quarterly GDP Outlook**

# Blue Chip U.S. Economic Outlook: February 2020 Release

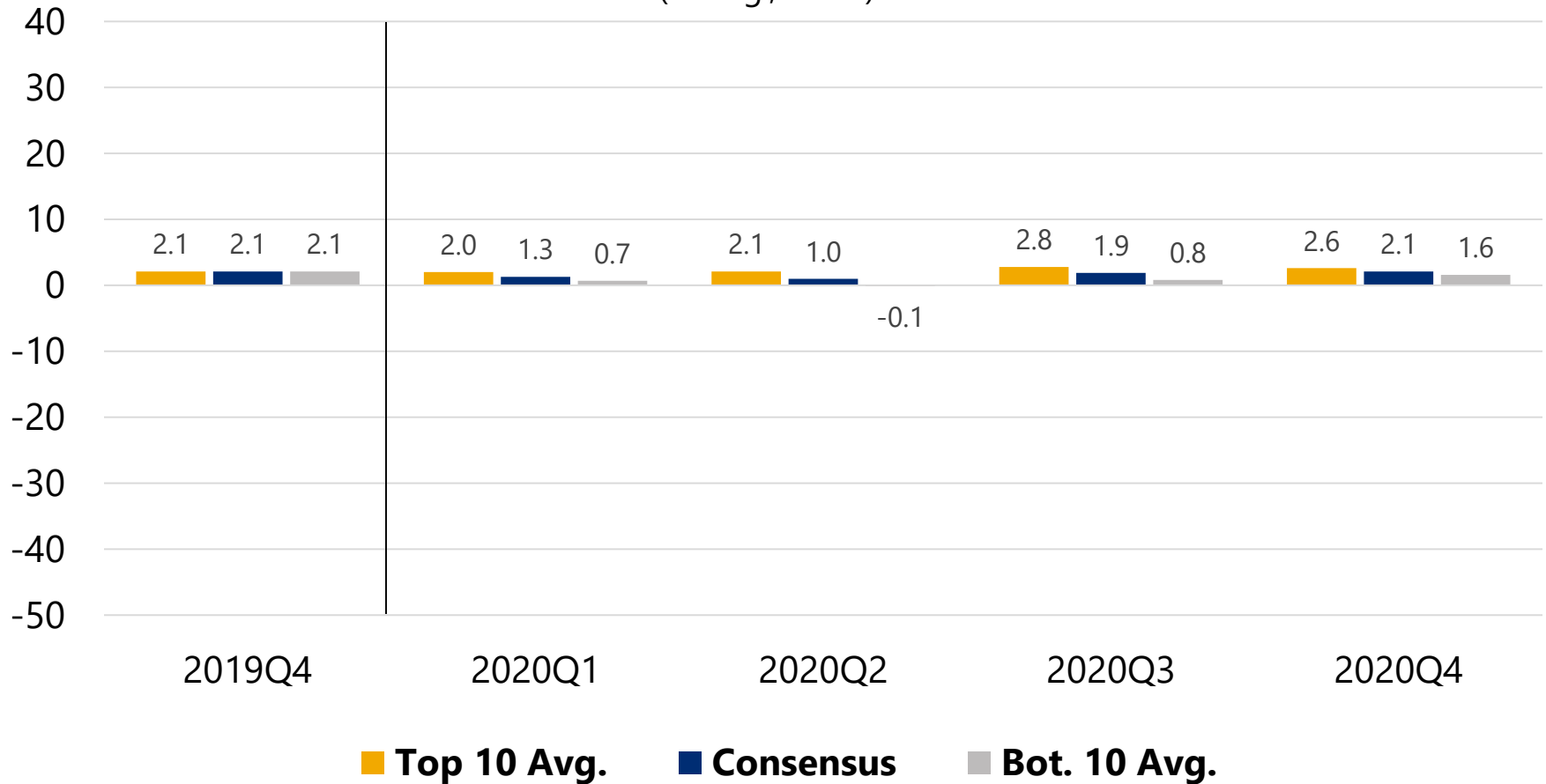
**Real GDP Growth**  
(% Chg., SAAR)



Note: GDP advanced estimate 2019 Q4 (BEA)  
Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: March 2020 Release

## Real GDP Growth (% Chg., SAAR)

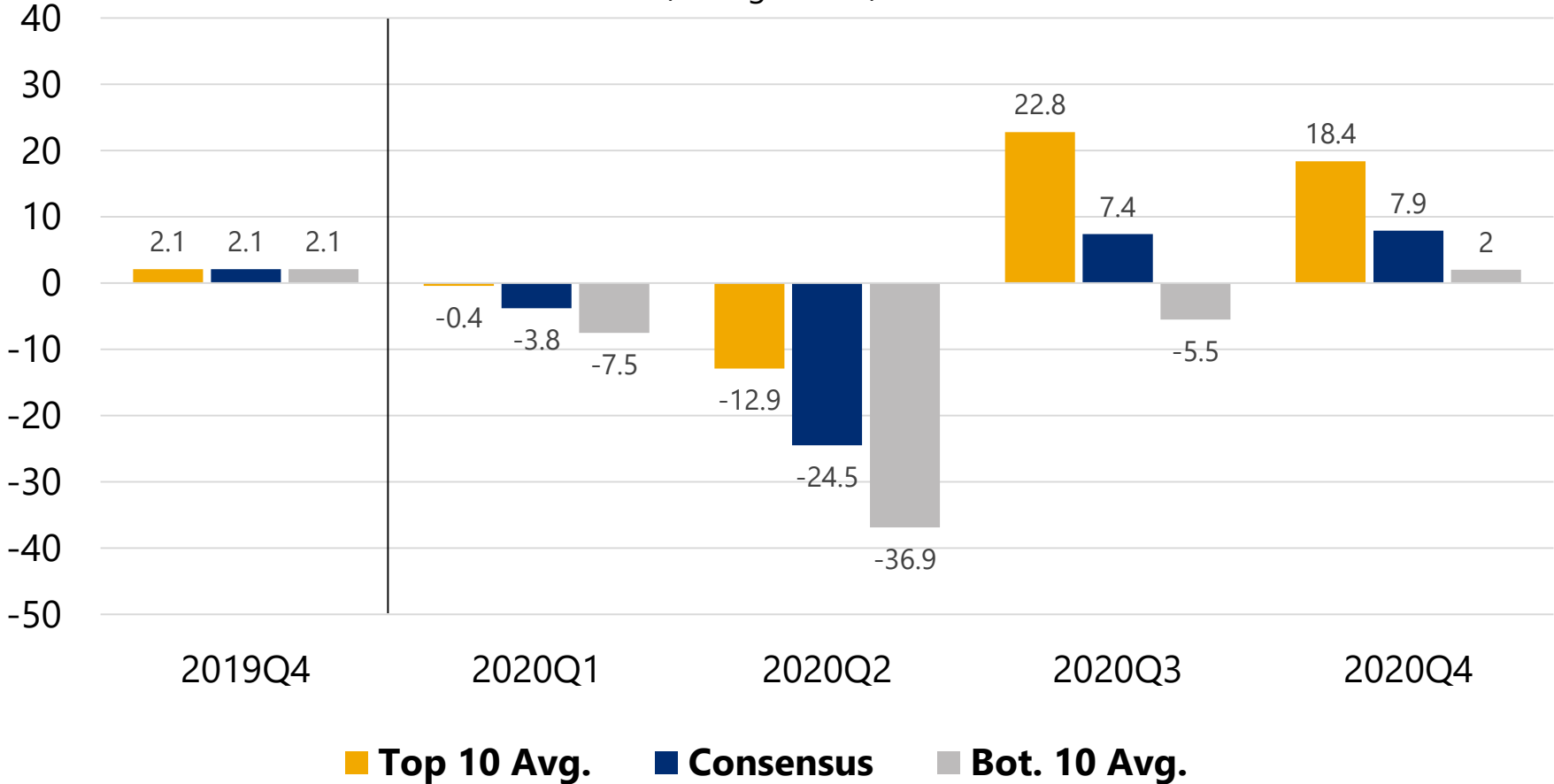


Note: GDP second estimate 2019 Q4 (BEA)

Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: April 2020 Release

**Real GDP Growth**  
(% Chg., SAAR)

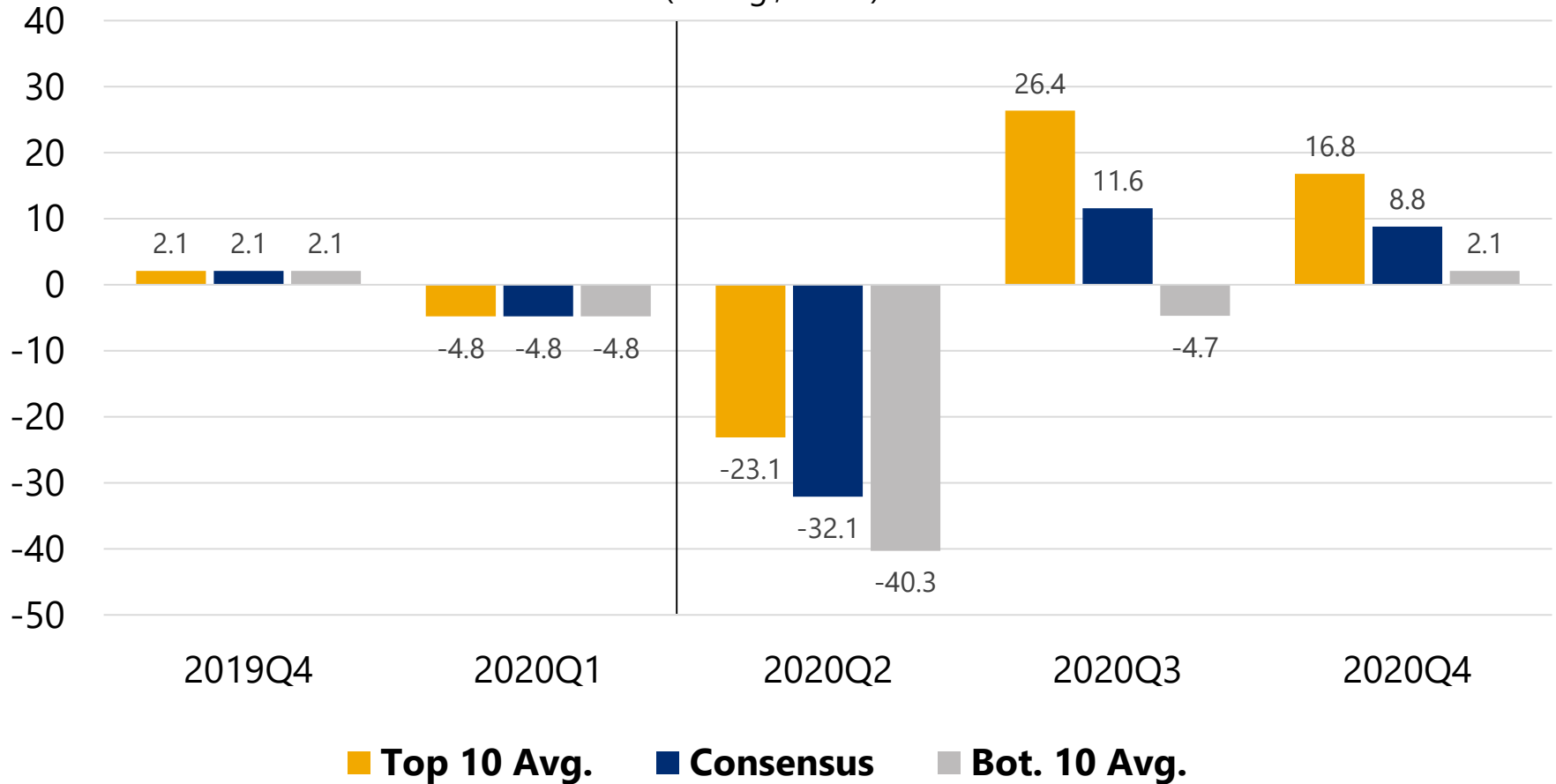


Note: GDP third estimate 2019 Q4 (BEA)  
Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: May 2020 Release

## Real GDP Growth

(% Chg., SAAR)



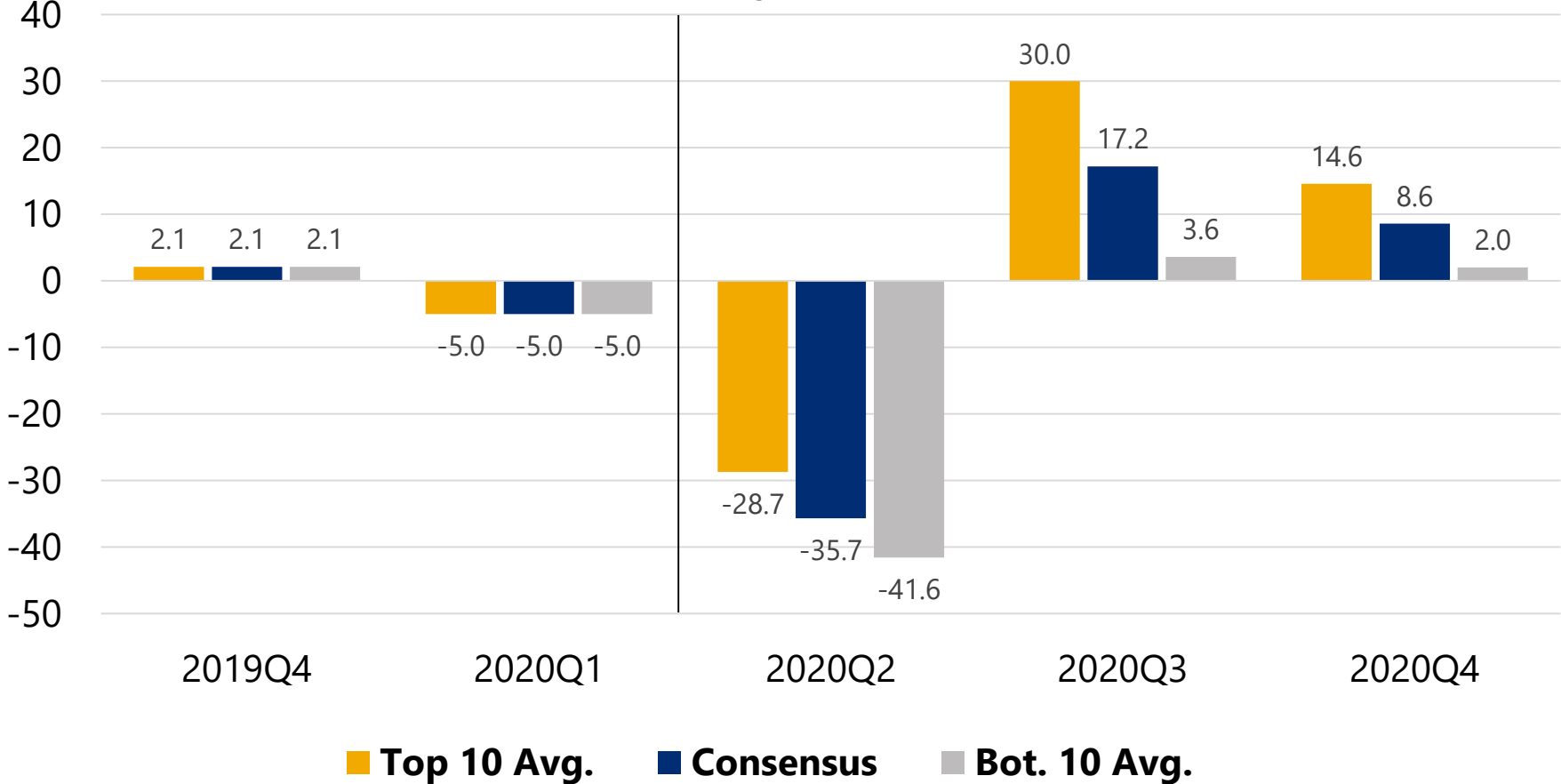
Note: GDP advanced estimate 2020 Q1 (BEA)

Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: June 2020 Release

## Real GDP Growth

(% Chg., SAAR)

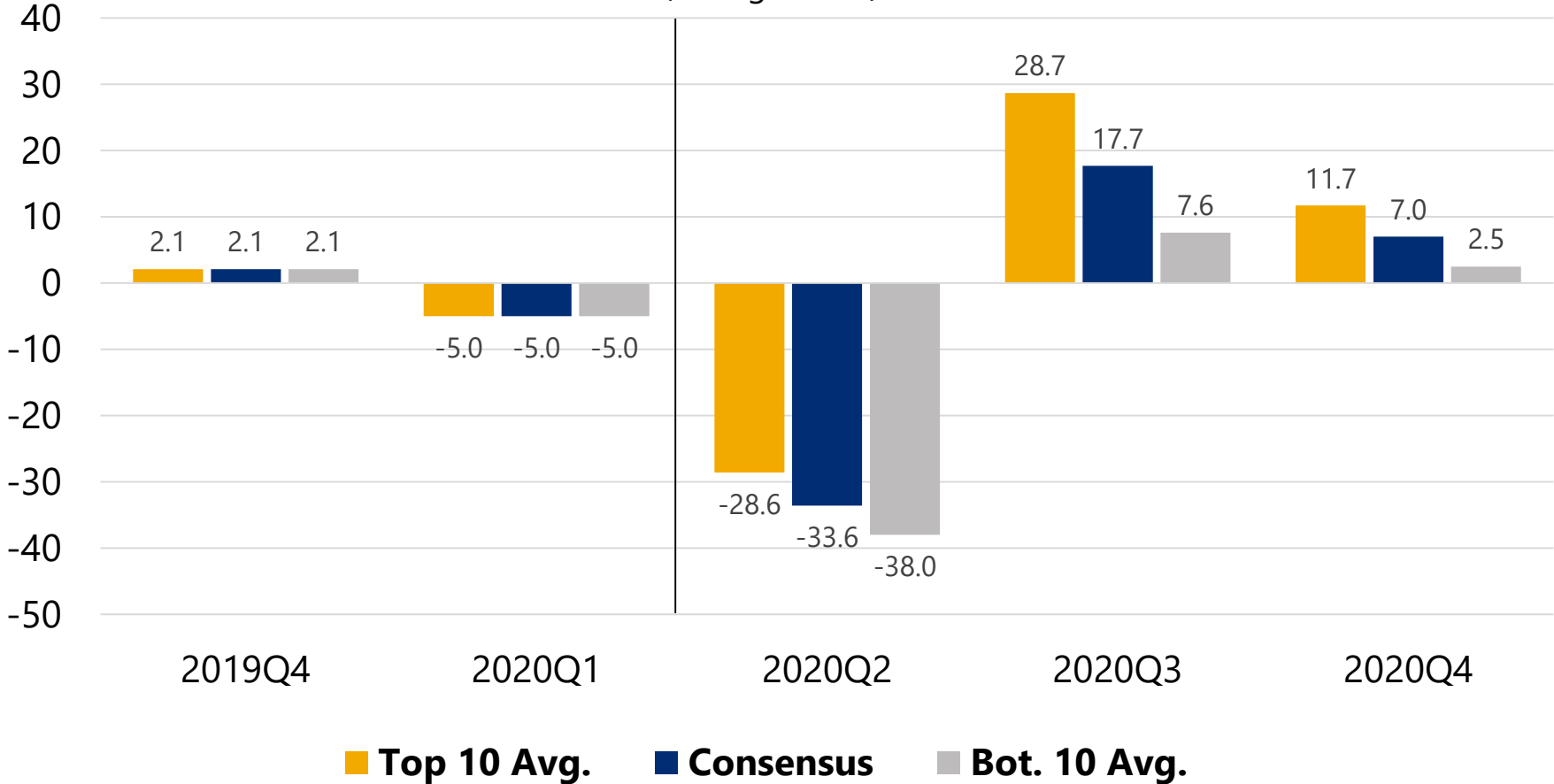


Note: GDP second estimate 2020 Q1 (BEA)  
Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: July 2020 Release

## Real GDP Growth

(% Chg., SAAR)

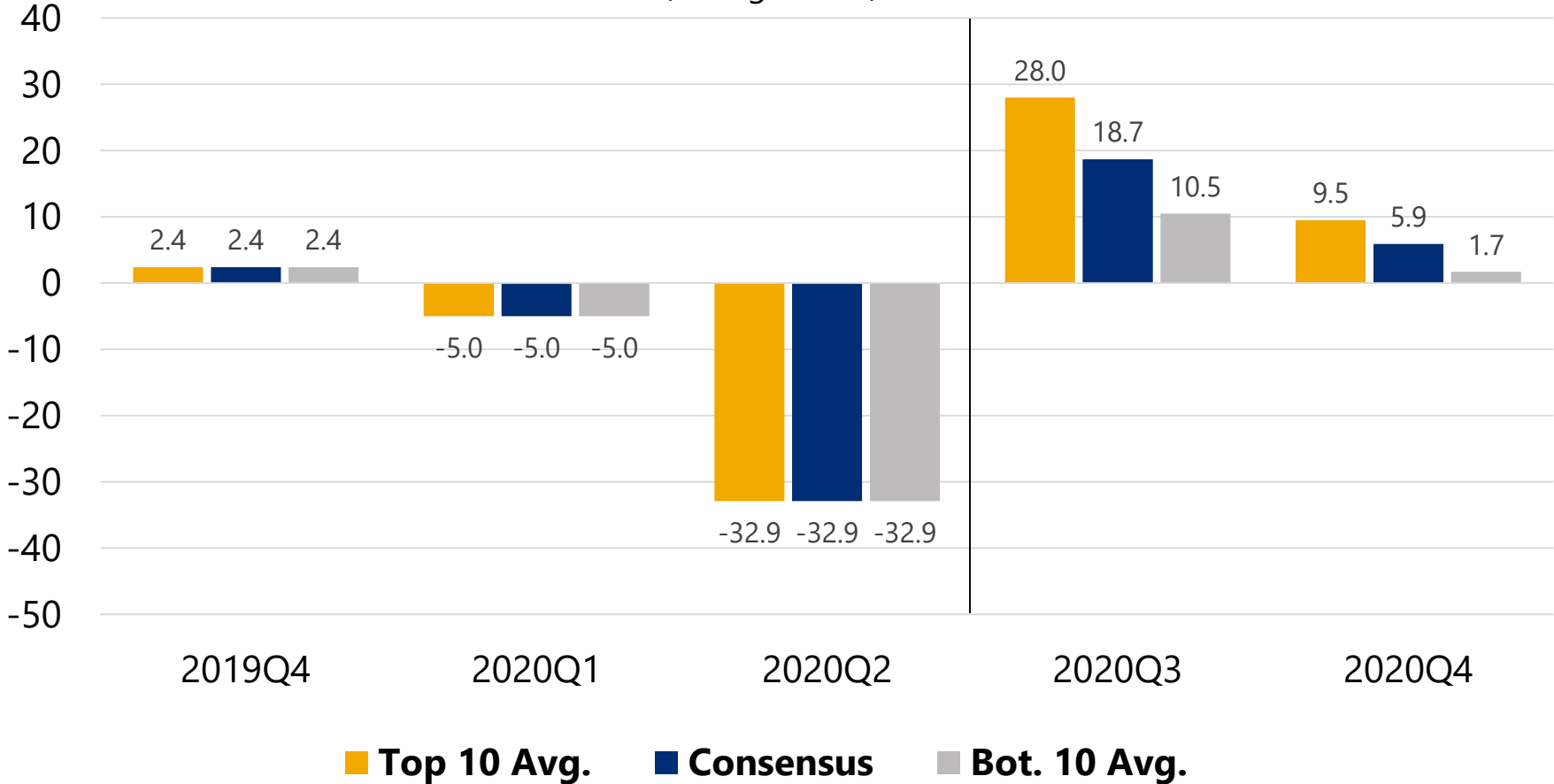


Note: GDP third estimate 2020 Q1 (BEA)  
Source: Blue Chip Economic Indicators



# Blue Chip U.S. Economic Outlook: August 2020 Release

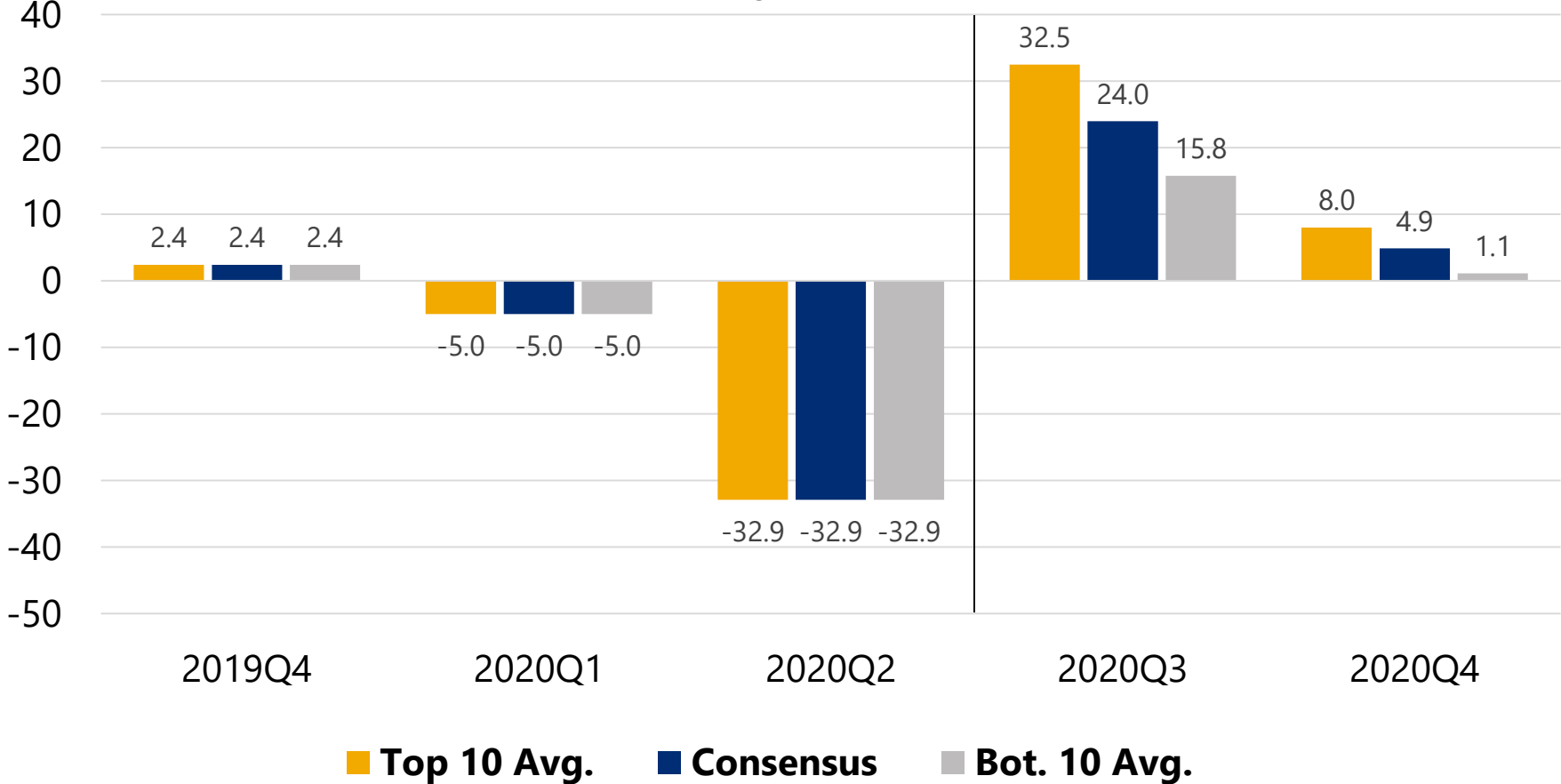
**Real GDP Growth**  
(% Chg., SAAR)



Note: GDP advanced estimate 2020 Q2 (BEA)  
Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: September 2020 Release

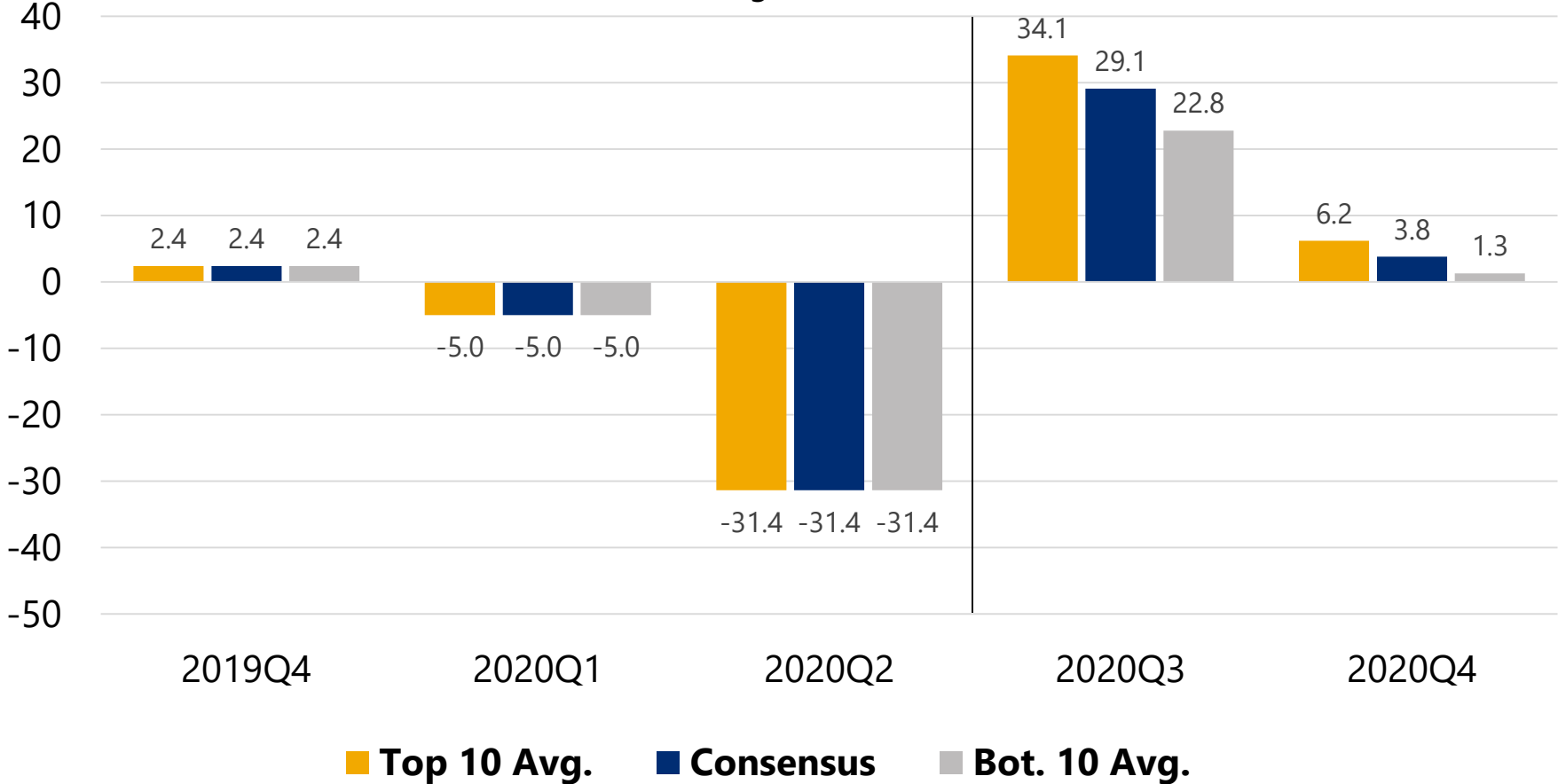
**Real GDP Growth**  
(% Chg., SAAR)



Note: GDP second estimate 2020 Q2 (BEA)  
Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: October 2020 Release

**Real GDP Growth**  
(% Chg., SAAR)



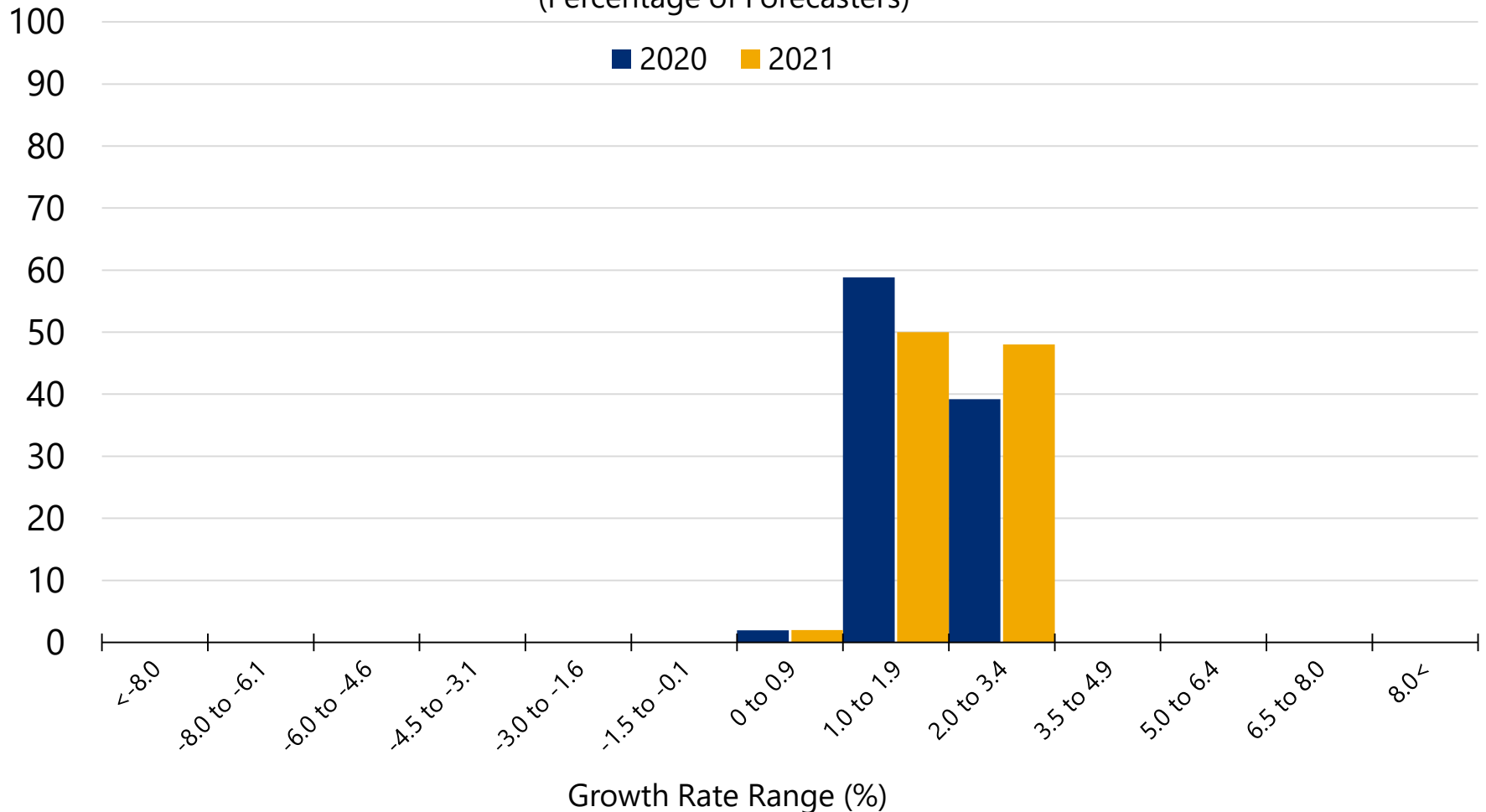
Note: GDP third estimate 2020 Q2 (BEA)  
Source: Blue Chip Economic Indicators

# **Blue Chip Annual GDP Outlook**

# Blue Chip U.S. Economic Outlook: February 2020 Release

## Real GDP Growth

(Percentage of Forecasters)

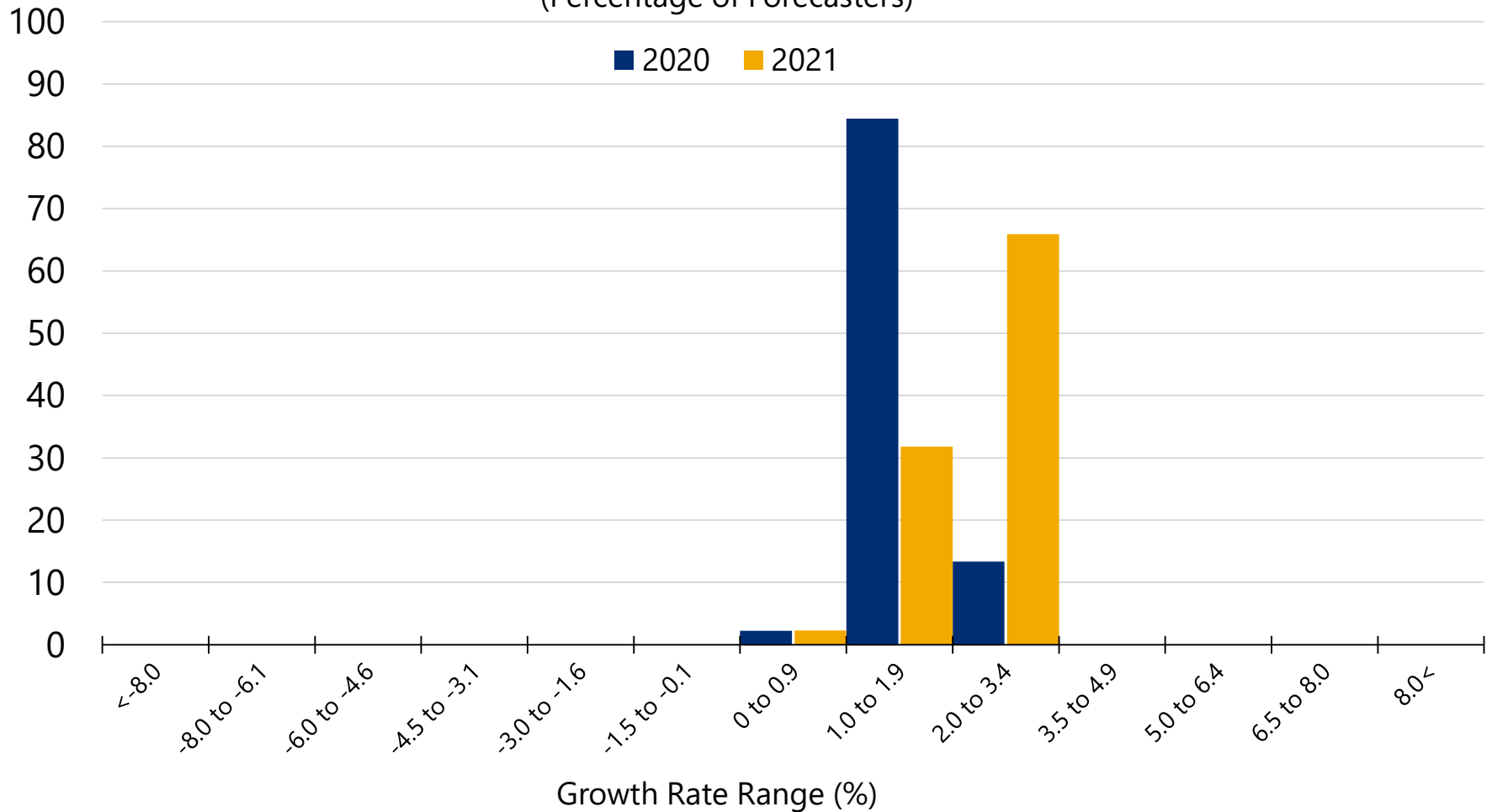


Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: March 2020 Release

## Real GDP Growth

(Percentage of Forecasters)

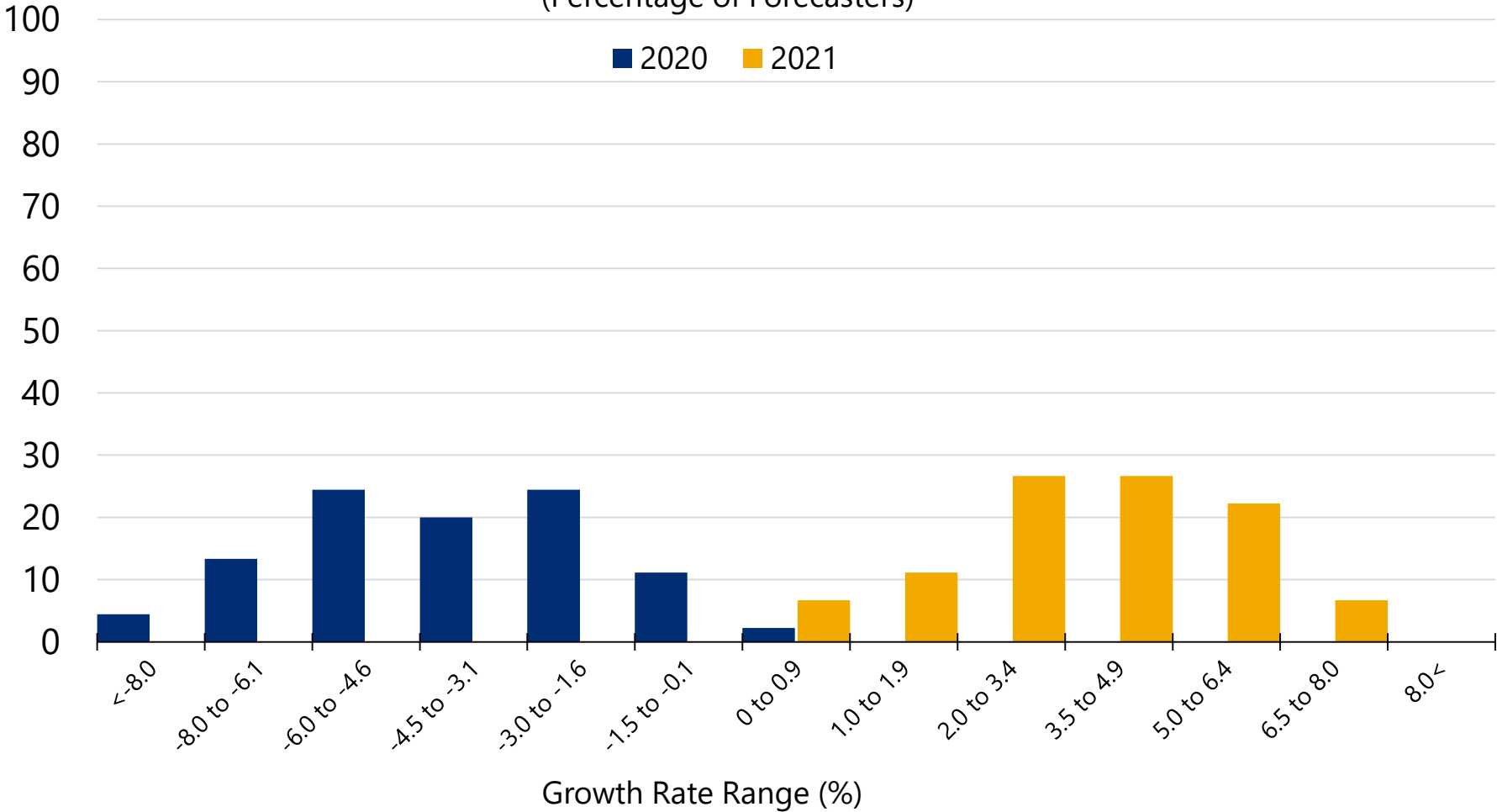


Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: April 2020 Release

## Real GDP Growth

(Percentage of Forecasters)

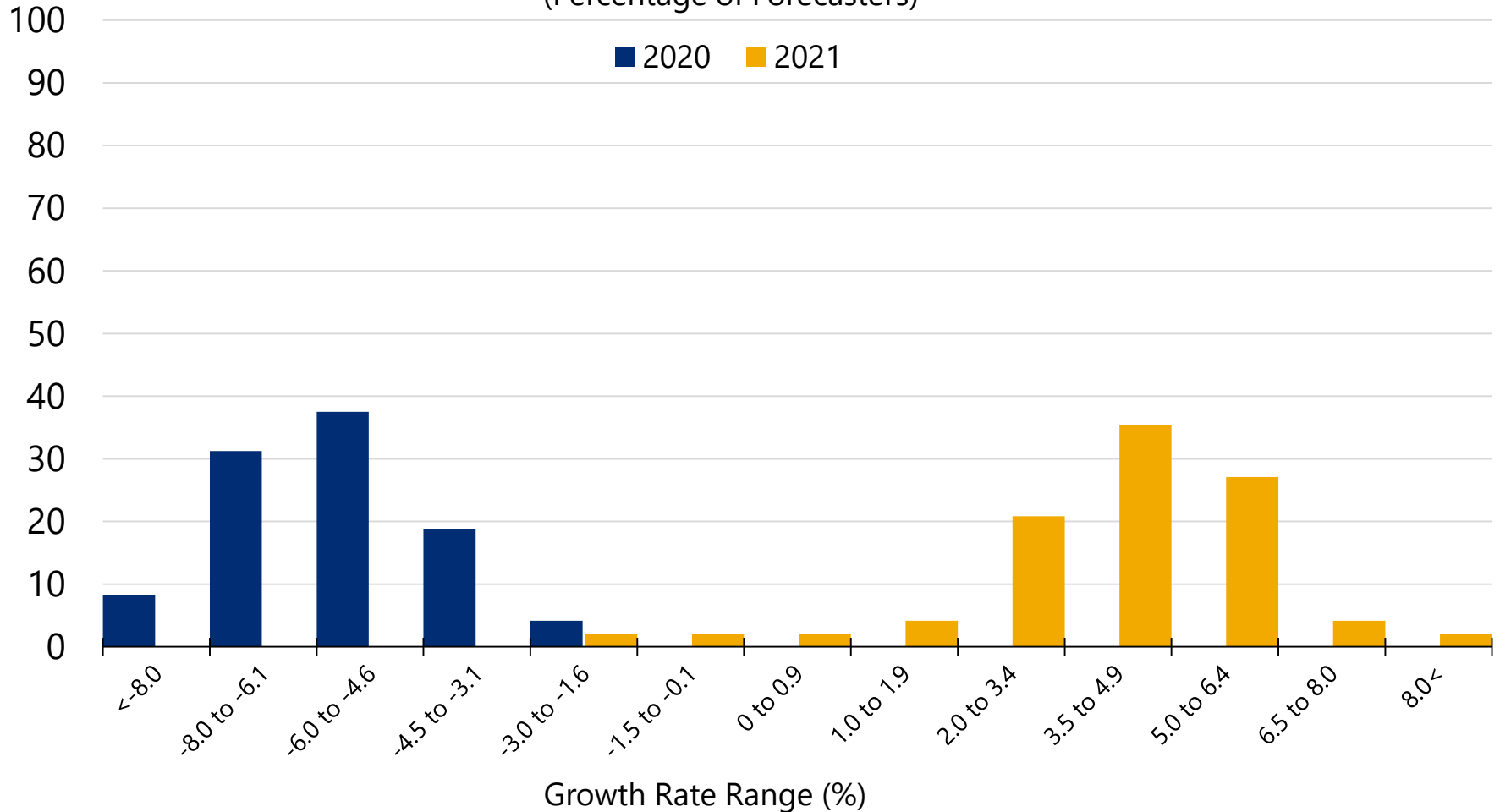


Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: May 2020 Release

## Real GDP Growth

(Percentage of Forecasters)



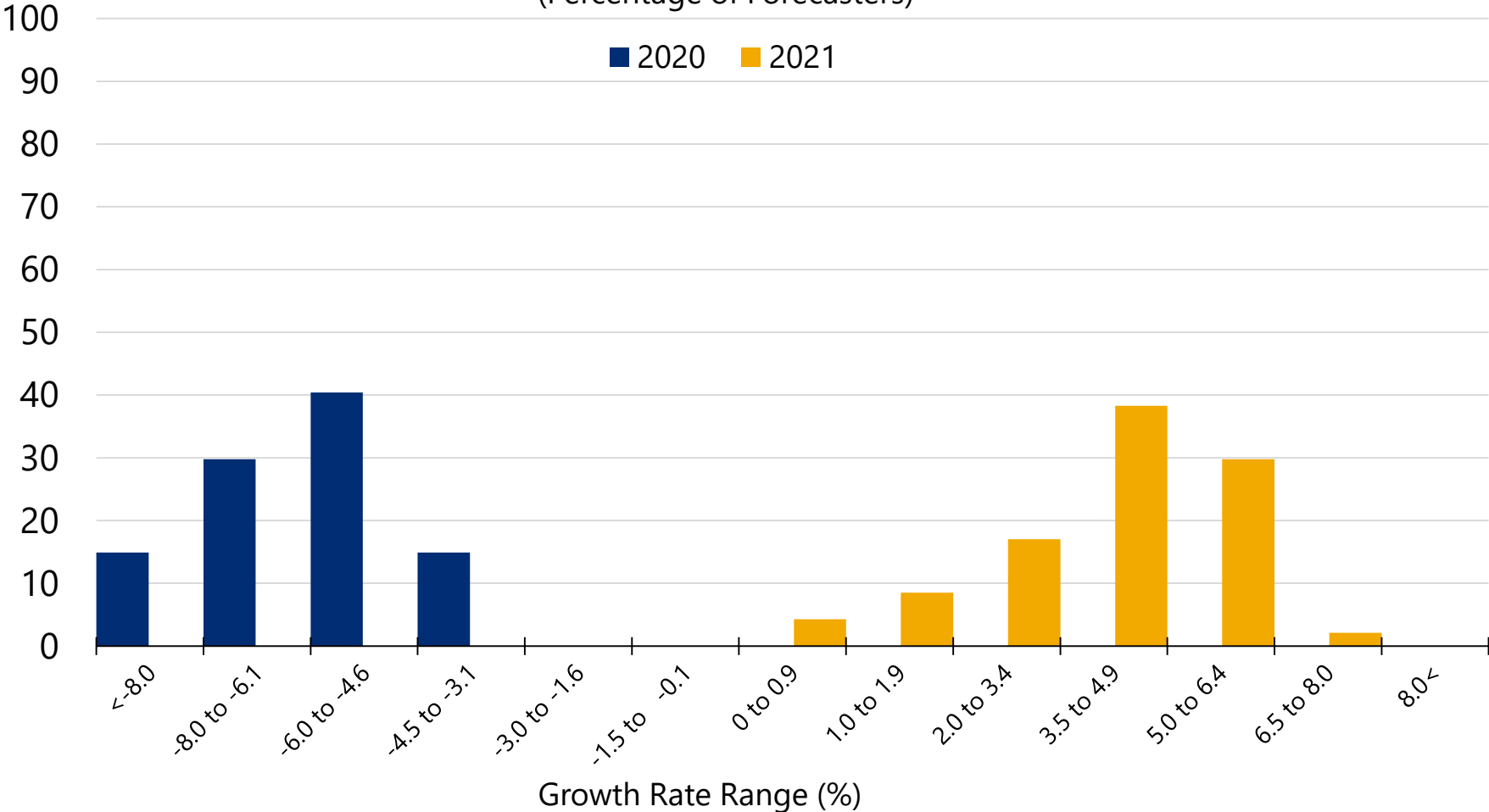
Source: Blue Chip Economic Indicators



# Blue Chip U.S. Economic Outlook: June 2020 Release

## Real GDP Growth

(Percentage of Forecasters)

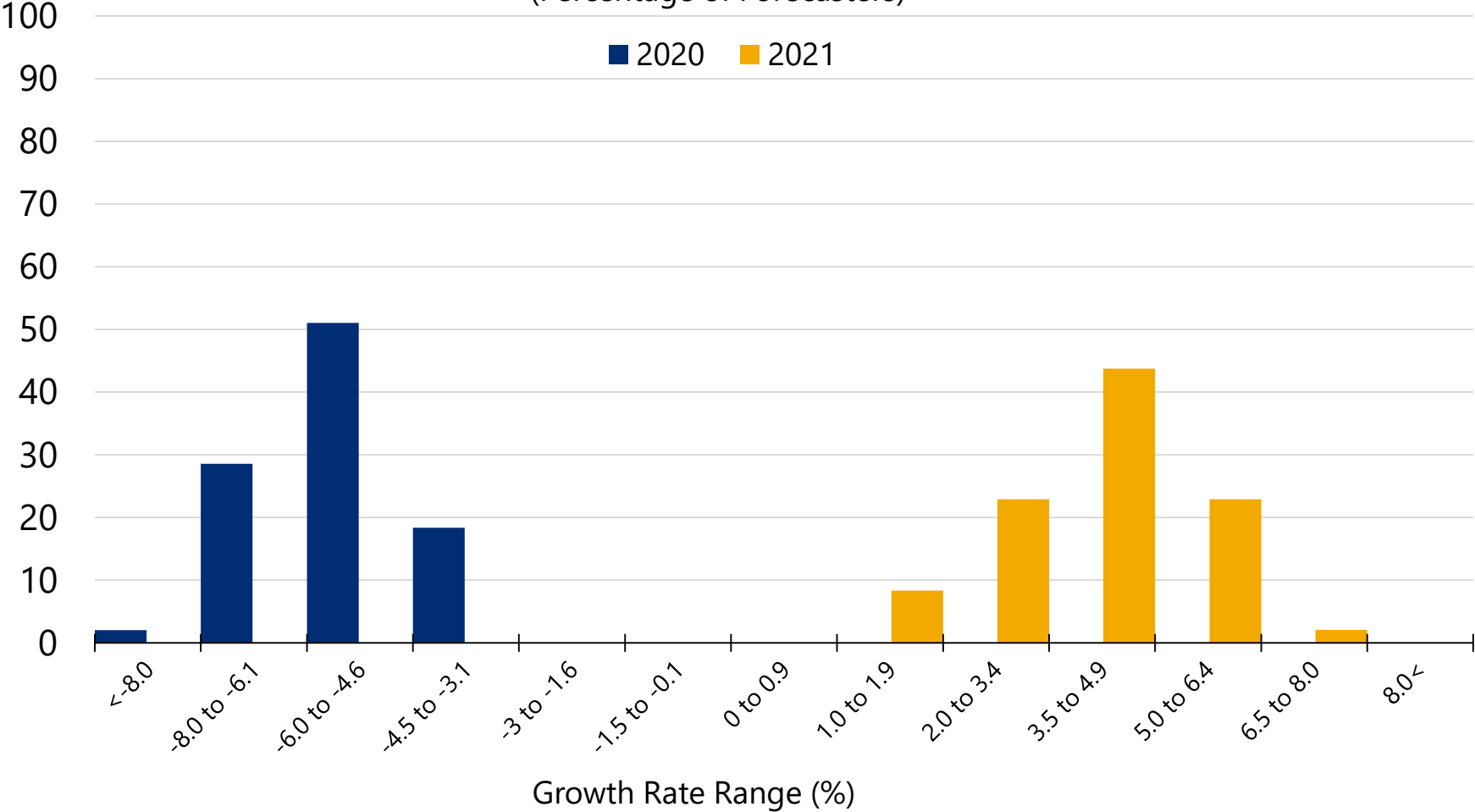


Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: July 2020 Release

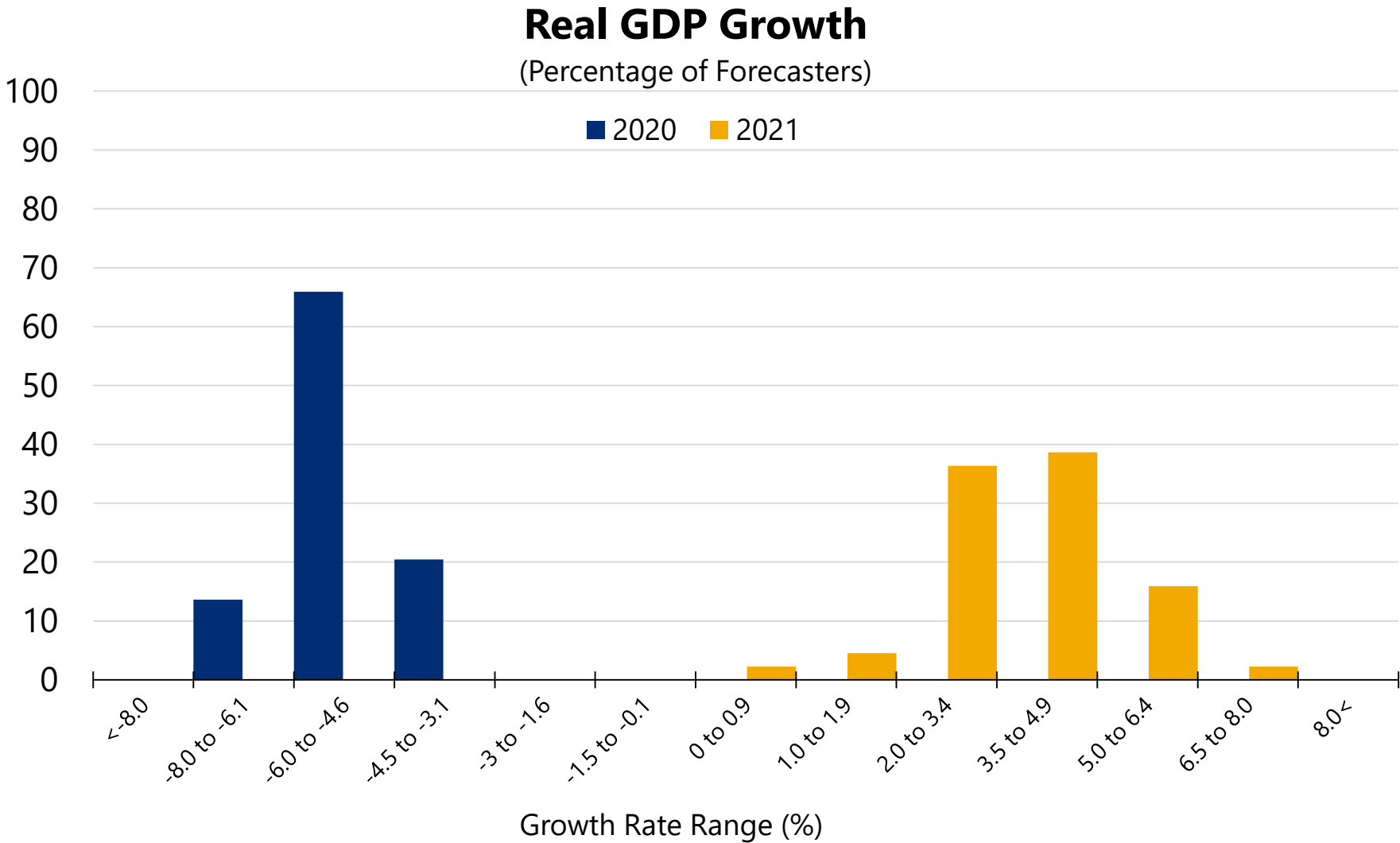
### Real GDP Growth

(Percentage of Forecasters)



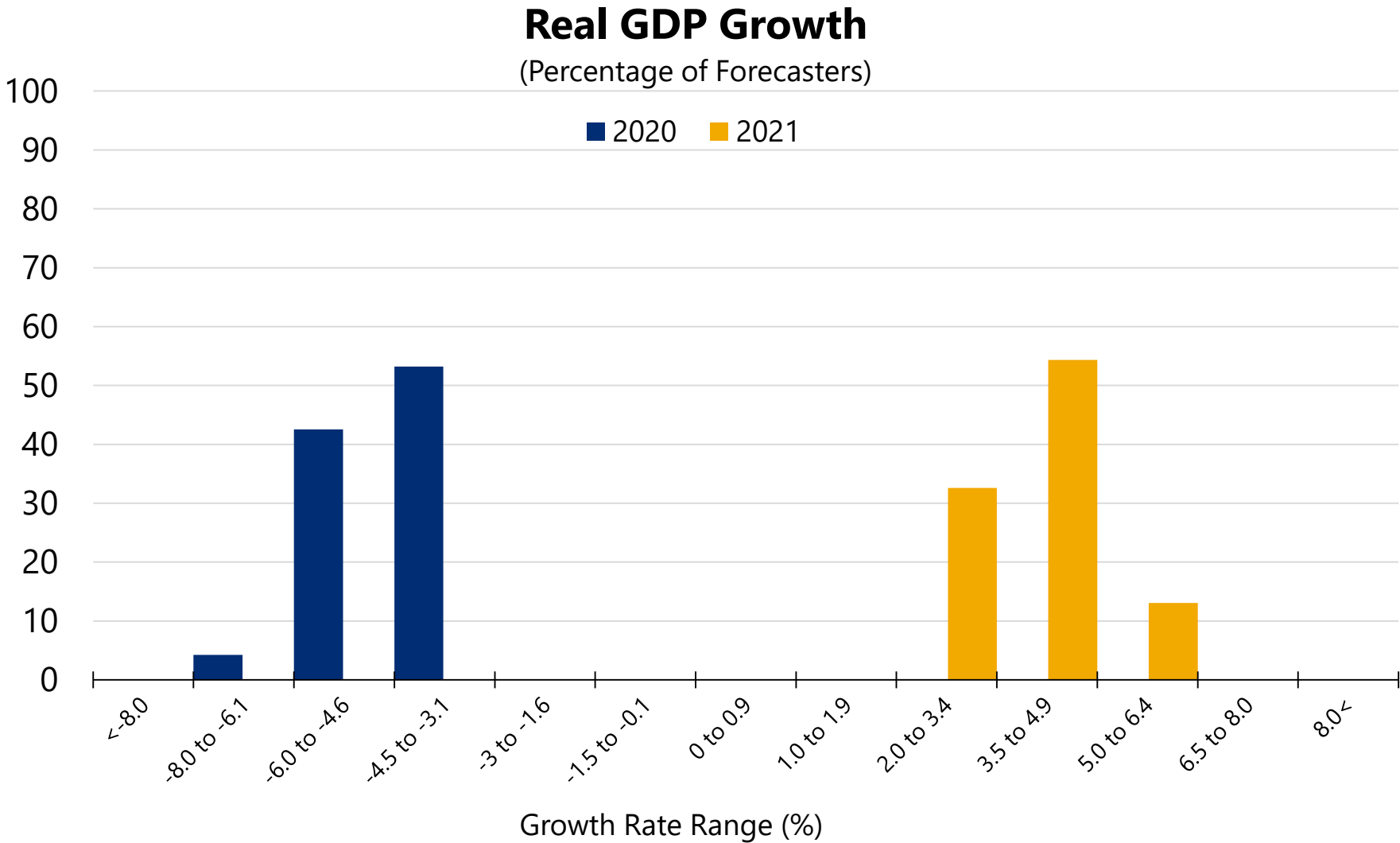
Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: August 2020 Release



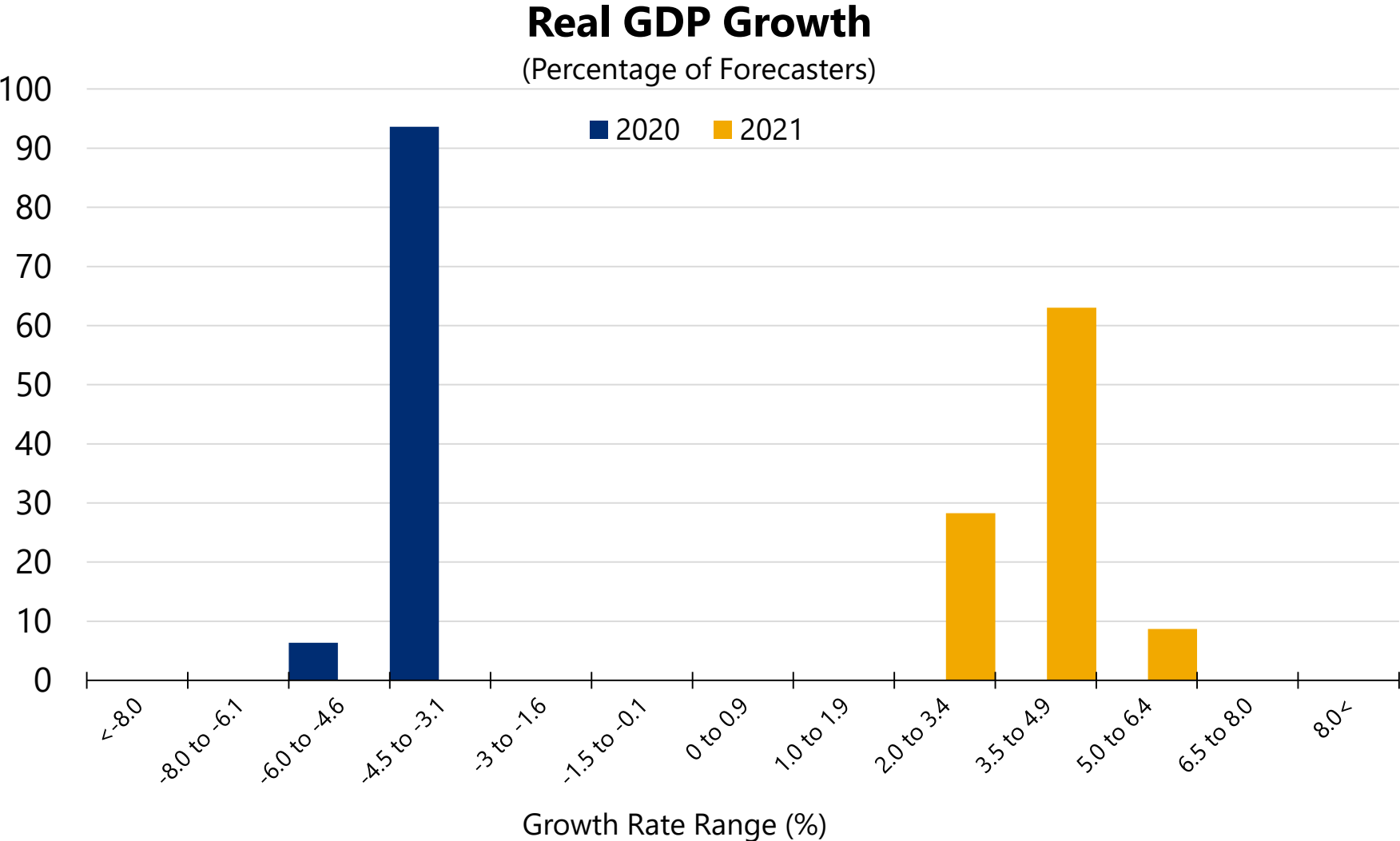
Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: September 2020 Release



Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: October 2020 Release

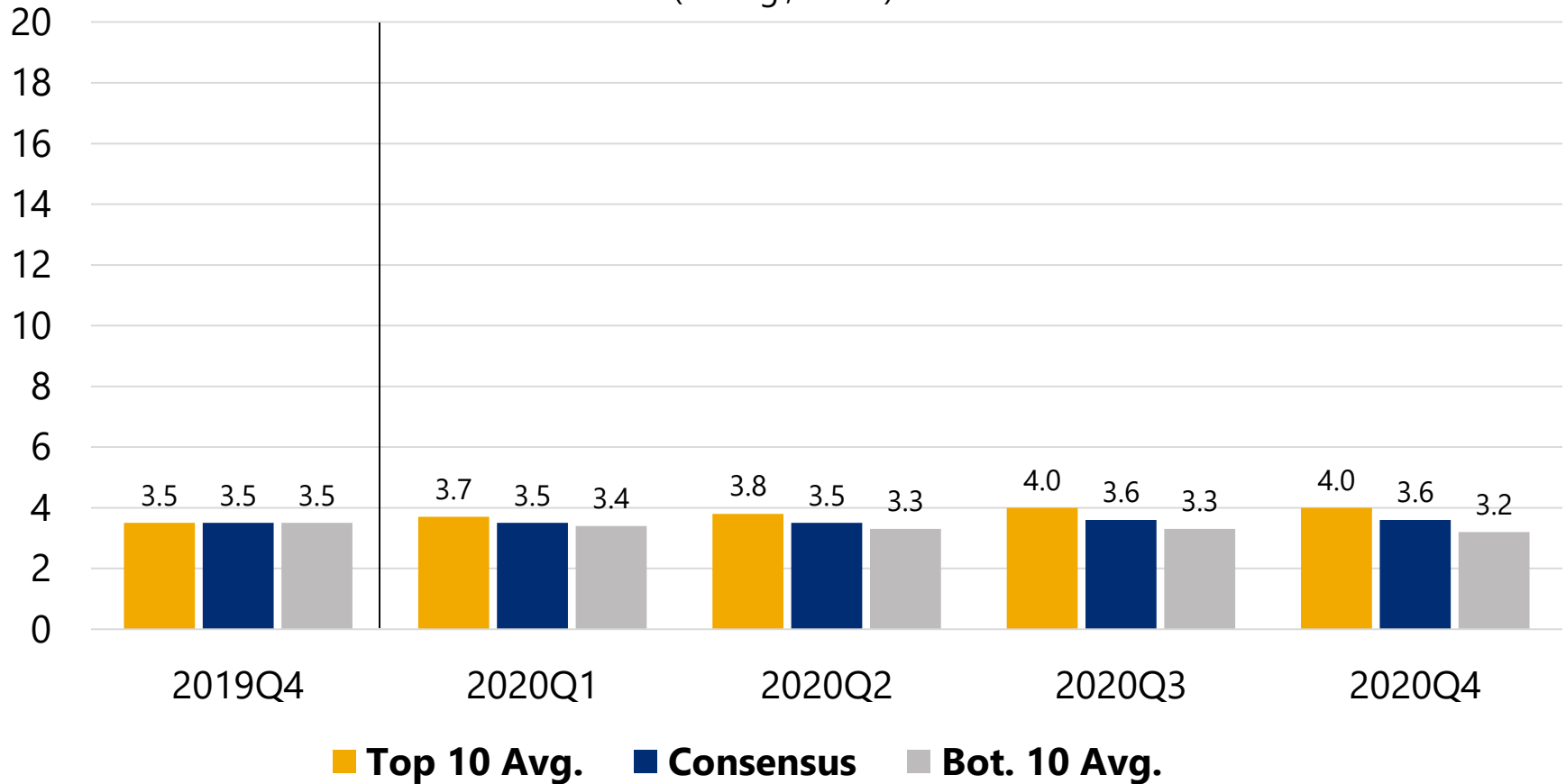


Source: Blue Chip Economic Indicators

# **Blue Chip Quarterly Unemployment Outlook**

# Blue Chip U.S. Economic Outlook: February 2020 Release

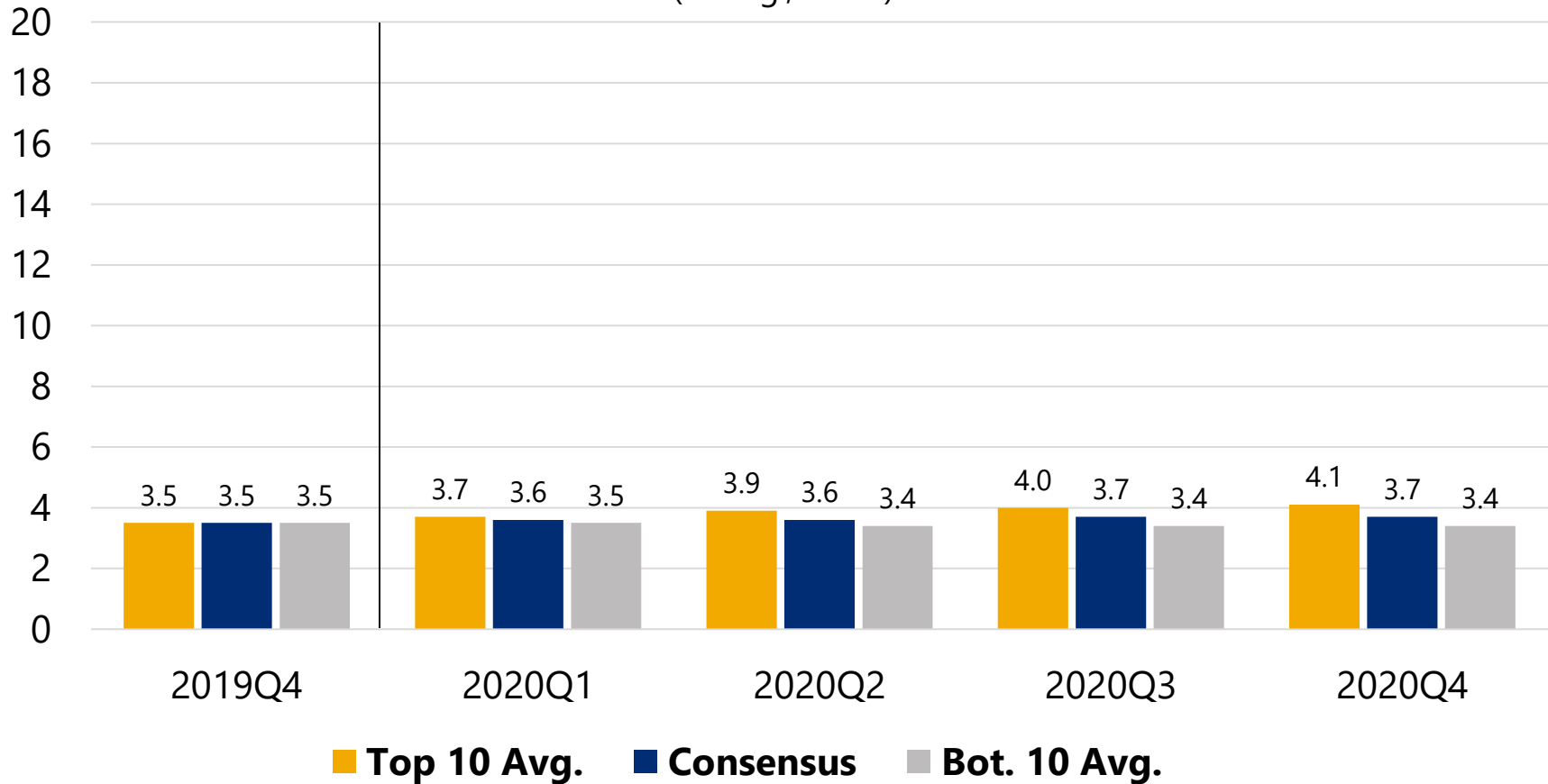
## U.S. Unemployment Rate (% Chg., SAAR)



# Blue Chip U.S. Economic Outlook: March 2020 Release

## U.S. Unemployment Rate

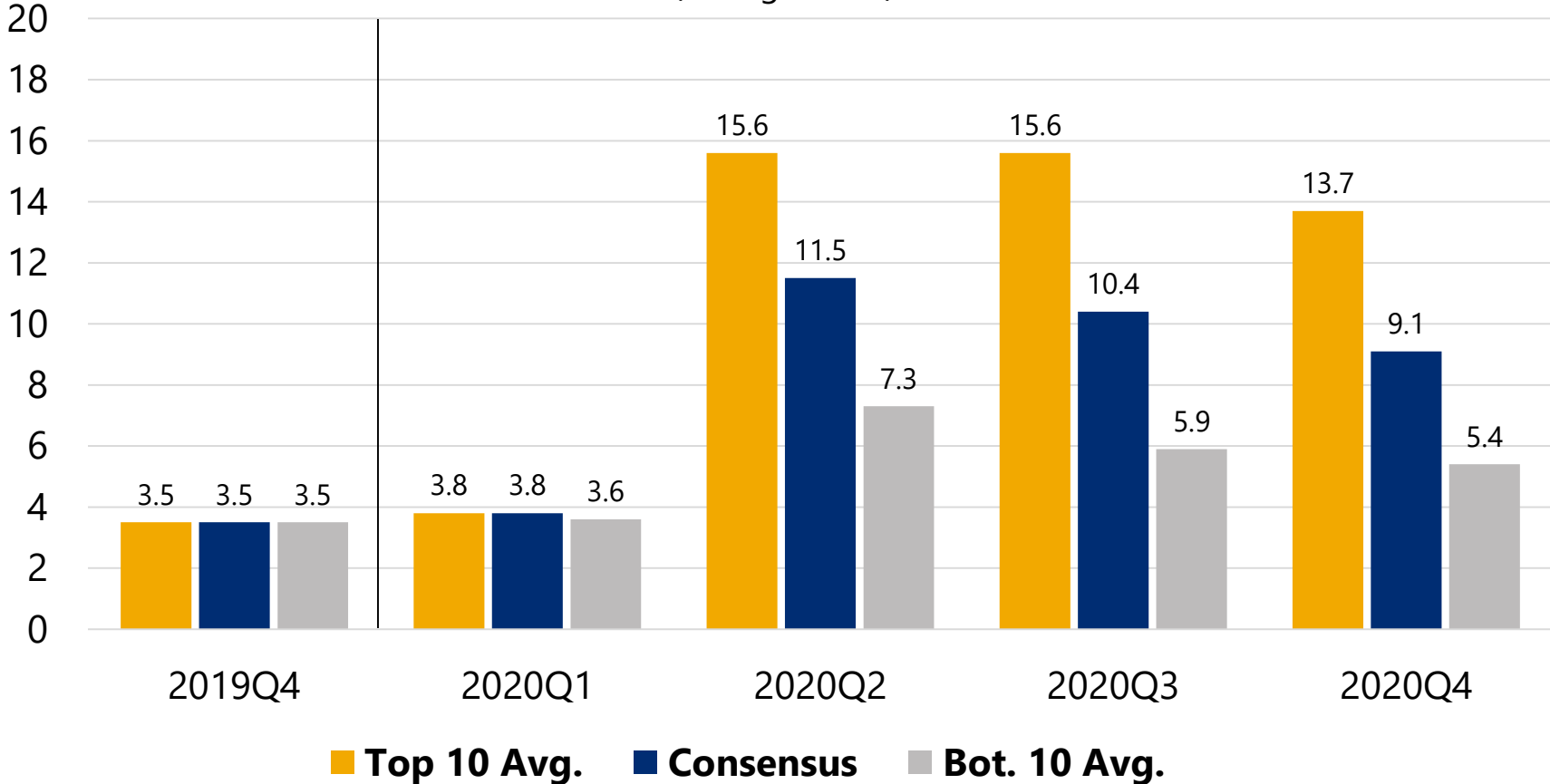
(% Chg., SAAR)





# Blue Chip U.S. Economic Outlook: April 2020 Release

## U.S. Unemployment Rate (% Chg., SAAR)

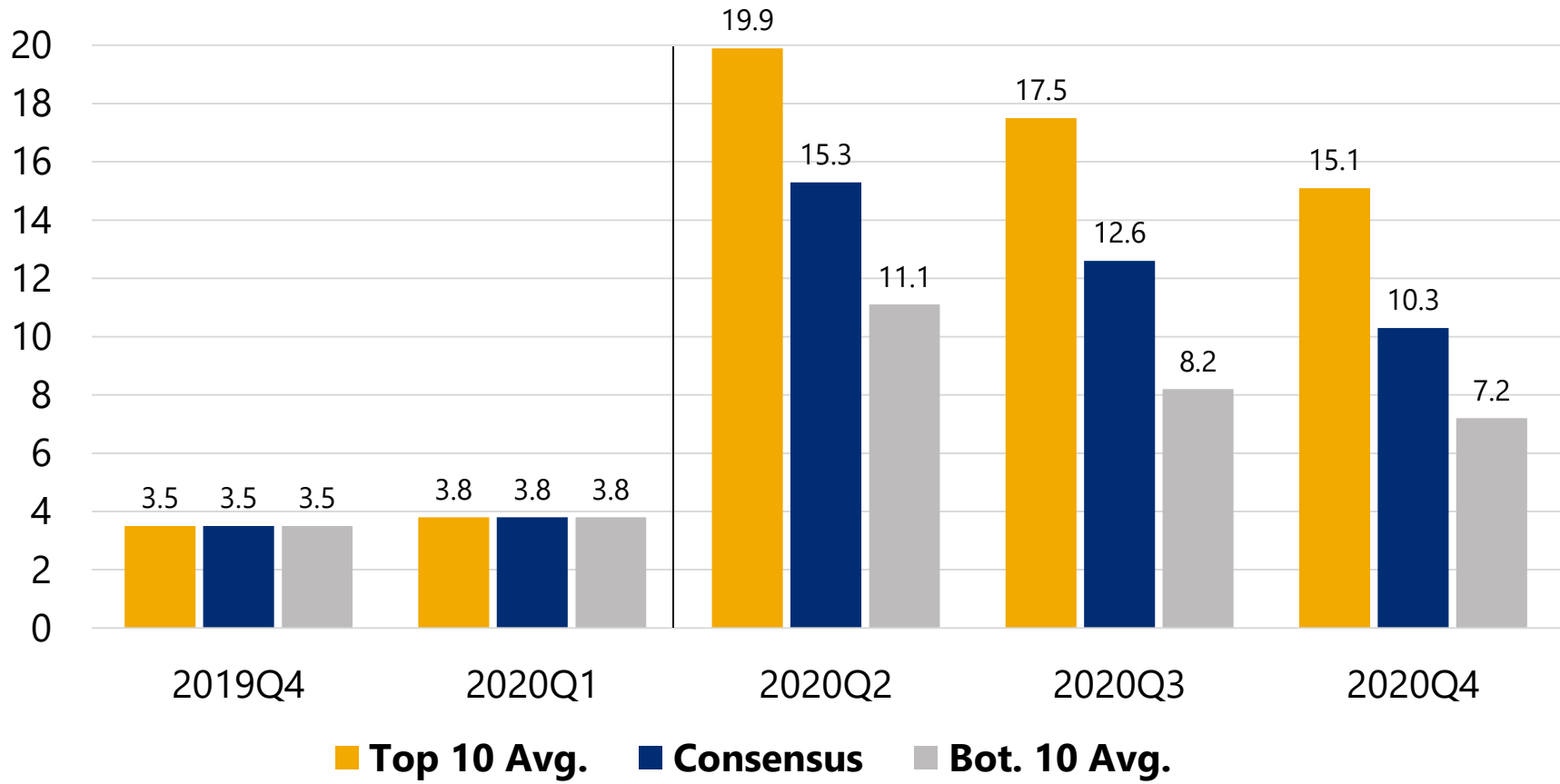


Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: May 2020 Release

## U.S. Unemployment Rate

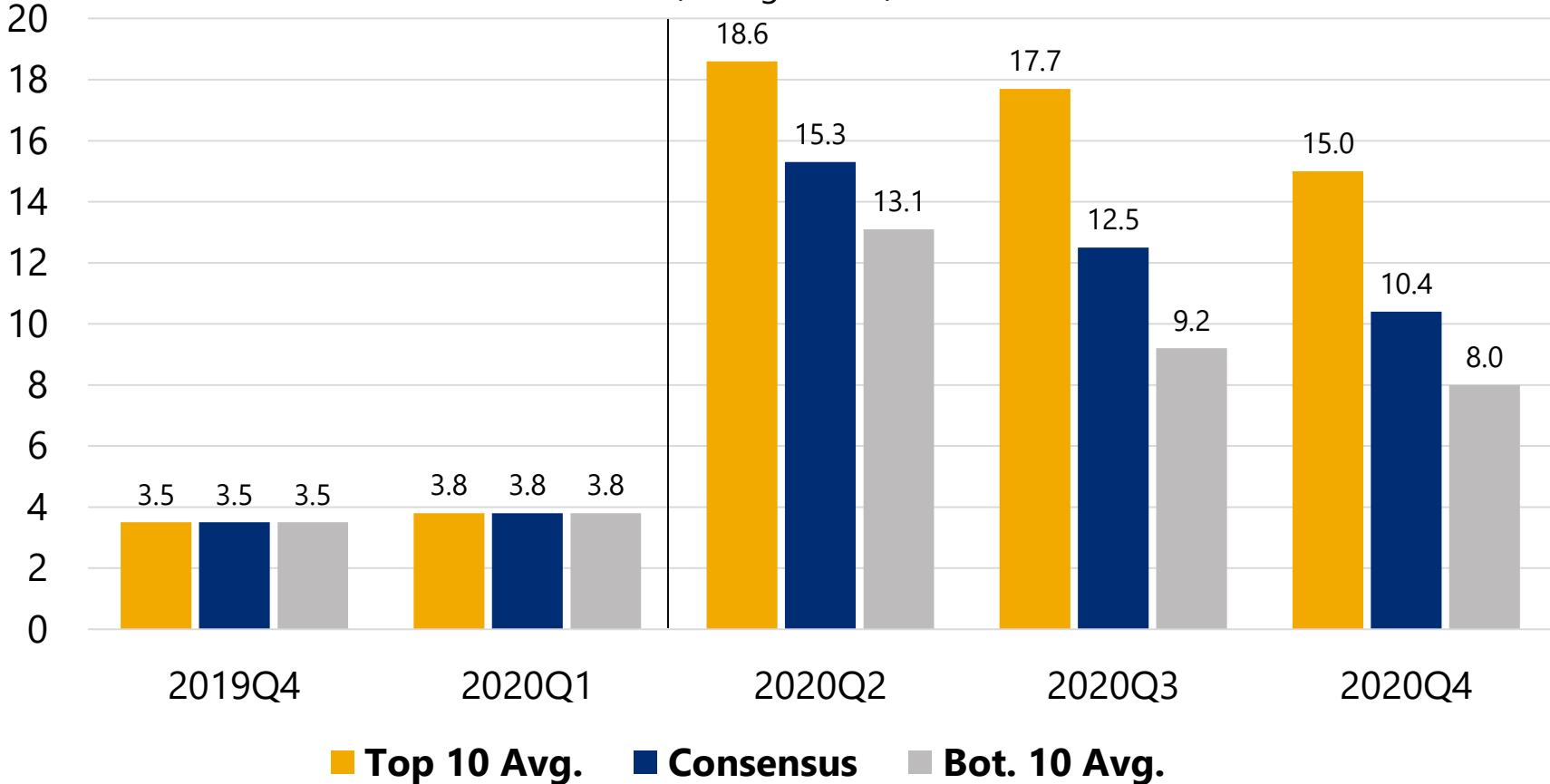
(% Chg., SAAR)



# Blue Chip U.S. Economic Outlook: June 2020 Release

## U.S. Unemployment Rate

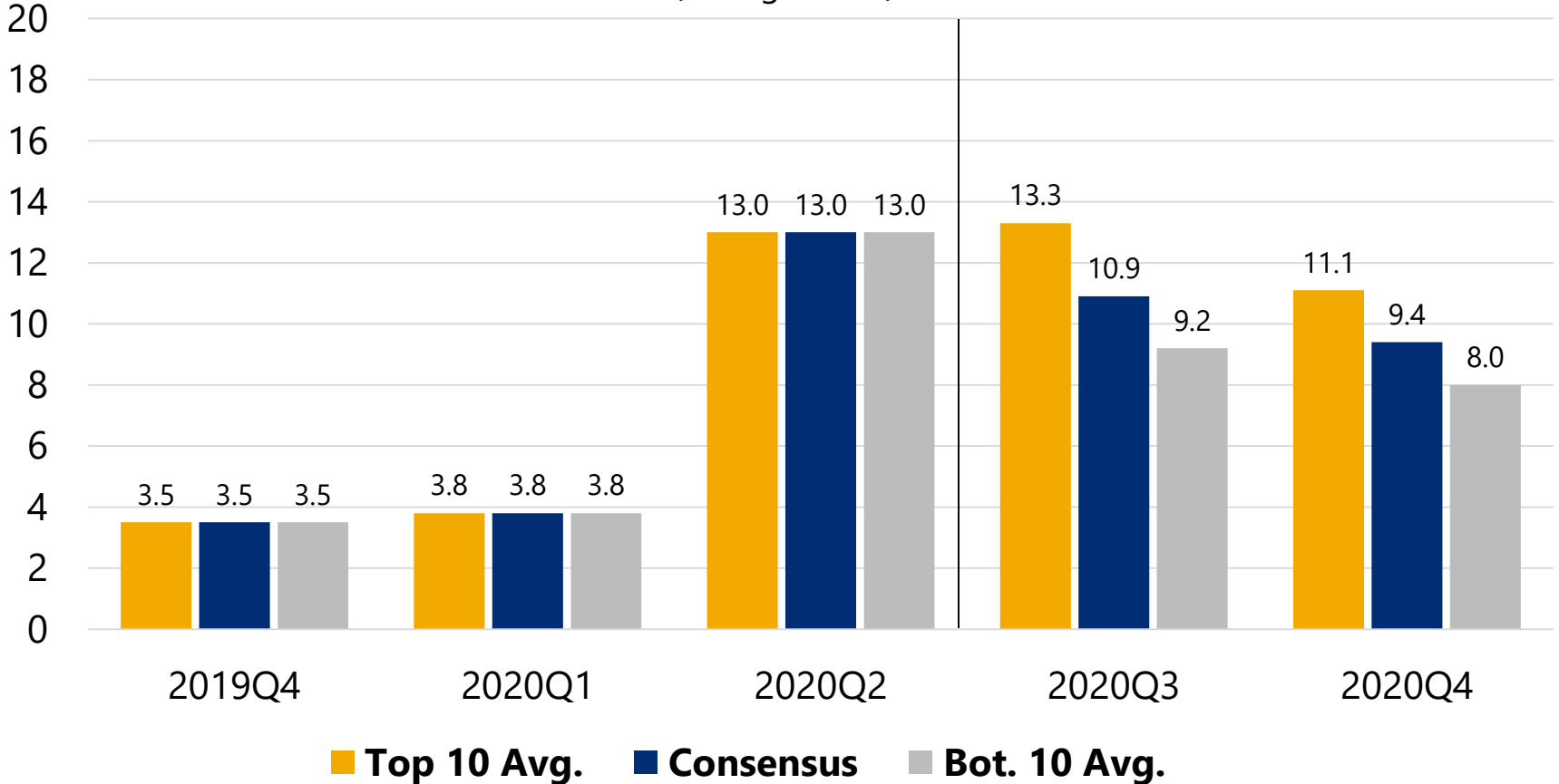
(% Chg., SAAR)



Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: July 2020 Release

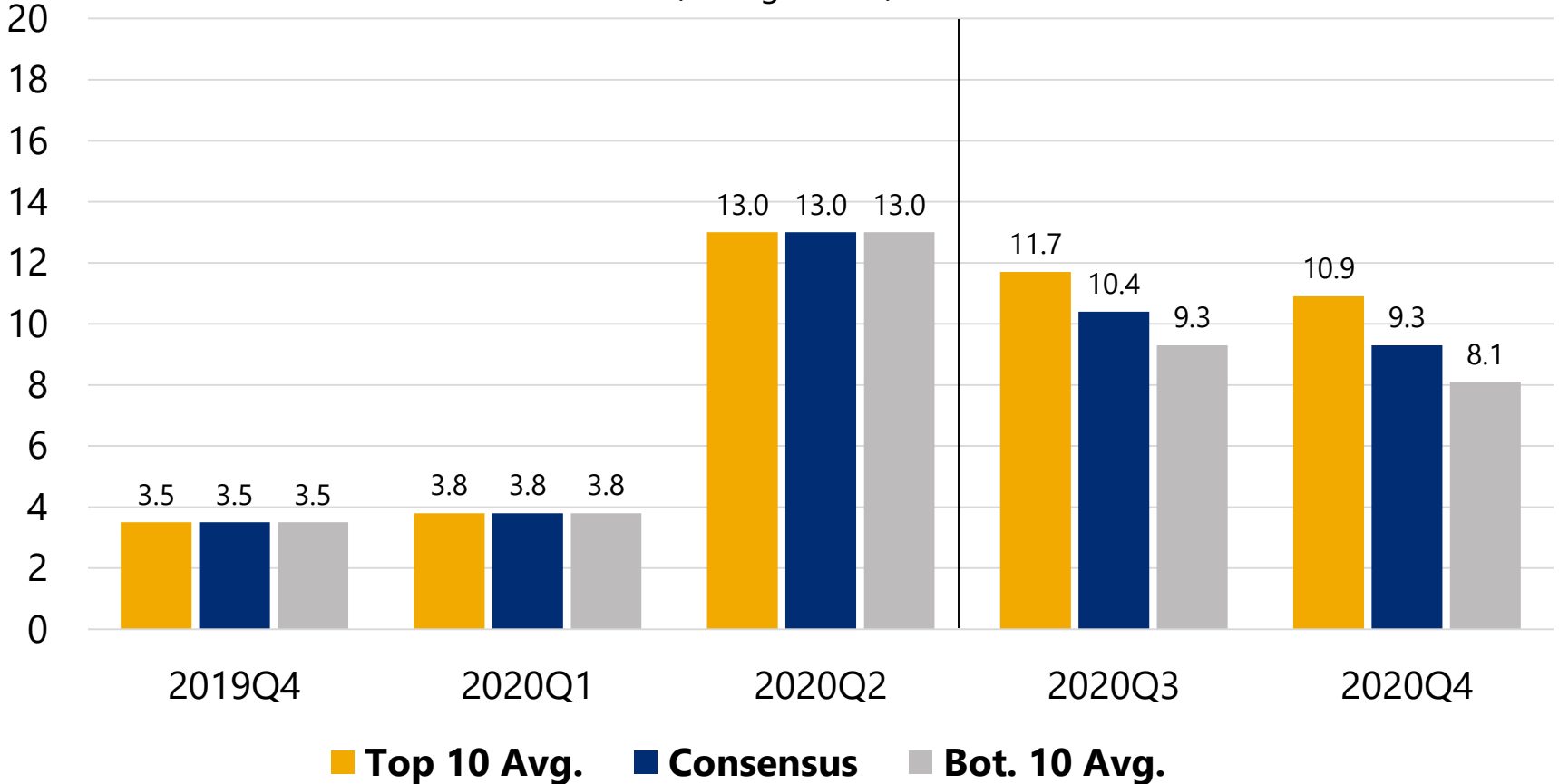
## U.S. Unemployment Rate (% Chg., SAAR)



Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: August 2020 Release

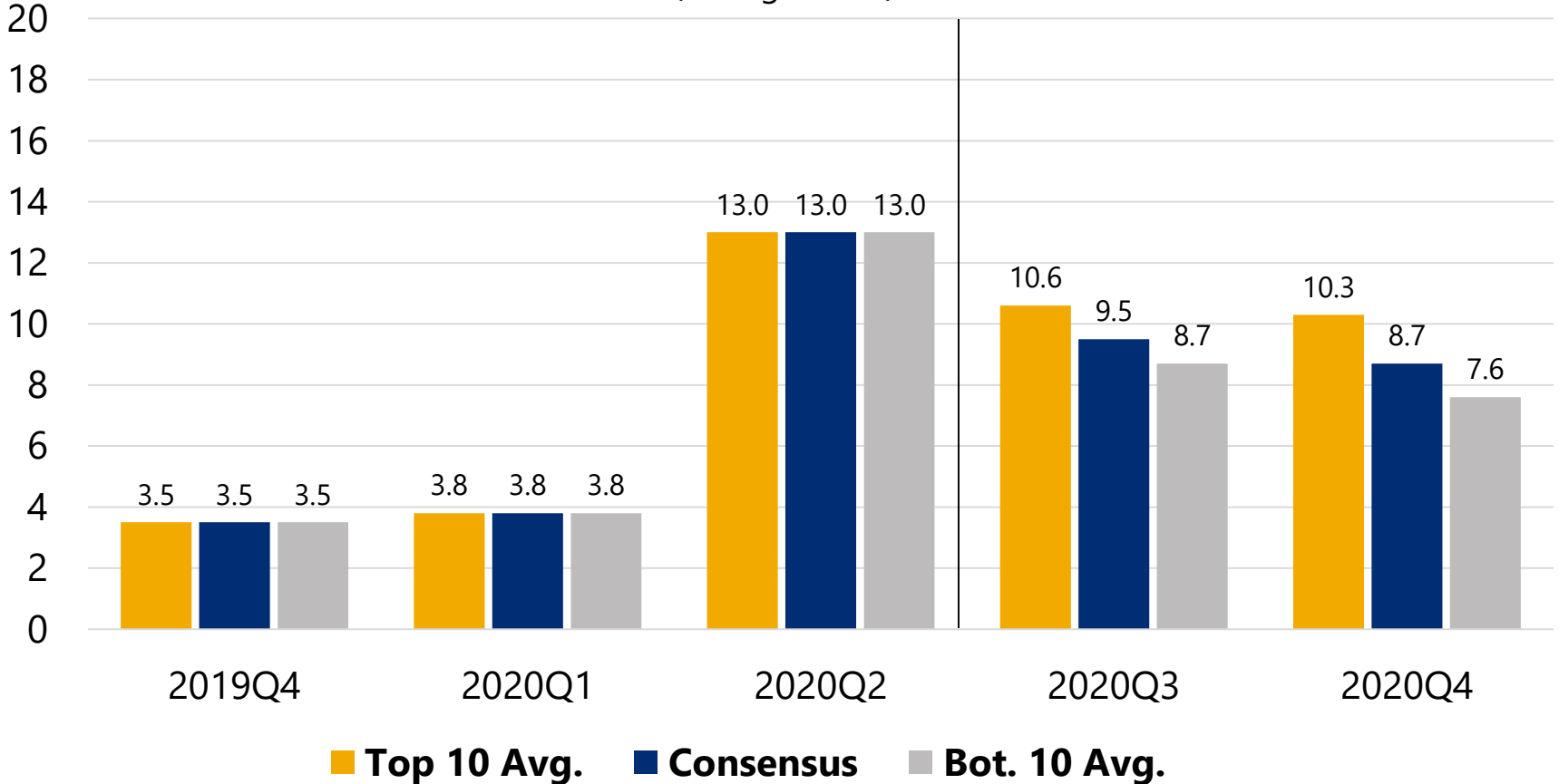
## U.S. Unemployment Rate (% Chg., SAAR)



Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: September 2020 Release

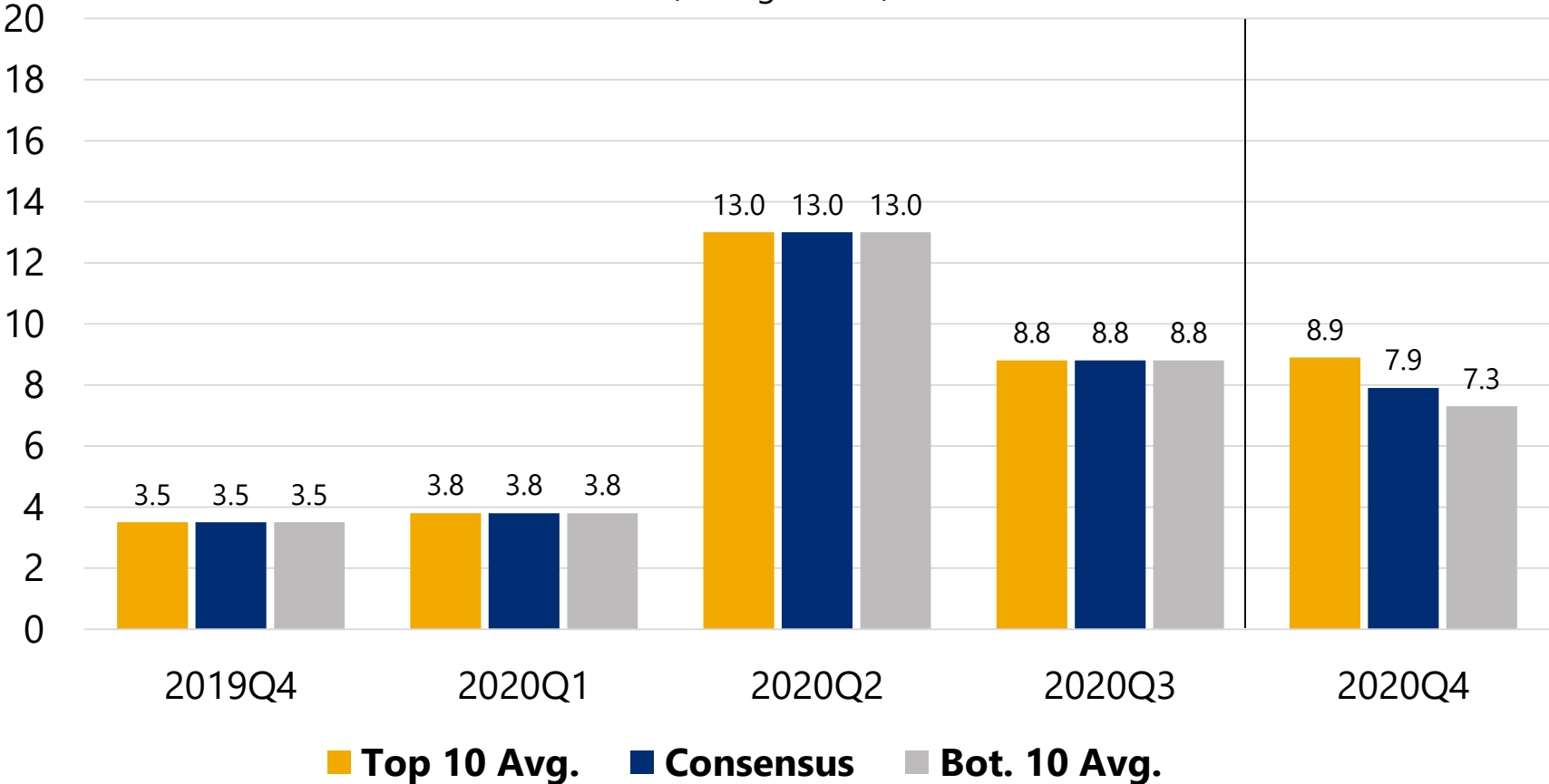
## U.S. Unemployment Rate (% Chg., SAAR)



Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: October 2020 Release

## U.S. Unemployment Rate (% Chg., SAAR)



Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Indicators:

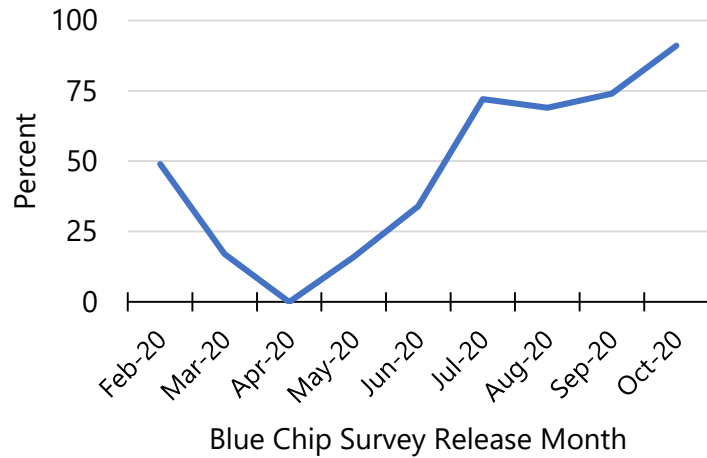
## Real GDP Level Tracking

| Blue Chip Economic Indicators Release Tracking |              |        |        |        |        |        |        |        |        |        |        |        |        |
|--|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Real GDP (Billions \$ 2012, SAAR)              |              |        |        |        |        |        |        |        |        |        |        |        |        |
| Blue Chip Release Month                        |              | 2019Q4 | 2020Q1 | 2020Q2 | 2020Q3 | 2020Q4 | 2021Q1 | 2021Q2 | 2021Q3 | 2021Q4 | 2019   | 2020   | 2021   |
| October 2020                                   | Consensus    | 19,254 | 19,011 | 17,303 | 18,443 | 18,616 | 18,800 | 18,985 | 19,158 | 19,319 | 19,092 | 18,328 | 19,043 |
|  | Top 10 Avg.  | 19,254 | 19,011 | 17,303 | 18,619 | 18,902 | 19,179 | 19,451 | 19,723 | 19,974 | 19,092 | 18,423 | 19,363 |
|  | Bot. 10 Avg. | 19,254 | 19,011 | 17,303 | 18,214 | 18,273 | 18,368 | 18,468 | 18,565 | 18,661 | 19,092 | 18,175 | 18,684 |
| September 2020                                 | Consensus    | 19,254 | 19,011 | 17,282 | 18,156 | 18,375 | 18,583 | 18,775 | 18,964 | 19,133 | 19,092 | 18,213 | 18,906 |
|  | Top 10 Avg.  | 19,254 | 19,011 | 17,282 | 18,460 | 18,818 | 19,171 | 19,484 | 19,789 | 20,084 | 19,092 | 18,385 | 19,378 |
|  | Bot. 10 Avg. | 19,254 | 19,011 | 17,282 | 17,849 | 17,897 | 17,973 | 18,071 | 18,174 | 18,273 | 19,092 | 18,023 | 18,437 |
| August 2020                                    | Consensus    | 19,254 | 19,011 | 17,206 | 17,959 | 18,218 | 18,477 | 18,699 | 18,897 | 19,070 | 19,092 | 18,099 | 18,787 |
|  | Top 10 Avg.  | 19,254 | 19,011 | 17,206 | 18,301 | 18,721 | 19,111 | 19,464 | 19,778 | 20,092 | 19,092 | 18,309 | 19,316 |
|  | Bot. 10 Avg. | 19,254 | 19,011 | 17,206 | 17,641 | 17,715 | 17,868 | 17,996 | 18,108 | 18,198 | 19,092 | 17,908 | 18,302 |
| July 2020                                      | Consensus    | 19,222 | 18,977 | 17,131 | 17,843 | 18,148 | 18,410 | 18,635 | 18,842 | 19,018 | 19,073 | 18,024 | 18,745 |
|  | Top 10 Avg.  | 19,222 | 18,977 | 17,445 | 18,580 | 19,102 | 19,513 | 19,906 | 20,255 | 20,591 | 19,073 | 18,291 | 19,352 |
|  | Bot. 10 Avg. | 19,222 | 18,977 | 16,840 | 17,151 | 17,257 | 17,394 | 17,501 | 17,610 | 17,697 | 19,073 | 17,738 | 18,128 |
| June 2020                                      | Consensus    | 19,222 | 18,975 | 16,991 | 17,679 | 18,047 | 18,334 | 18,563 | 18,755 | 18,922 | 19,073 | 17,910 | 18,626 |
|  | Top 10 Avg.  | 19,222 | 18,975 | 17,436 | 18,618 | 19,263 | 19,755 | 20,148 | 20,477 | 20,777 | 19,073 | 18,253 | 19,330 |
|  | Bot. 10 Avg. | 19,222 | 18,975 | 16,587 | 16,735 | 16,818 | 16,938 | 17,039 | 17,124 | 17,209 | 19,073 | 17,509 | 17,824 |
| May 2020                                       | Consensus    | 19,222 | 18,988 | 17,236 | 17,716 | 18,093 | 18,393 | 18,628 | 18,821 | 18,978 | 19,073 | 17,967 | 18,686 |
|  | Top 10 Avg.  | 19,222 | 18,988 | 17,781 | 18,854 | 19,600 | 20,235 | 20,732 | 21,140 | 21,455 | 19,073 | 18,406 | 19,565 |
|  | Bot. 10 Avg. | 19,222 | 18,988 | 16,691 | 16,491 | 16,577 | 16,671 | 16,754 | 16,812 | 16,883 | 19,073 | 17,509 | 17,737 |
| April 2020                                     | Consensus    | 19,222 | 19,037 | 17,745 | 18,065 | 18,411 | 18,721 | 18,960 | 19,147 | 19,303 | 19,073 | 18,291 | 18,986 |
|  | Top 10 Avg.  | 19,222 | 19,203 | 18,551 | 19,528 | 20,371 | 21,049 | 21,601 | 22,010 | 22,338 | 19,073 | 18,863 | 20,071 |
|  | Bot. 10 Avg. | 19,222 | 18,851 | 16,801 | 16,565 | 16,648 | 16,730 | 16,821 | 16,880 | 16,943 | 19,073 | 17,662 | 17,927 |
| March 2020                                     | Consensus    | 19,221 | 19,283 | 19,331 | 19,422 | 19,523 | 19,625 | 19,722 | 19,815 | 19,909 | 19,073 | 19,397 | 19,785 |
|  | Top 10 Avg.  | 19,221 | 19,316 | 19,417 | 19,551 | 19,677 | 19,808 | 19,936 | 20,064 | 20,193 | 19,073 | 19,454 | 19,902 |
|  | Bot. 10 Avg. | 19,221 | 19,254 | 19,249 | 19,288 | 19,364 | 19,432 | 19,499 | 19,562 | 19,626 | 19,073 | 19,321 | 19,630 |
| February 2020                                  | Consensus    | 19,221 | 19,297 | 19,388 | 19,479 | 19,576 | 19,668 | 19,766 | 19,859 | 19,958 | 19,073 | 19,435 | 19,824 |
|  | Top 10 Avg.  | 19,221 | 19,330 | 19,459 | 19,585 | 19,706 | 19,823 | 19,946 | 20,074 | 20,208 | 19,073 | 19,492 | 19,941 |
|  | Bot. 10 Avg. | 19,221 | 19,268 | 19,316 | 19,379 | 19,451 | 19,514 | 19,582 | 19,645 | 19,709 | 19,073 | 19,359 | 19,669 |

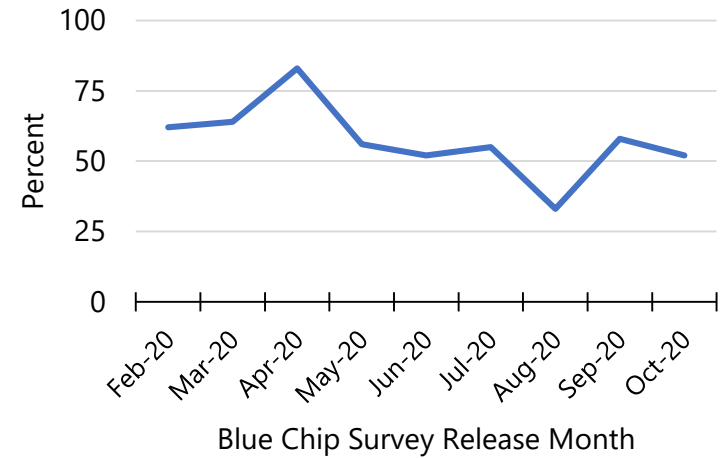


# Blue Chip Survey Diffusion Indexes

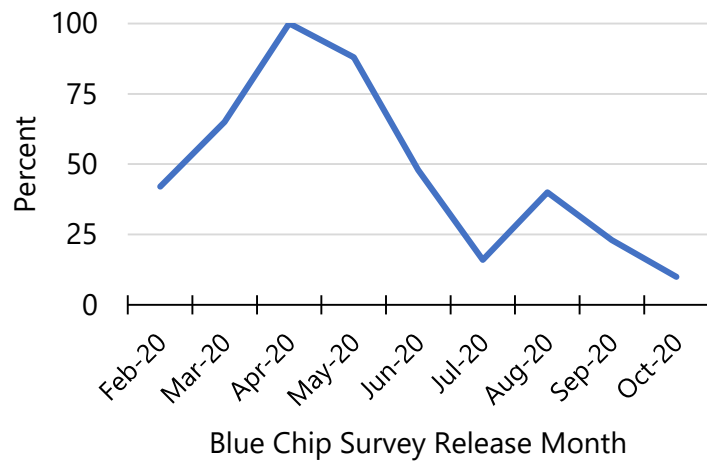
## Real GDP Growth in 2020



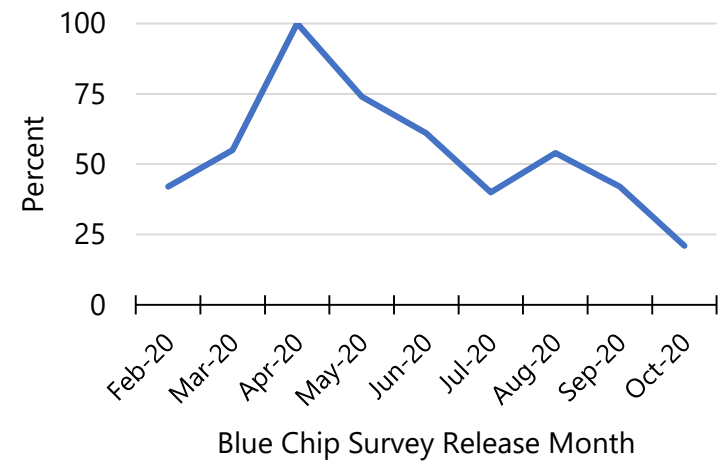
## Real GDP Growth in 2021



## Unemployment Rate in 2020

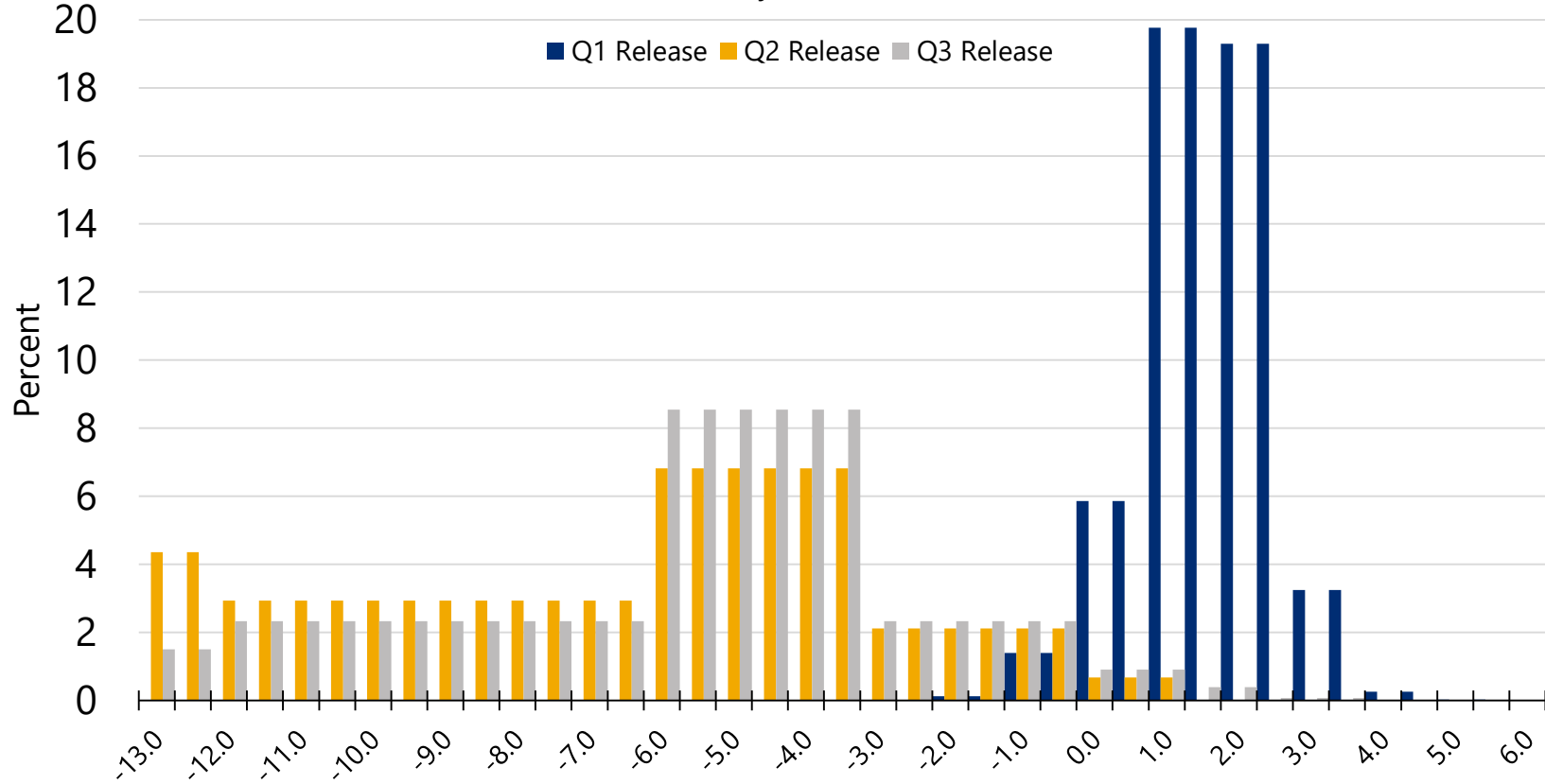


## Unemployment Rate in 2021



# Survey of Professional Forecasters: 2020 Q1-Q3 Release

## Real GDP Growth in 2020 (Probability Distribution)

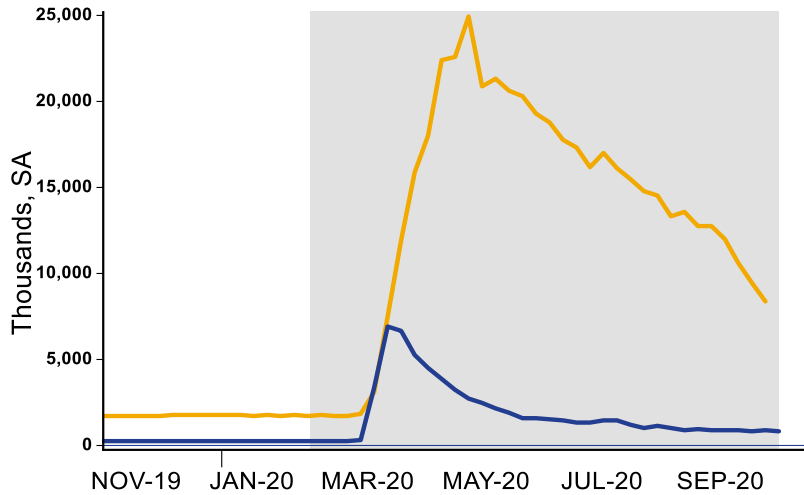


Source: FRB of Philadelphia

# Unemployment Insurance Claims and Employment

## Weekly Unemployment Insurance

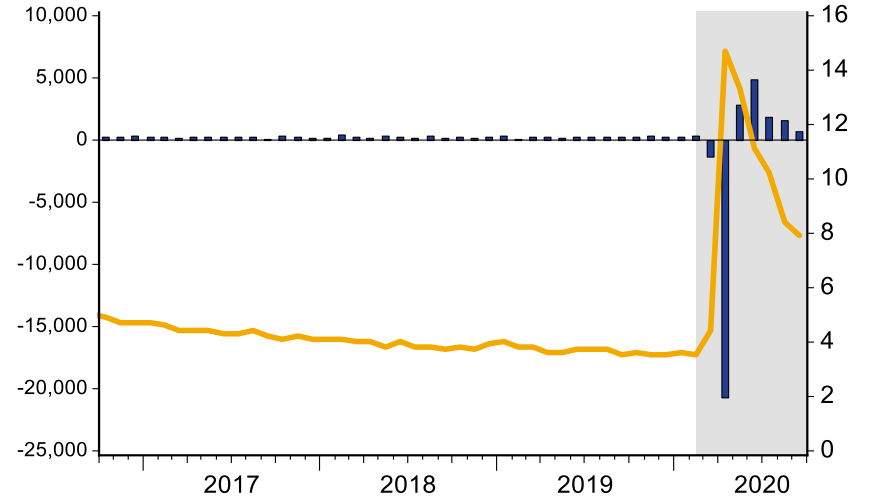
— Initial Claims — Continuing Claims



Source: Department of Labor/Haver Analytics

## Employment

Thous. , SA — Change in nonfarm employment — Unemployment rate, U3 (right) Percent, SA

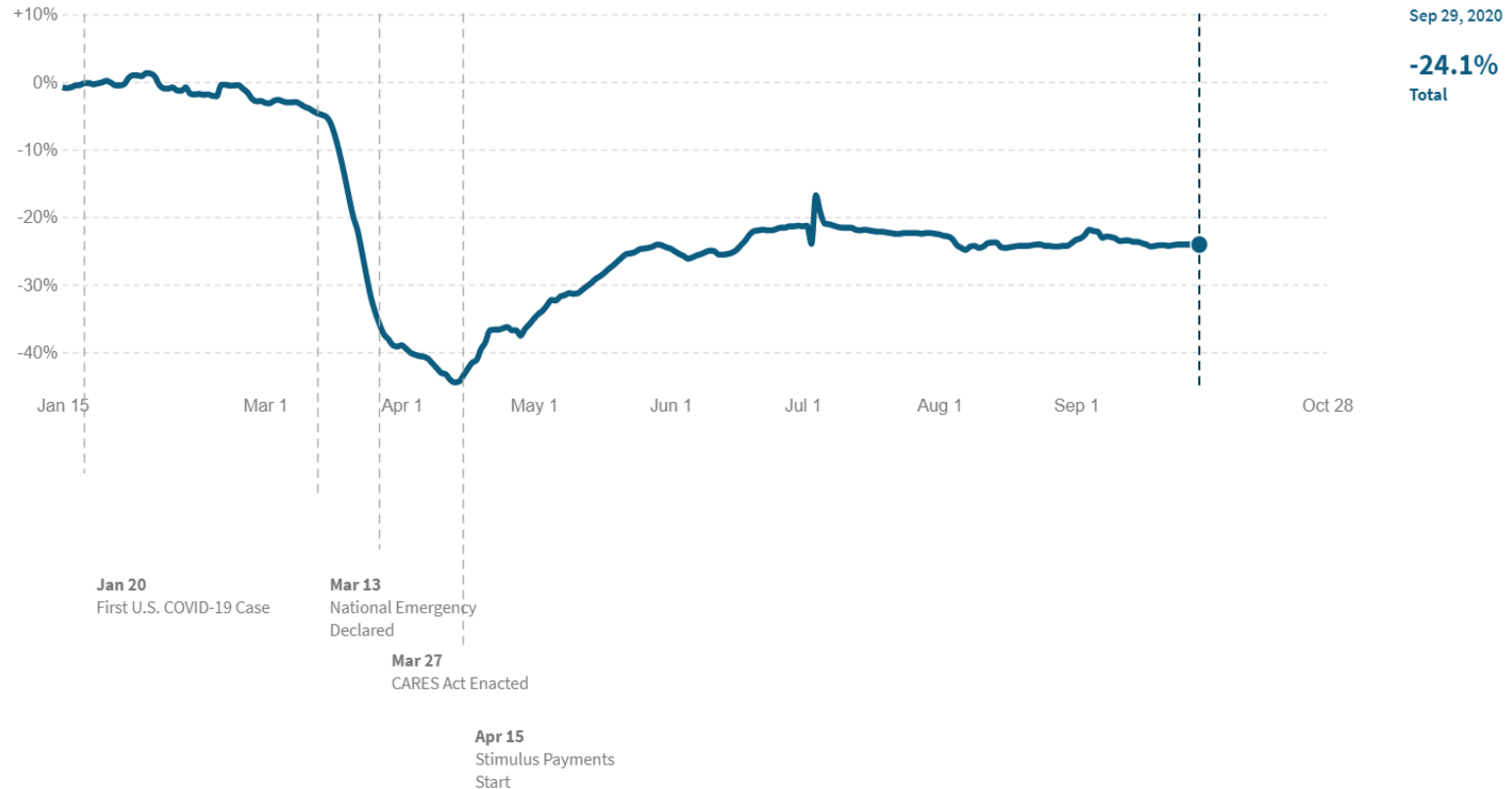


Source: Bureau of Labor Statistics/Haver Analytics

# Economic Tracker: U.S.

## Percent Change in Number of Small Businesses Open\*

In the United States, as of September 29, 2020, the number of small businesses open decreased by 24.1% compared to January 2020.



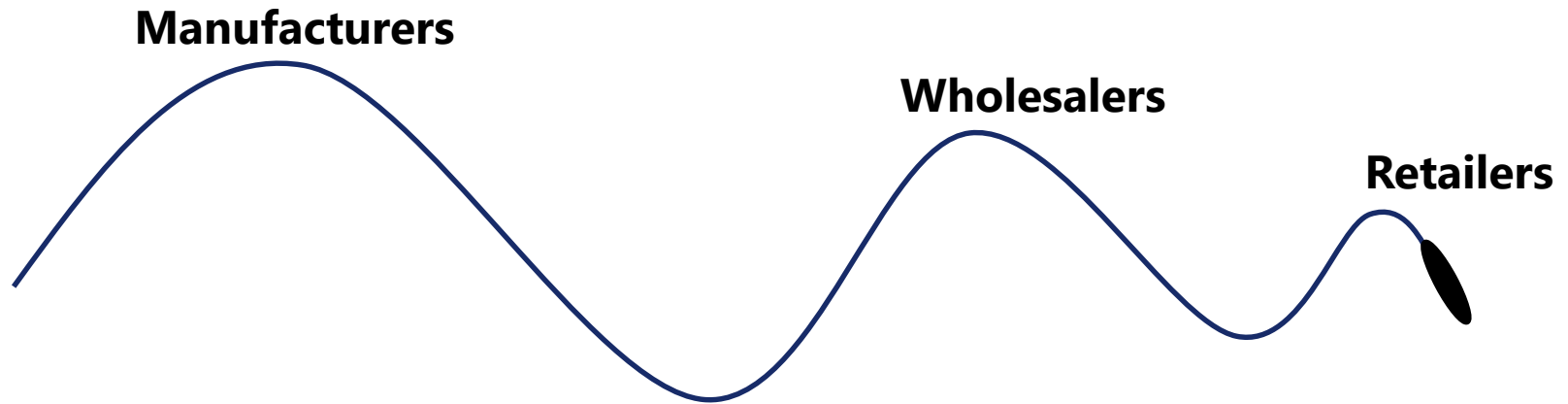
\*Change in small businesses open (defined as having financial transaction activity), indexed to January 4-31 2020 and seasonally adjusted. This series is based on data from Womply.

last updated: October 09, 2020 next update expected: October 30, 2020

visit [tracktherecovery.org](https://tracktherecovery.org) to explore

# **The Bullwhip Effect and COVID-19 Economics**

# The Bullwhip Effect



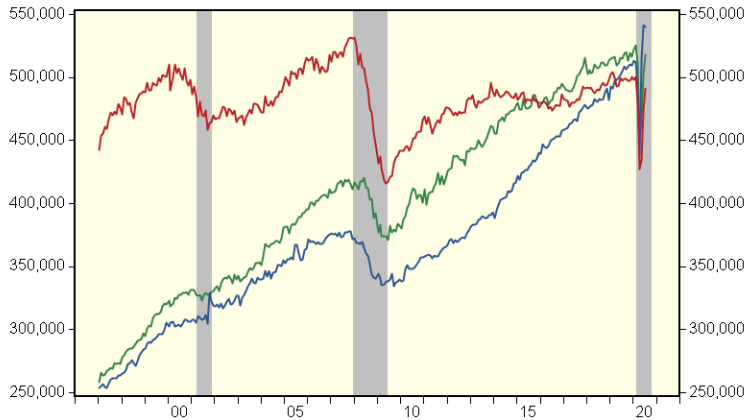
*When we talk about the "bullwhip effect"—the magnification of order fluctuations at each upstream point in a supply chain—we usually are referring to a particular company's experience. But this phenomenon can also play out in a much larger theater.*

*The bullwhip effect describes a phenomenon in which the impact of fluctuations in orders—and therefore in demand for parts and materials—becomes larger as demand works backward from the customer through to raw material suppliers.*

Chris G. Christopher, Jr., PhD, CBE  
Globalization, China, and the "bullwhip effect"  
Monetary Matters  
CSCMP's Supply Chain Quarterly, September 15, 2010  
[Click Here](#)

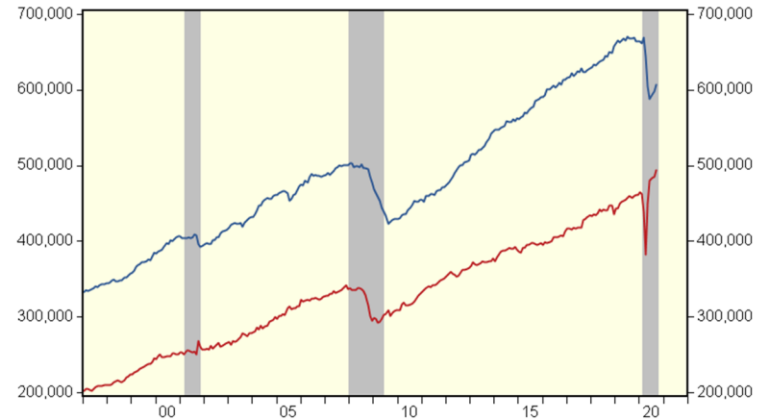
# The Bullwhip Effect in Action

Real Sales: Manufacturing Industries (SA, Mil.Chn.2012\$)  
 Real Sales: Retail Trade (SA, Mil.Chn.2012\$)  
 Real Sales: Merchant Wholesale Trade Industries (SA, Mil.Chn.2012\$)



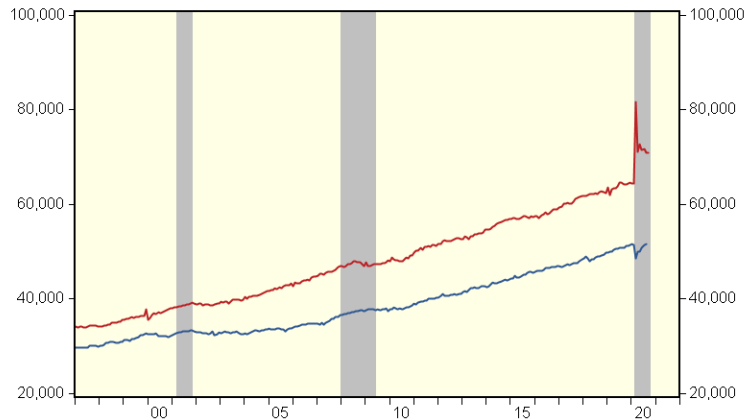
Source: Bureau of Economic Analysis/Haver Analytics

Retail Sales: Total  
 SA, Mil.\$  
 Retail Inventories: Total  
 EOP, SA, Mil.\$



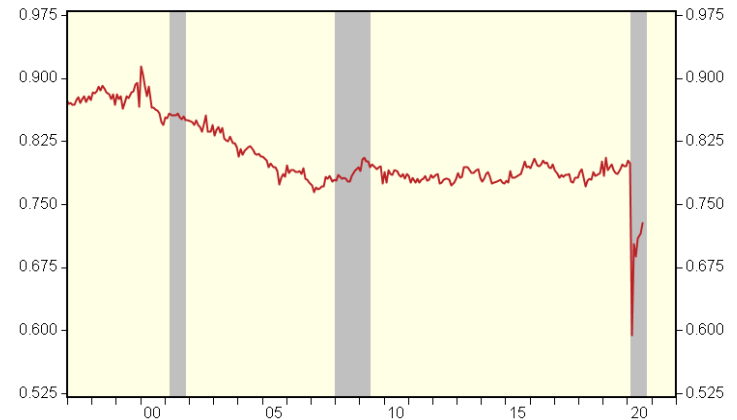
Source: Census Bureau/Haver Analytics

Retail Sales: Food & Beverage Stores  
 SA, Mil.\$  
 Retail Inventories: Food and Beverage Stores  
 EOP, SA, Mil.\$



Source: Census Bureau/Haver Analytics

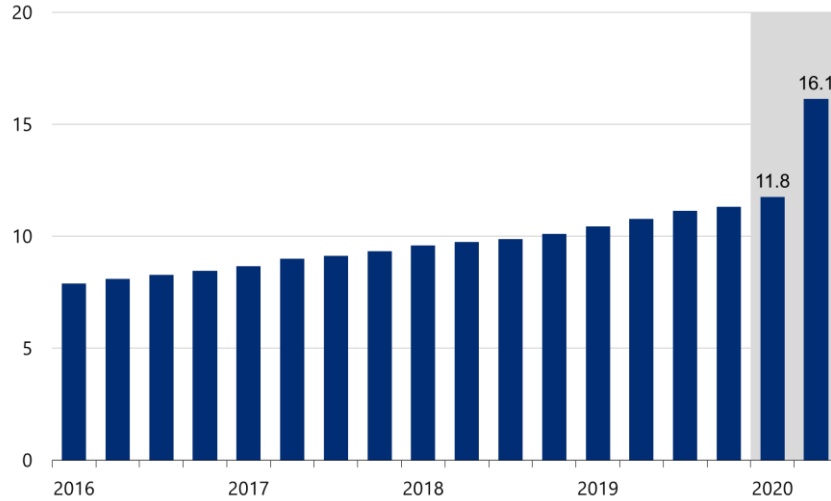
Inventories-to-Sales Ratio (Retail Food and Beverage Stores)  
 (Seasonally Adjusted)



Source: Haver Analytics

# E-Commerce Retail Sales

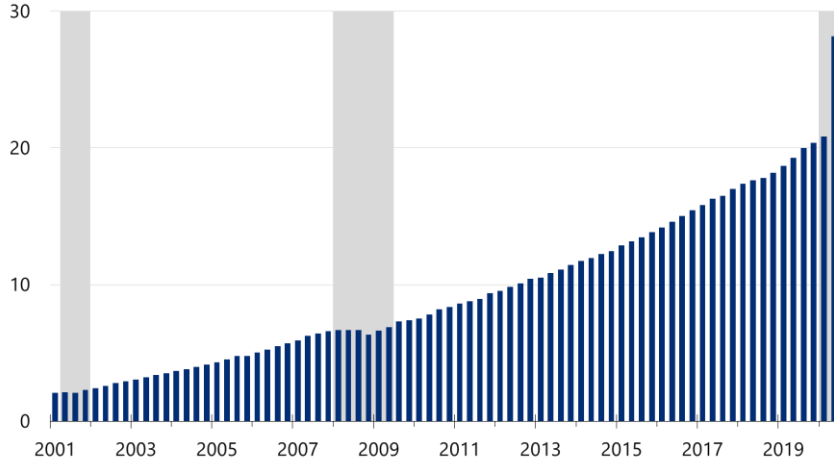
**E-Commerce Share of Retail Trade**  
(percent)



Source: Census\Haver

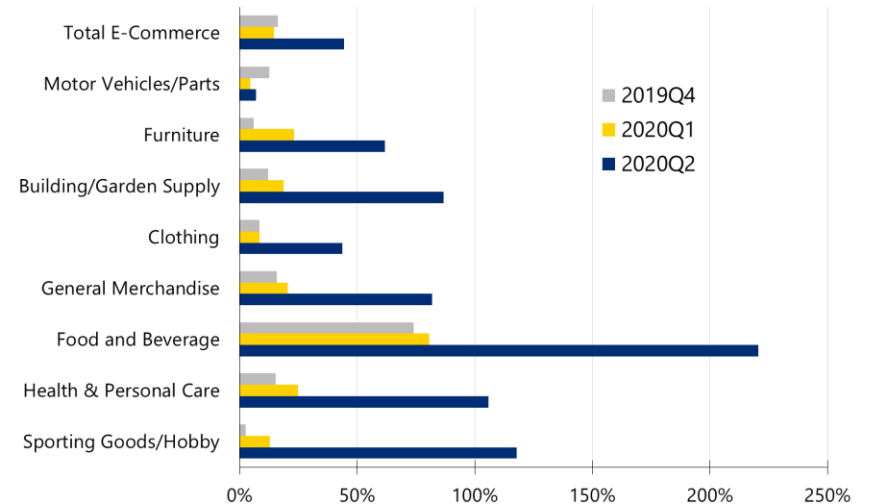


**E-Commerce Retail Share of Retail Sales Excluding Food, Gas, and Autos**  
(percent)



Source: Census\Haver

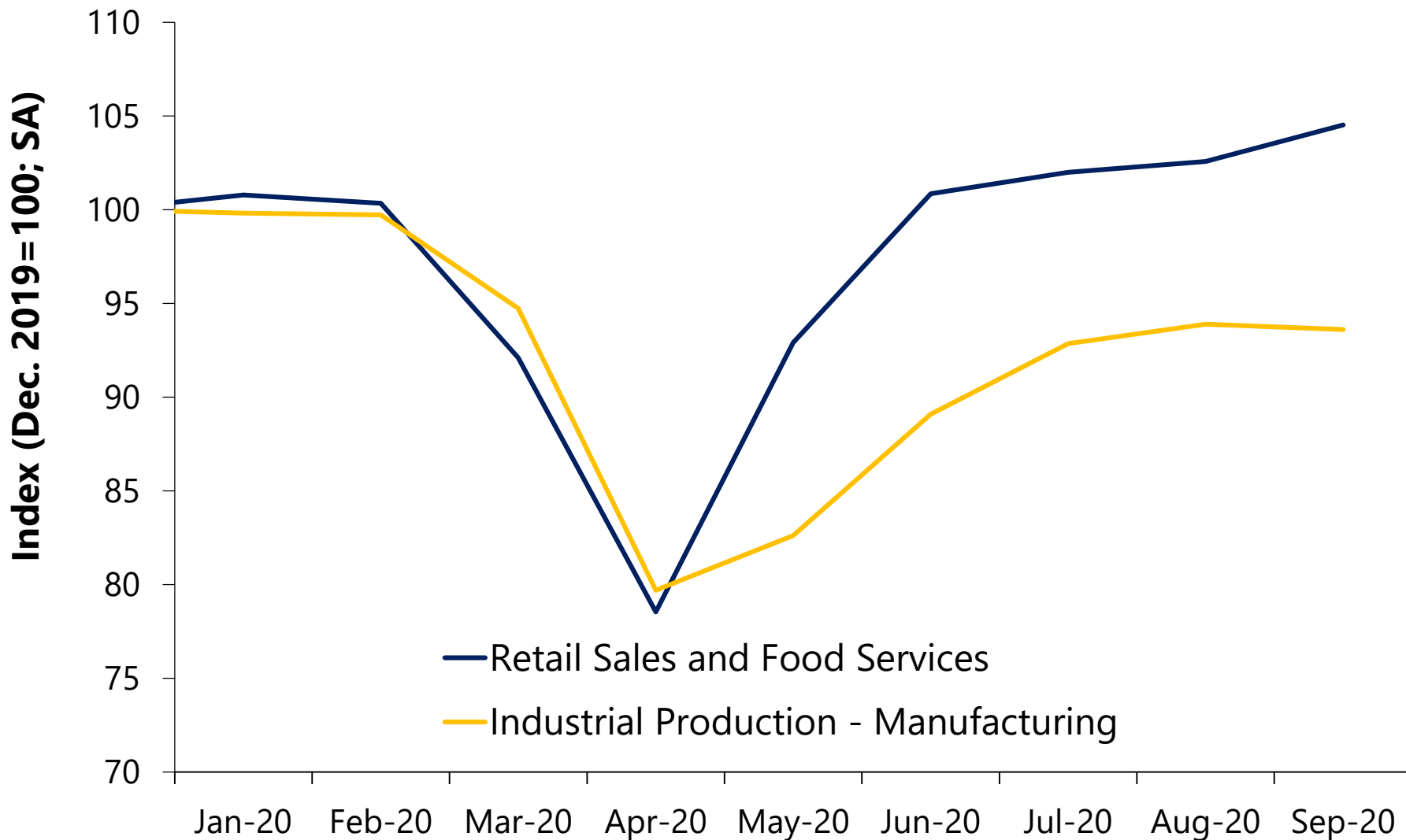
**E-Commerce Retail Sales Growth by Channel**  
(Year-over-year percent change, NSA)



Source: Census\Haver



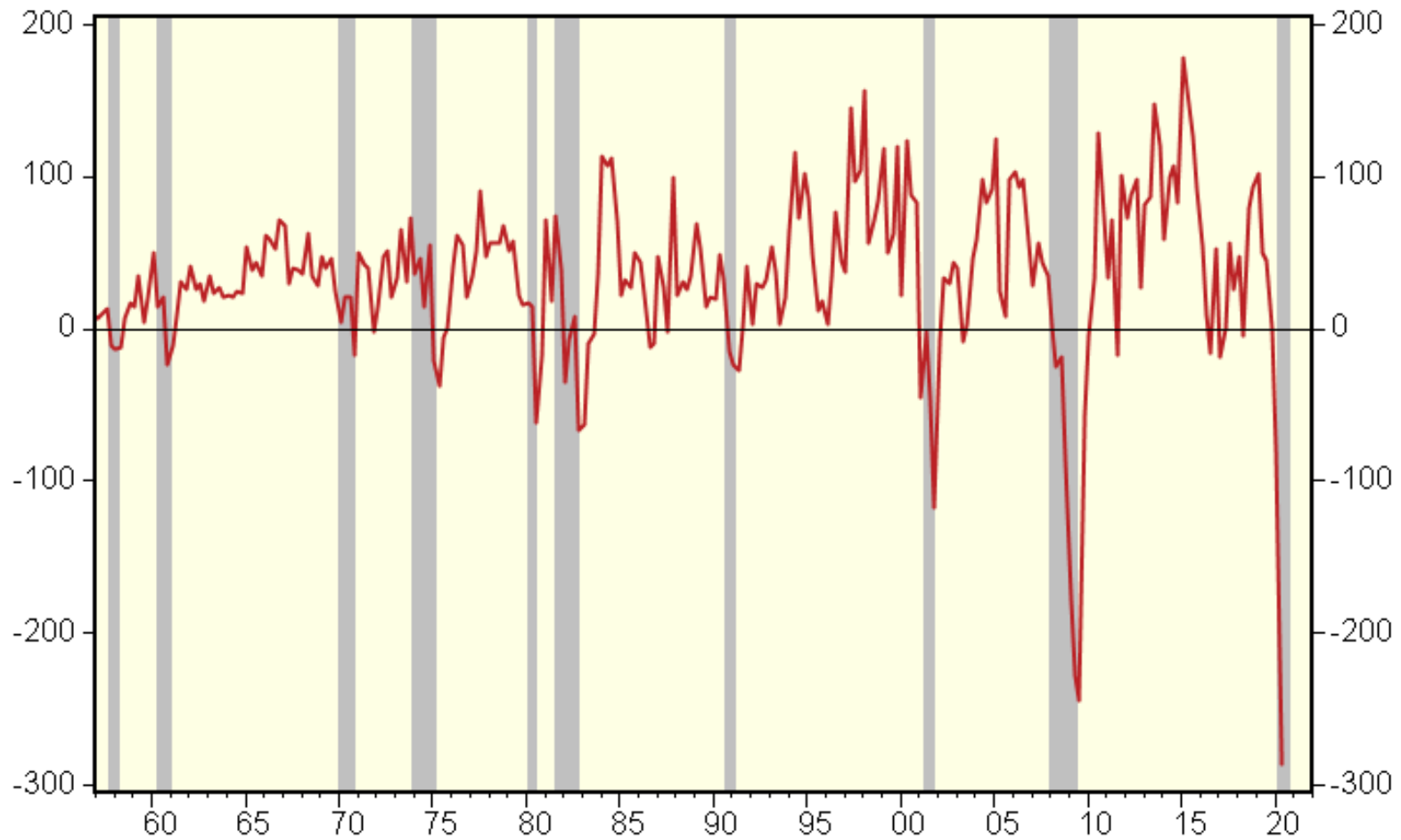
# Retail Sales and Industrial Production



Source: Haver Analytics/Census Bureau, Federal Reserve Board.

## Real Change in Private Inventories

SAAR, Bil.Chn.2012\$



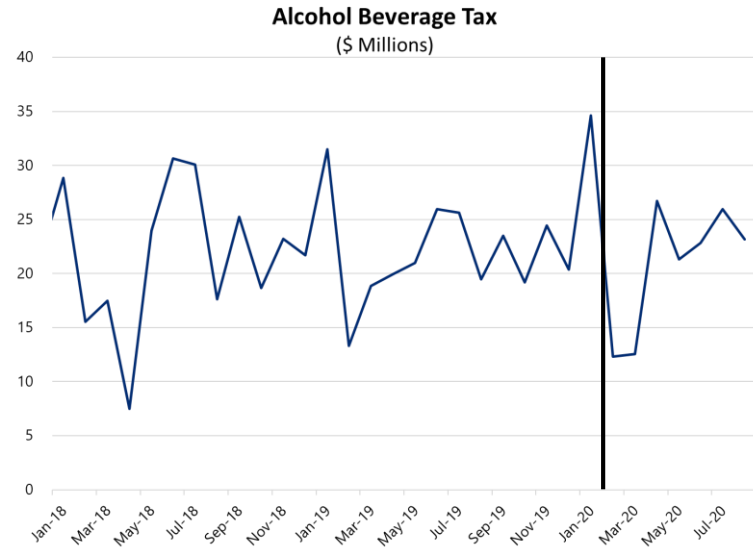
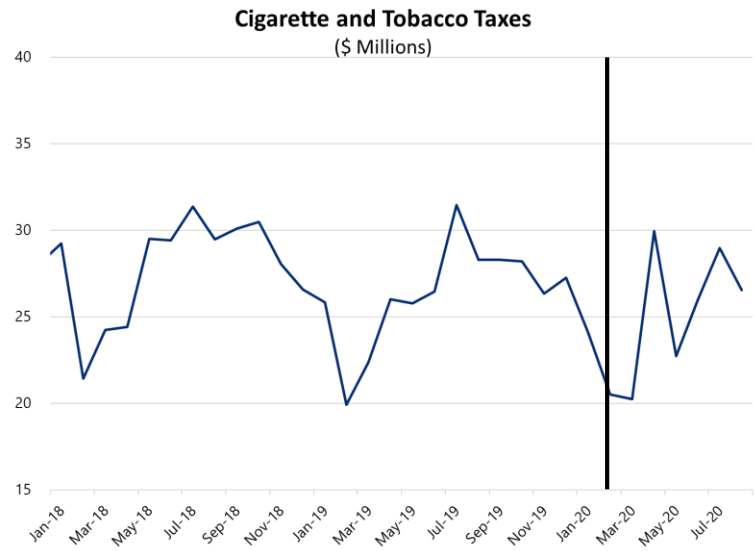
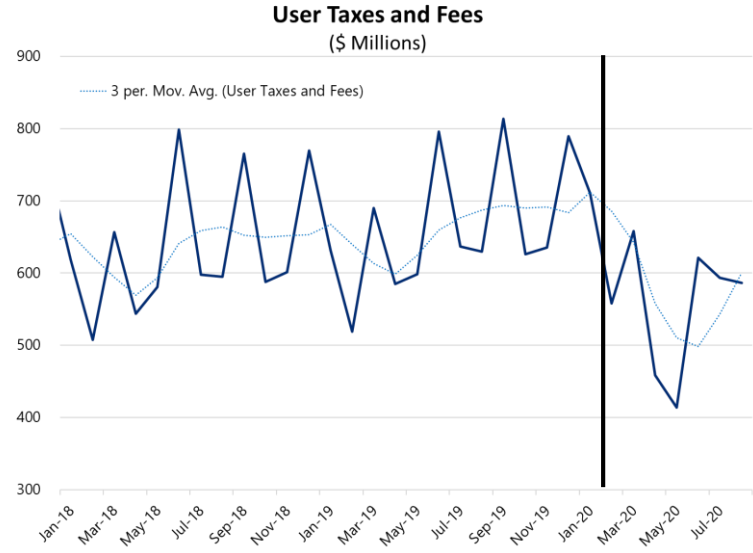
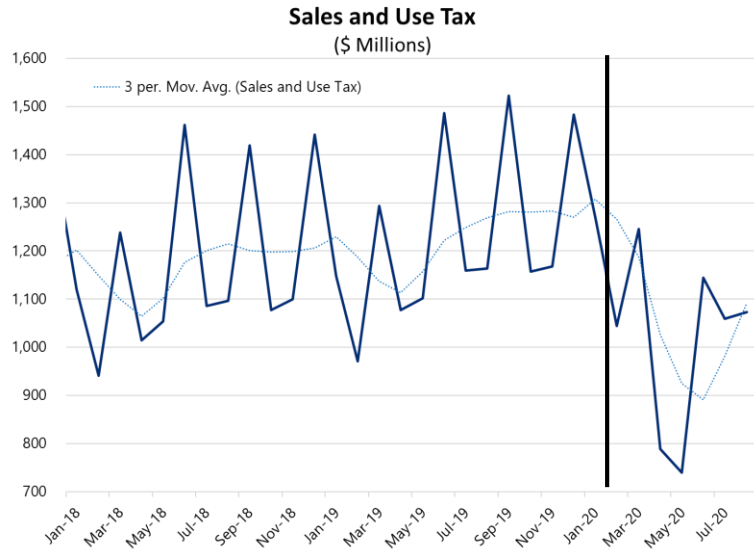
Source: Bureau of Economic Analysis/Haver Analytics

**Thank You!**

# Appendix

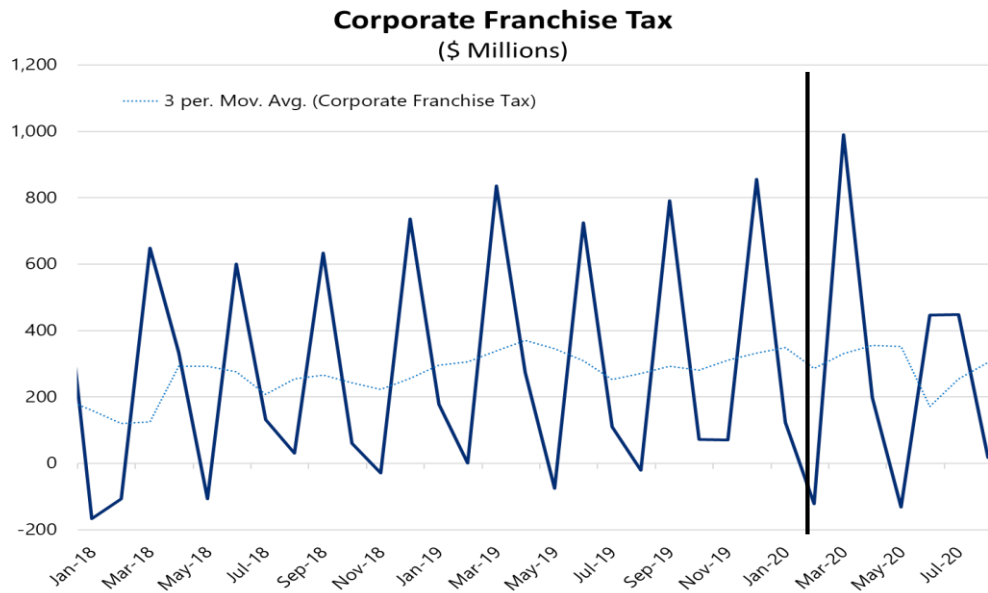
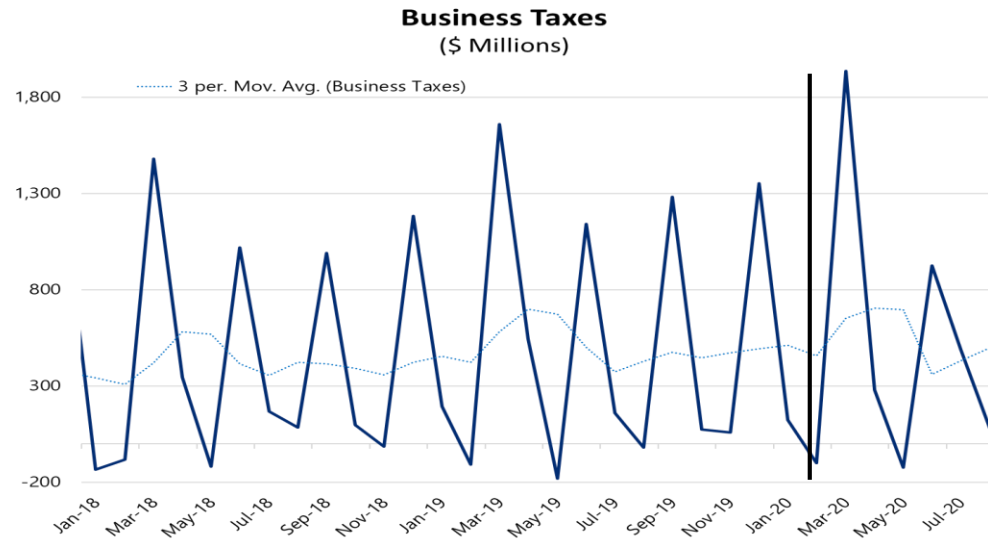
# State Tax Revenue

# New York State Tax Revenue



Source: New York State Dept. of Taxation and Finance/Office of the New York State Comptroller

# New York State Tax Revenue cont.



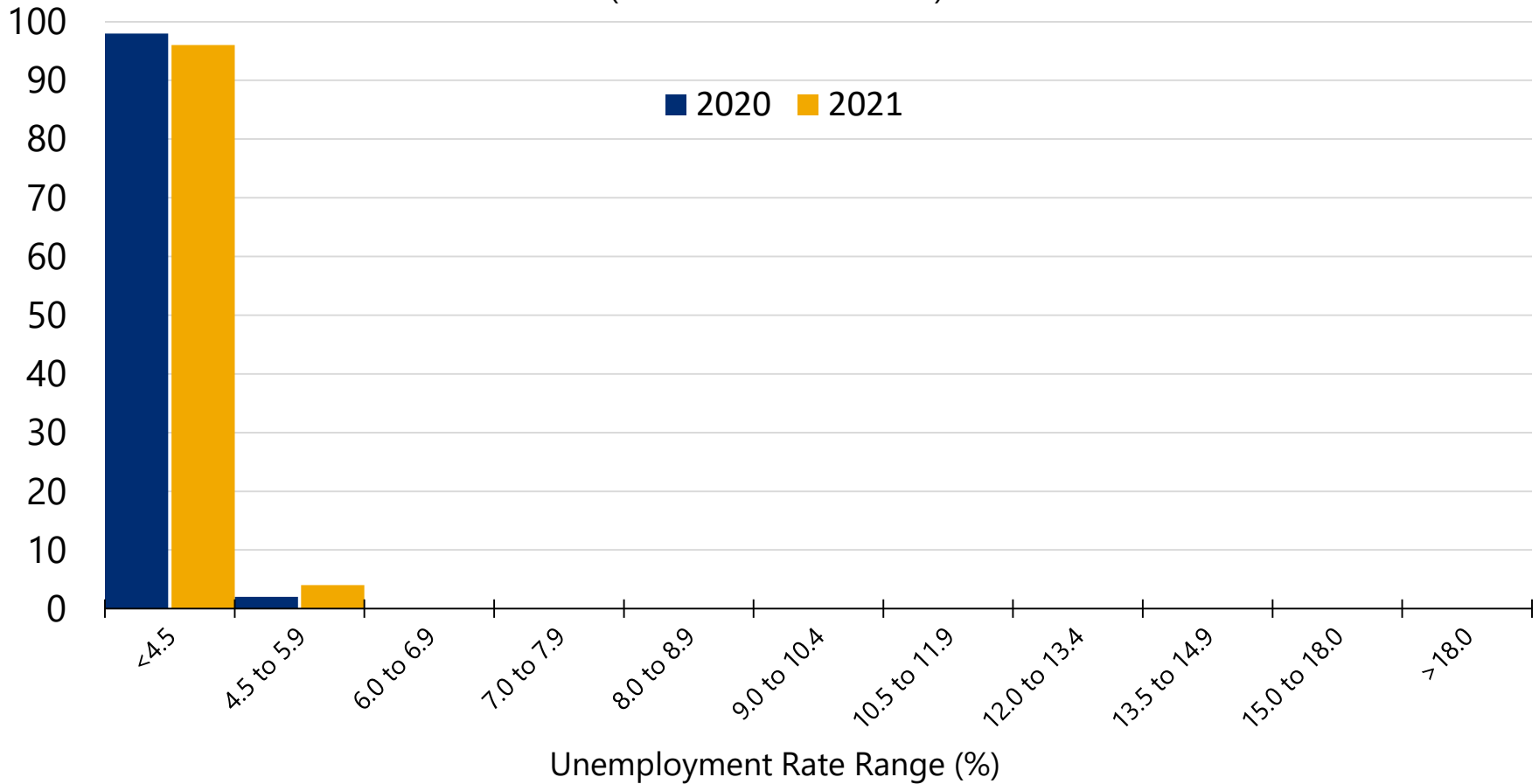
Source: New York State Dept. of Taxation and Finance/Office of the New York State Comptroller

# **Blue Chip Annual Unemployment Outlook**



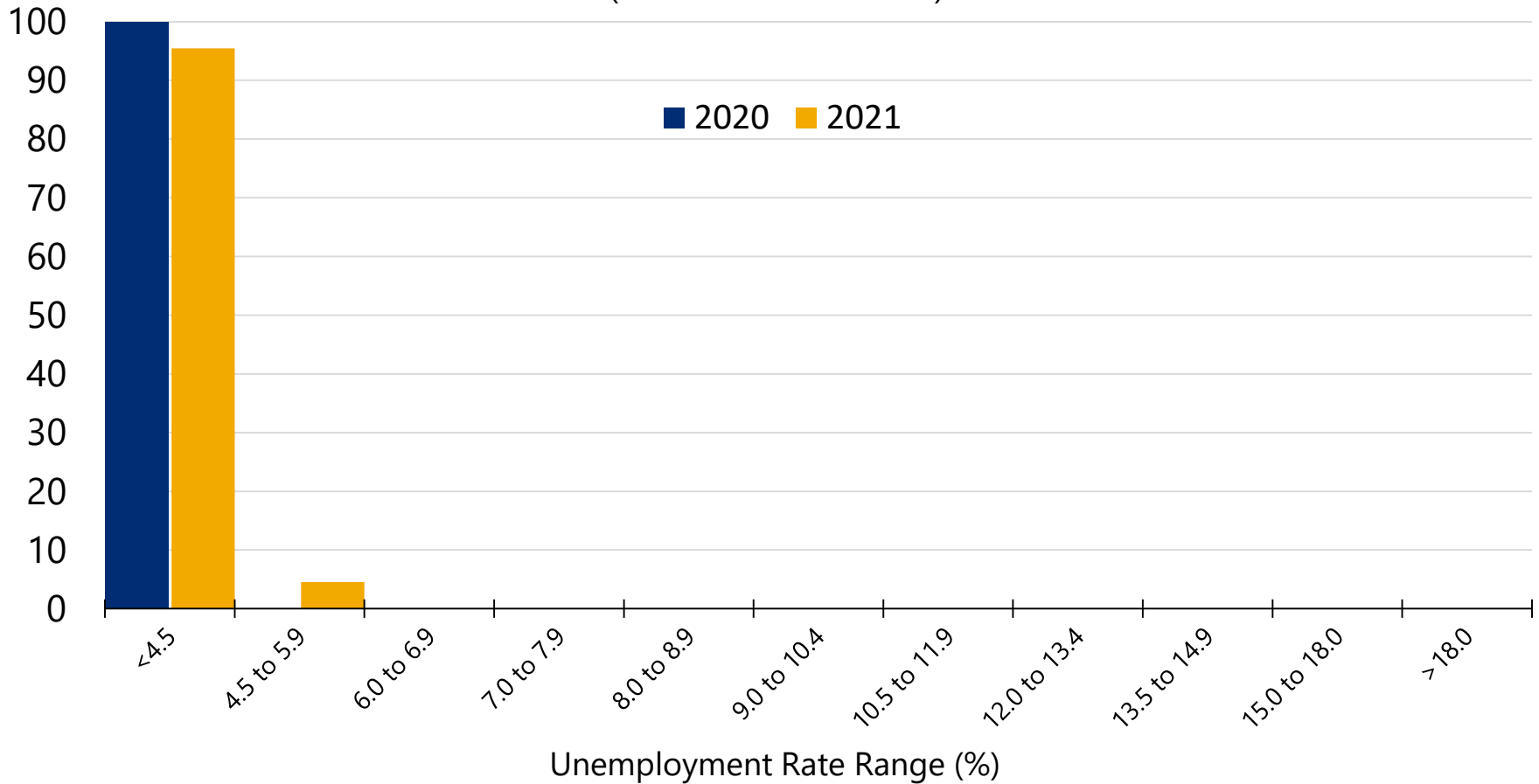
# Blue Chip U.S. Economic Outlook: February 2020 Release

## Unemployment Rate (Percent of Forecasters)



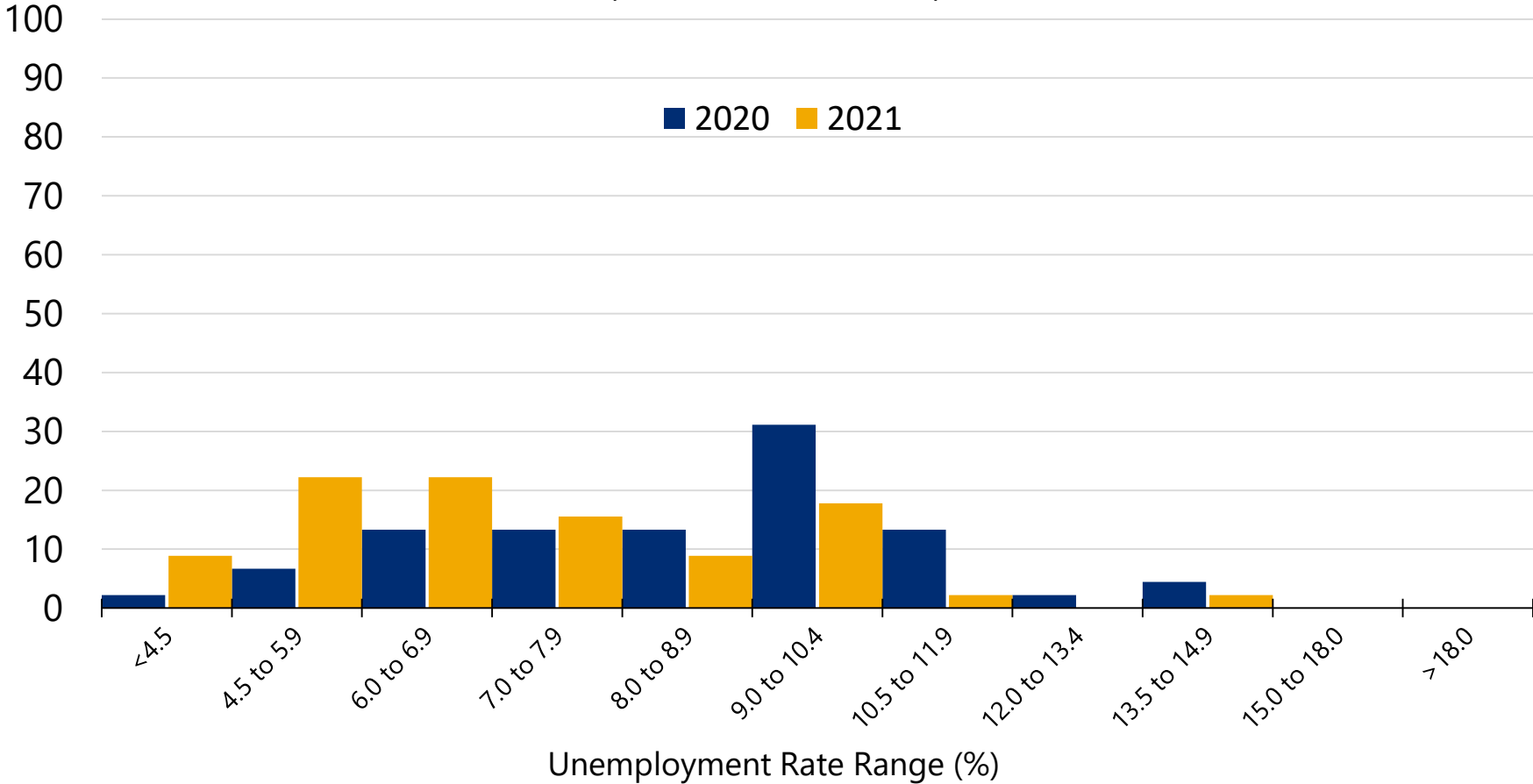
# Blue Chip U.S. Economic Outlook: March 2020 Release

## Unemployment Rate (Percent of Forecasters)



# Blue Chip U.S. Economic Outlook: April 2020 Release

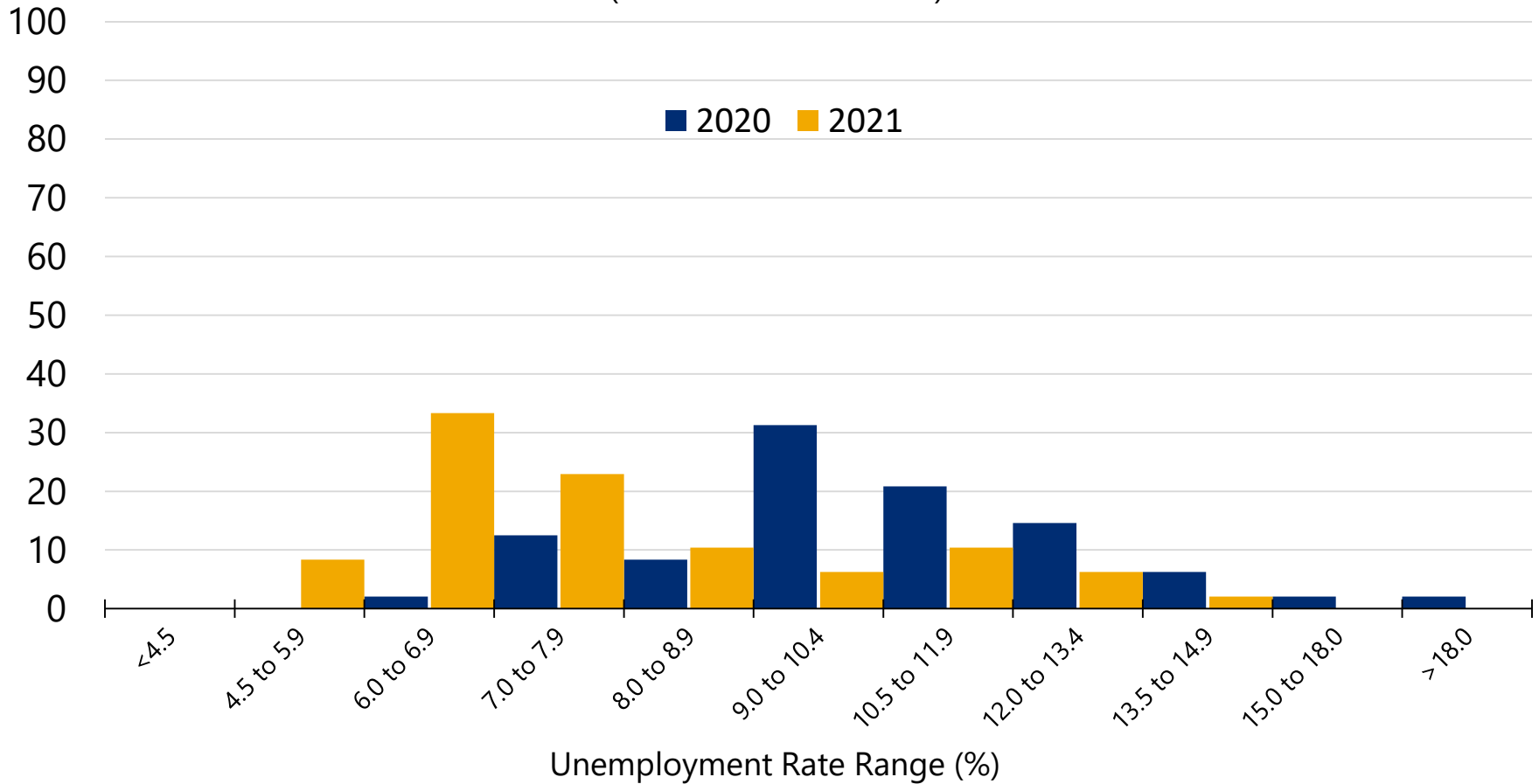
### Unemployment Rate (Percent of Forecasters)



Source: Blue Chip Economic Indicators

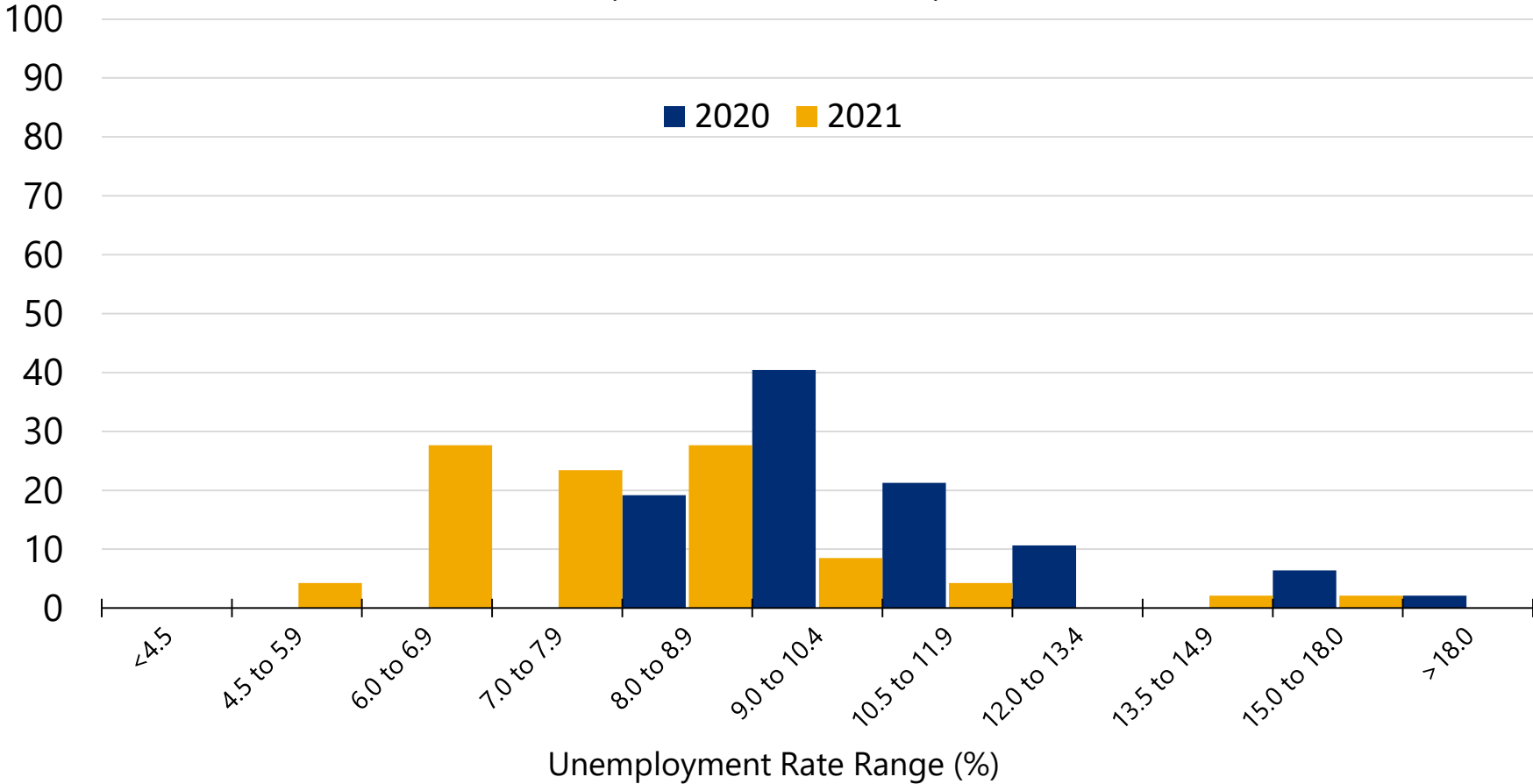
# Blue Chip U.S. Economic Outlook: May 2020 Release

## Unemployment Rate (Percent of Forecasters)



# Blue Chip U.S. Economic Outlook: June 2020 Release

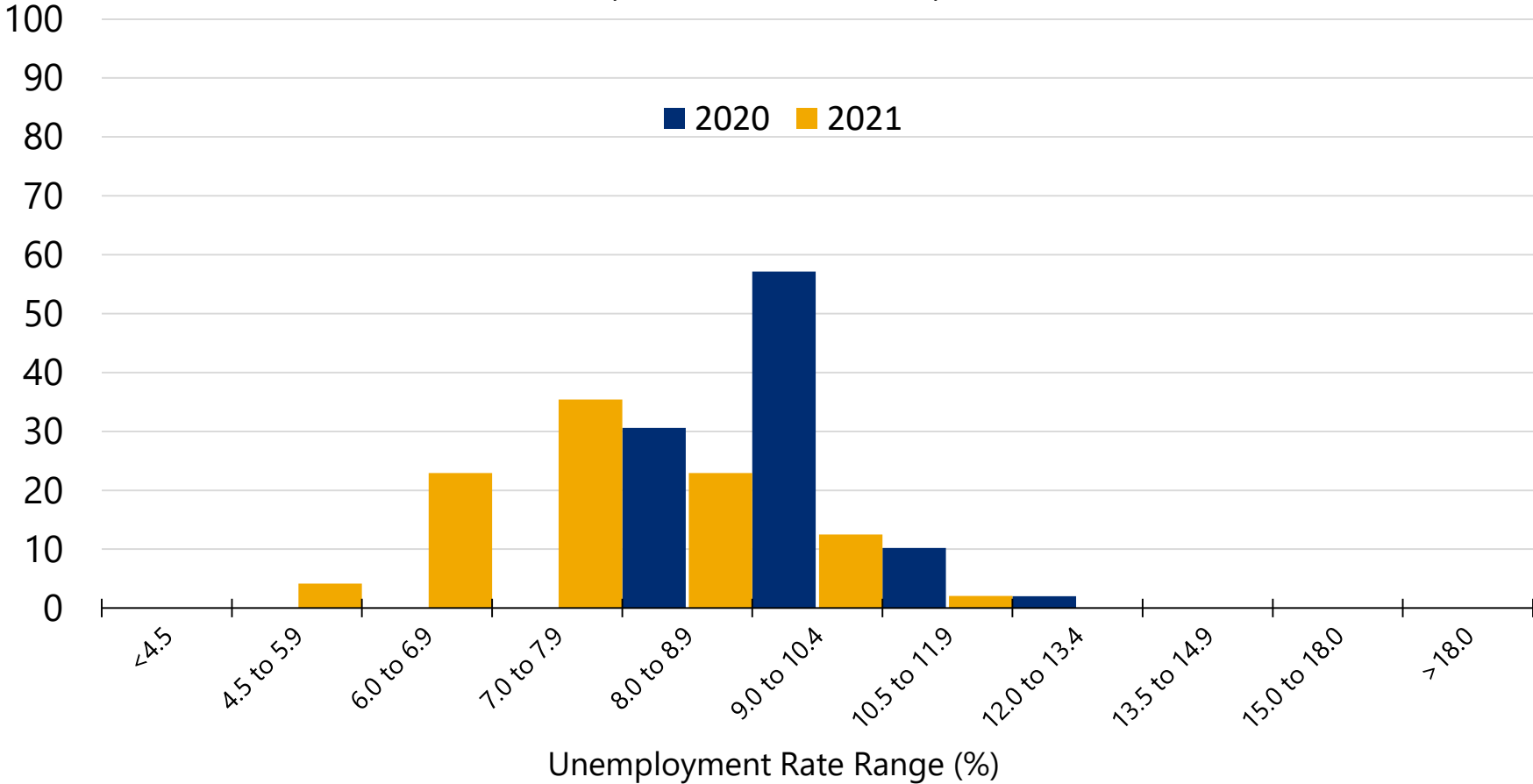
### Unemployment Rate (Percent of Forecasters)



Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: July 2020 Release

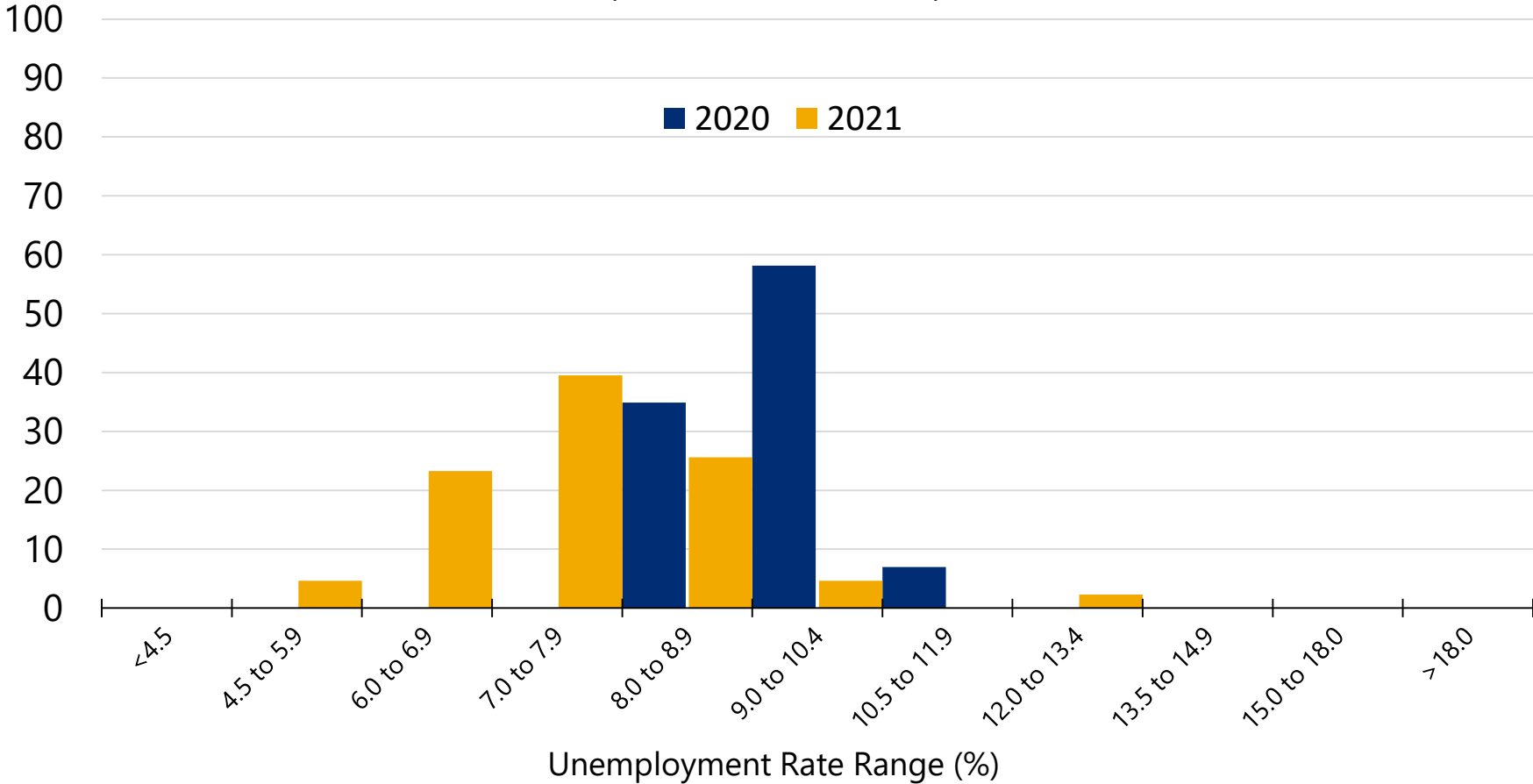
### Unemployment Rate (Percent of Forecasters)



Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: August 2020 Release

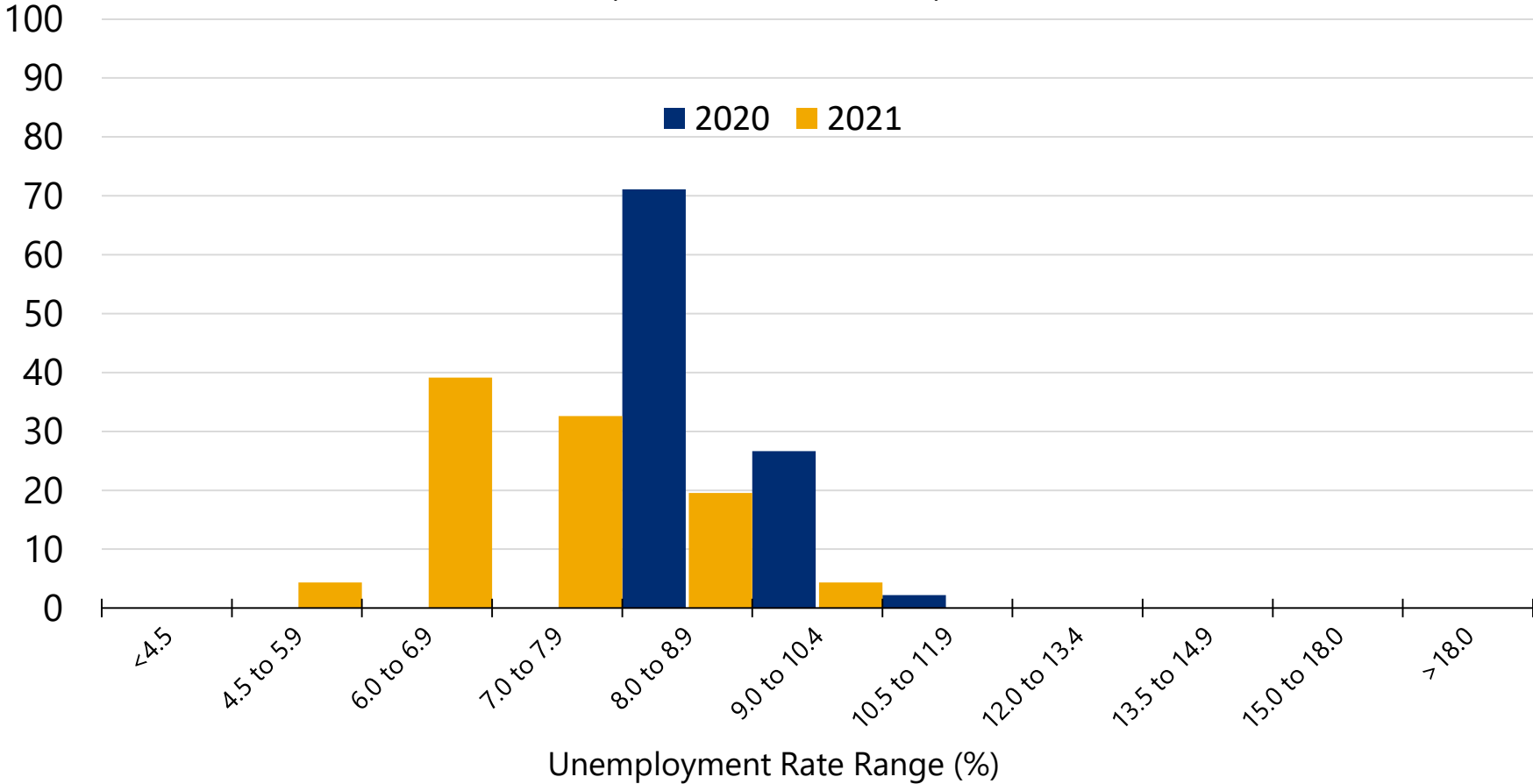
### Unemployment Rate (Percent of Forecasters)



Source: Blue Chip Economic Indicators

# Blue Chip U.S. Economic Outlook: September 2020 Release

### Unemployment Rate (Percent of Forecasters)

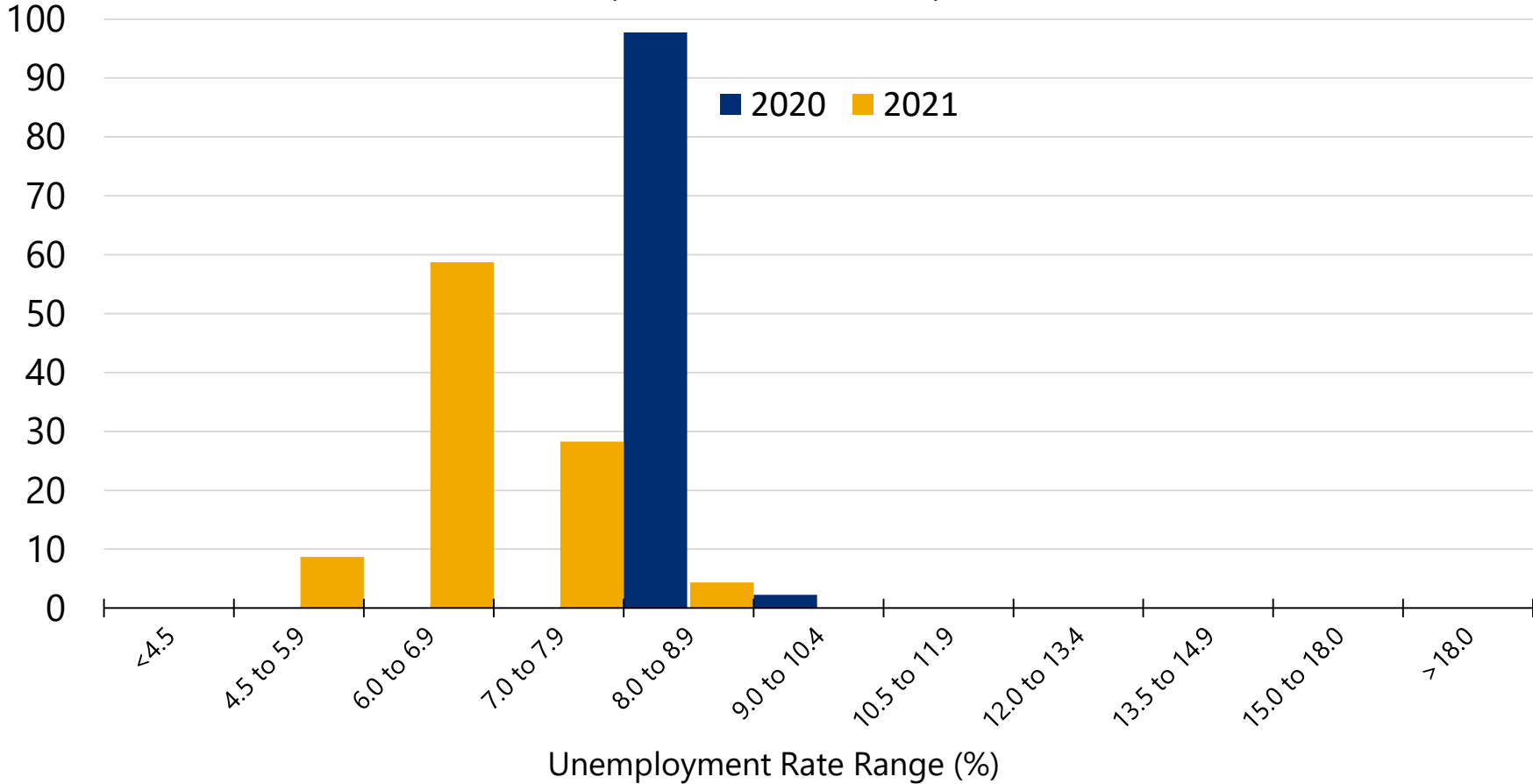


Source: Blue Chip Economic Indicators



# Blue Chip U.S. Economic Outlook: October 2020 Release

### Unemployment Rate (Percent of Forecasters)



Source: Blue Chip Economic Indicators

# **Blue Chip Survey Cross-over Tables**

# Blue Chip U.S. Economic Indicators: Real GDP Growth Rate Tracking

| Blue Chip Economic Indicators Release Tracking |              |                   |        |        |        |        |        |        |        |        |      |      |      |
|--|--------------|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|------|------|------|
|  |              | Real GDP (% SAAR) |        |        |        |        |        |        |        |        |      |      |      |
| Blue Chip Release Month                        |              | 2019Q4            | 2020Q1 | 2020Q2 | 2020Q3 | 2020Q4 | 2021Q1 | 2021Q2 | 2021Q3 | 2021Q4 | 2019 | 2020 | 2021 |
| October 2020                                   | Consensus    | 2.4               | -5.0   | -31.4  | 29.1   | 3.8    | 4.0    | 4.0    | 3.7    | 3.4    | 2.2  | -4.0 | 3.9  |
|  | Top 10 Avg.  | 2.4               | -5.0   | -31.4  | 34.1   | 6.2    | 6.0    | 5.8    | 5.7    | 5.2    | 2.2  | -3.5 | 5.1  |
|  | Bot. 10 Avg. | 2.4               | -5.0   | -31.4  | 22.8   | 1.3    | 2.1    | 2.2    | 2.1    | 2.1    | 2.2  | -4.8 | 2.8  |
| September 2020                                 | Consensus    | 2.4               | -5.0   | -32.9  | 24.0   | 4.9    | 4.6    | 4.2    | 4.1    | 3.6    | 2.2  | -4.6 | 3.8  |
|  | Top 10 Avg.  | 2.4               | -5.0   | -32.9  | 32.5   | 8.0    | 7.7    | 6.7    | 6.4    | 6.1    | 2.2  | -3.7 | 5.4  |
|  | Bot. 10 Avg. | 2.4               | -5.0   | -32.9  | 15.8   | 1.1    | 1.7    | 2.2    | 2.3    | 2.2    | 2.2  | -5.6 | 2.3  |
| August 2020                                    | Consensus    | 2.4               | -5.0   | -32.9  | 18.7   | 5.9    | 5.8    | 4.9    | 4.3    | 3.7    | 2.2  | -5.2 | 3.8  |
|  | Top 10 Avg.  | 2.4               | -5.0   | -32.9  | 28.0   | 9.5    | 8.6    | 7.6    | 6.6    | 6.5    | 2.2  | -4.1 | 5.5  |
|  | Bot. 10 Avg. | 2.4               | -5.0   | -32.9  | 10.5   | 1.7    | 3.5    | 2.9    | 2.5    | 2.0    | 2.2  | -6.2 | 2.2  |
| July 2020                                      | Consensus    | 2.1               | -5.0   | -33.6  | 17.7   | 7.0    | 5.9    | 5.0    | 4.5    | 3.8    | 2.3  | -5.5 | 4.0  |
|  | Top 10 Avg.  | 2.1               | -5.0   | -28.6  | 28.7   | 11.7   | 8.9    | 8.3    | 7.2    | 6.8    | 2.3  | -4.1 | 5.8  |
|  | Bot. 10 Avg. | 2.1               | -5.0   | -38.0  | 7.6    | 2.5    | 3.2    | 2.5    | 2.5    | 2.0    | 2.3  | -7.0 | 2.2  |
| June 2020                                      | Consensus    | 2.1               | -5.0   | -35.7  | 17.2   | 8.6    | 6.5    | 5.1    | 4.2    | 3.6    | 2.3  | -6.1 | 4.0  |
|  | Top 10 Avg.  | 2.1               | -5.0   | -28.7  | 30.0   | 14.6   | 10.6   | 8.2    | 6.7    | 6.0    | 2.3  | -4.3 | 5.9  |
|  | Bot. 10 Avg. | 2.1               | -5.0   | -41.6  | 3.6    | 2.0    | 2.9    | 2.4    | 2.0    | 2.0    | 2.3  | -8.2 | 1.8  |
| May 2020                                       | Consensus    | 2.1               | -4.8   | -32.1  | 11.6   | 8.8    | 6.8    | 5.2    | 4.2    | 3.4    | 2.3  | -5.8 | 4.0  |
|  | Top 10 Avg.  | 2.1               | -4.8   | -23.1  | 26.4   | 16.8   | 13.6   | 10.2   | 8.1    | 6.1    | 2.3  | -3.5 | 6.3  |
|  | Bot. 10 Avg. | 2.1               | -4.8   | -40.3  | -4.7   | 2.1    | 2.3    | 2.0    | 1.4    | 1.7    | 2.3  | -8.2 | 1.3  |
| April 2020                                     | Consensus    | 2.1               | -3.8   | -24.5  | 7.4    | 7.9    | 6.9    | 5.2    | 4.0    | 3.3    | 2.3  | -4.1 | 3.8  |
|  | Top 10 Avg.  | 2.1               | -0.4   | -12.9  | 22.8   | 18.4   | 14.0   | 10.9   | 7.8    | 6.1    | 2.3  | -1.1 | 6.4  |
|  | Bot. 10 Avg. | 2.1               | -7.5   | -36.9  | -5.5   | 2.0    | 2.0    | 2.2    | 1.4    | 1.5    | 2.3  | -7.4 | 1.5  |
| March 2020                                     | Consensus    | 2.1               | 1.3    | 1.0    | 1.9    | 2.1    | 2.1    | 2.0    | 1.9    | 1.9    | 2.3  | 1.7  | 2.0  |
|  | Top 10 Avg.  | 2.1               | 2.0    | 2.1    | 2.8    | 2.6    | 2.7    | 2.6    | 2.6    | 2.6    | 2.3  | 2.0  | 2.3  |
|  | Bot. 10 Avg. | 2.1               | 0.7    | -0.1   | 0.8    | 1.6    | 1.4    | 1.4    | 1.3    | 1.3    | 2.3  | 1.3  | 1.6  |
| February 2020                                  | Consensus    | 2.1               | 1.6    | 1.9    | 1.9    | 2.0    | 1.9    | 2.0    | 1.9    | 2.0    | 2.3  | 1.9  | 2.0  |
|  | Top 10 Avg.  | 2.1               | 2.3    | 2.7    | 2.6    | 2.5    | 2.4    | 2.5    | 2.6    | 2.7    | 2.3  | 2.2  | 2.3  |
|  | Bot. 10 Avg. | 2.1               | 1.0    | 1.0    | 1.3    | 1.5    | 1.3    | 1.4    | 1.3    | 1.3    | 2.3  | 1.5  | 1.6  |

# Blue Chip U.S. Economic Indicators: Real GDP Level Tracking

| Blue Chip Economic Indicators Release Tracking |              |        |        |        |        |        |        |        |        |        |        |        |        |
|--|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Real GDP (Billions \$ 2012, SAAR)              |              |        |        |        |        |        |        |        |        |        |        |        |        |
| Blue Chip Release Month                        |              | 2019Q4 | 2020Q1 | 2020Q2 | 2020Q3 | 2020Q4 | 2021Q1 | 2021Q2 | 2021Q3 | 2021Q4 | 2019   | 2020   | 2021   |
| October 2020                                   | Consensus    | 19,254 | 19,011 | 17,303 | 18,443 | 18,616 | 18,800 | 18,985 | 19,158 | 19,319 | 19,092 | 18,328 | 19,043 |
|  | Top 10 Avg.  | 19,254 | 19,011 | 17,303 | 18,619 | 18,902 | 19,179 | 19,451 | 19,723 | 19,974 | 19,092 | 18,423 | 19,363 |
|  | Bot. 10 Avg. | 19,254 | 19,011 | 17,303 | 18,214 | 18,273 | 18,368 | 18,468 | 18,565 | 18,661 | 19,092 | 18,175 | 18,684 |
| September 2020                                 | Consensus    | 19,254 | 19,011 | 17,282 | 18,156 | 18,375 | 18,583 | 18,775 | 18,964 | 19,133 | 19,092 | 18,213 | 18,906 |
|  | Top 10 Avg.  | 19,254 | 19,011 | 17,282 | 18,460 | 18,818 | 19,171 | 19,484 | 19,789 | 20,084 | 19,092 | 18,385 | 19,378 |
|  | Bot. 10 Avg. | 19,254 | 19,011 | 17,282 | 17,849 | 17,897 | 17,973 | 18,071 | 18,174 | 18,273 | 19,092 | 18,023 | 18,437 |
| August 2020                                    | Consensus    | 19,254 | 19,011 | 17,206 | 17,959 | 18,218 | 18,477 | 18,699 | 18,897 | 19,070 | 19,092 | 18,099 | 18,787 |
|  | Top 10 Avg.  | 19,254 | 19,011 | 17,206 | 18,301 | 18,721 | 19,111 | 19,464 | 19,778 | 20,092 | 19,092 | 18,309 | 19,316 |
|  | Bot. 10 Avg. | 19,254 | 19,011 | 17,206 | 17,641 | 17,715 | 17,868 | 17,996 | 18,108 | 18,198 | 19,092 | 17,908 | 18,302 |
| July 2020                                      | Consensus    | 19,222 | 18,977 | 17,131 | 17,843 | 18,148 | 18,410 | 18,635 | 18,842 | 19,018 | 19,073 | 18,024 | 18,745 |
|  | Top 10 Avg.  | 19,222 | 18,977 | 17,445 | 18,580 | 19,102 | 19,513 | 19,906 | 20,255 | 20,591 | 19,073 | 18,291 | 19,352 |
|  | Bot. 10 Avg. | 19,222 | 18,977 | 16,840 | 17,151 | 17,257 | 17,394 | 17,501 | 17,610 | 17,697 | 19,073 | 17,738 | 18,128 |
| June 2020                                      | Consensus    | 19,222 | 18,975 | 16,991 | 17,679 | 18,047 | 18,334 | 18,563 | 18,755 | 18,922 | 19,073 | 17,910 | 18,626 |
|  | Top 10 Avg.  | 19,222 | 18,975 | 17,436 | 18,618 | 19,263 | 19,755 | 20,148 | 20,477 | 20,777 | 19,073 | 18,253 | 19,330 |
|  | Bot. 10 Avg. | 19,222 | 18,975 | 16,587 | 16,735 | 16,818 | 16,938 | 17,039 | 17,124 | 17,209 | 19,073 | 17,509 | 17,824 |
| May 2020                                       | Consensus    | 19,222 | 18,988 | 17,236 | 17,716 | 18,093 | 18,393 | 18,628 | 18,821 | 18,978 | 19,073 | 17,967 | 18,686 |
|  | Top 10 Avg.  | 19,222 | 18,988 | 17,781 | 18,854 | 19,600 | 20,235 | 20,732 | 21,140 | 21,455 | 19,073 | 18,406 | 19,565 |
|  | Bot. 10 Avg. | 19,222 | 18,988 | 16,691 | 16,491 | 16,577 | 16,671 | 16,754 | 16,812 | 16,883 | 19,073 | 17,509 | 17,737 |
| April 2020                                     | Consensus    | 19,222 | 19,037 | 17,745 | 18,065 | 18,411 | 18,721 | 18,960 | 19,147 | 19,303 | 19,073 | 18,291 | 18,986 |
|  | Top 10 Avg.  | 19,222 | 19,203 | 18,551 | 19,528 | 20,371 | 21,049 | 21,601 | 22,010 | 22,338 | 19,073 | 18,863 | 20,071 |
|  | Bot. 10 Avg. | 19,222 | 18,851 | 16,801 | 16,565 | 16,648 | 16,730 | 16,821 | 16,880 | 16,943 | 19,073 | 17,662 | 17,927 |
| March 2020                                     | Consensus    | 19,221 | 19,283 | 19,331 | 19,422 | 19,523 | 19,625 | 19,722 | 19,815 | 19,909 | 19,073 | 19,397 | 19,785 |
|  | Top 10 Avg.  | 19,221 | 19,316 | 19,417 | 19,551 | 19,677 | 19,808 | 19,936 | 20,064 | 20,193 | 19,073 | 19,454 | 19,902 |
|  | Bot. 10 Avg. | 19,221 | 19,254 | 19,249 | 19,288 | 19,364 | 19,432 | 19,499 | 19,562 | 19,626 | 19,073 | 19,321 | 19,630 |
| February 2020                                  | Consensus    | 19,221 | 19,297 | 19,388 | 19,479 | 19,576 | 19,668 | 19,766 | 19,859 | 19,958 | 19,073 | 19,435 | 19,824 |
|  | Top 10 Avg.  | 19,221 | 19,330 | 19,459 | 19,585 | 19,706 | 19,823 | 19,946 | 20,074 | 20,208 | 19,073 | 19,492 | 19,941 |
|  | Bot. 10 Avg. | 19,221 | 19,268 | 19,316 | 19,379 | 19,451 | 19,514 | 19,582 | 19,645 | 19,709 | 19,073 | 19,359 | 19,669 |

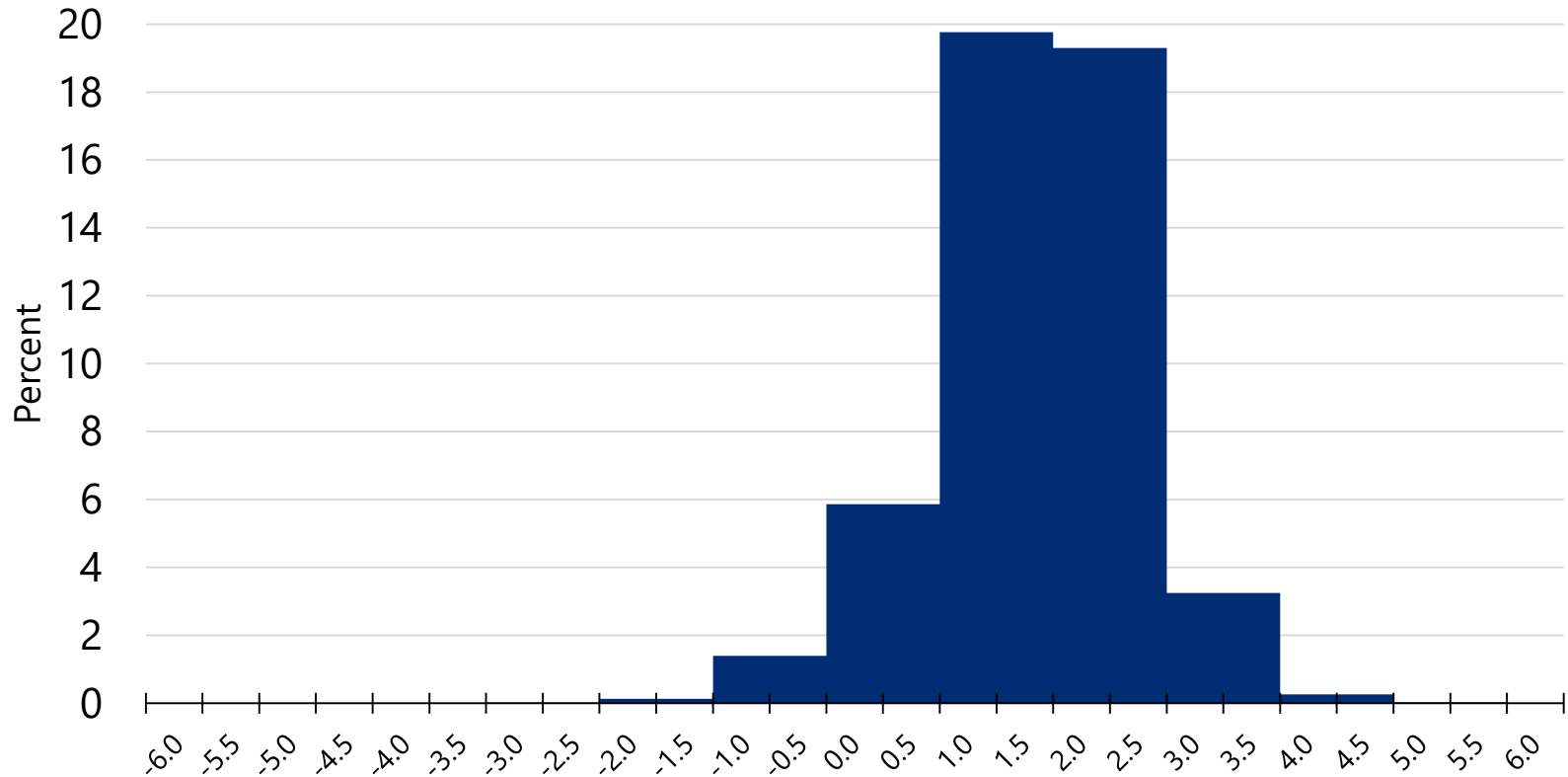
# Blue Chip U.S. Economic Indicators: Unemployment Rate Tracking

| Blue Chip Economic Indicators Release Tracking |              |                          |        |        |        |        |        |        |        |        |      |      |      |  |
|--|--------------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|------|------|------|--|
|  |              | Unemployment Rate (% SA) |        |        |        |        |        |        |        |        |      |      |      |  |
| Blue Chip Release Month                        |              | 2019Q4                   | 2020Q1 | 2020Q2 | 2020Q3 | 2020Q4 | 2021Q1 | 2021Q2 | 2021Q3 | 2021Q4 | 2019 | 2020 | 2021 |  |
| October 2020                                   | Consensus    | 3.5                      | 3.8    | 13.0   | 8.8    | 7.9    | 7.4    | 7.0    | 6.6    | 6.3    | 3.7  | 8.4  | 6.8  |  |
|  | Top 10 Avg.  | 3.5                      | 3.8    | 13.0   | 8.8    | 8.9    | 8.7    | 8.2    | 7.9    | 7.6    | 3.7  | 8.9  | 8.1  |  |
|  | Bot. 10 Avg. | 3.5                      | 3.8    | 13.0   | 8.8    | 7.3    | 6.6    | 6.0    | 5.5    | 5.2    | 3.7  | 8.3  | 5.9  |  |
| September 2020                                 | Consensus    | 3.5                      | 3.8    | 13.0   | 9.5    | 8.7    | 8.1    | 7.5    | 7.0    | 6.6    | 3.7  | 8.8  | 7.3  |  |
|  | Top 10 Avg.  | 3.5                      | 3.8    | 13.0   | 10.6   | 10.3   | 9.9    | 9.3    | 8.7    | 8.4    | 3.7  | 9.6  | 8.9  |  |
|  | Bot. 10 Avg. | 3.5                      | 3.8    | 13.0   | 8.7    | 7.6    | 6.9    | 6.2    | 5.7    | 5.3    | 3.7  | 8.4  | 6.1  |  |
| August 2020                                    | Consensus    | 3.5                      | 3.8    | 13.0   | 10.4   | 9.3    | 8.5    | 7.8    | 7.2    | 6.7    | 3.7  | 9.2  | 7.6  |  |
|  | Top 10 Avg.  | 3.5                      | 3.8    | 13.0   | 11.7   | 10.9   | 10.1   | 9.5    | 8.7    | 8.3    | 3.7  | 10.0 | 9.1  |  |
|  | Bot. 10 Avg. | 3.5                      | 3.8    | 13.0   | 9.3    | 8.1    | 7.2    | 6.5    | 5.9    | 5.5    | 3.7  | 8.6  | 6.3  |  |
| July 2020                                      | Consensus    | 3.5                      | 3.8    | 13.0   | 10.9   | 9.4    | 8.6    | 7.9    | 7.3    | 6.9    | 3.7  | 9.4  | 7.7  |  |
|  | Top 10 Avg.  | 3.5                      | 3.8    | 13.0   | 13.3   | 11.1   | 10.2   | 9.7    | 9.0    | 8.6    | 3.7  | 10.7 | 9.3  |  |
|  | Bot. 10 Avg. | 3.5                      | 3.8    | 13.0   | 9.2    | 8.0    | 7.2    | 6.5    | 5.9    | 5.4    | 3.7  | 8.6  | 6.3  |  |
| June 2020                                      | Consensus    | 3.5                      | 3.8    | 15.3   | 12.5   | 10.4   | 9.3    | 8.4    | 7.7    | 7.2    | 3.7  | 10.6 | 8.1  |  |
|  | Top 10 Avg.  | 3.5                      | 3.8    | 18.6   | 17.7   | 15.0   | 12.7   | 11.5   | 10.5   | 9.8    | 3.7  | 14.0 | 10.8 |  |
|  | Bot. 10 Avg. | 3.5                      | 3.8    | 13.1   | 9.2    | 8.0    | 7.2    | 6.4    | 5.9    | 5.4    | 3.7  | 8.7  | 6.3  |  |
| May 2020                                       | Consensus    | 3.5                      | 3.8    | 15.3   | 12.6   | 10.3   | 9.2    | 8.4    | 7.7    | 7.1    | 3.7  | 10.6 | 8.0  |  |
|  | Top 10 Avg.  | 3.5                      | 3.8    | 19.9   | 17.5   | 15.1   | 13.6   | 12.1   | 11.1   | 10.2   | 3.7  | 14.1 | 11.7 |  |
|  | Bot. 10 Avg. | 3.5                      | 3.8    | 11.1   | 8.2    | 7.2    | 6.4    | 6.0    | 5.6    | 5.2    | 3.7  | 7.8  | 5.8  |  |
| April 2020                                     | Consensus    | 3.5                      | 3.8    | 11.5   | 10.4   | 9.1    | 8.1    | 7.4    | 6.7    | 6.2    | 3.7  | 8.8  | 7.2  |  |
|  | Top 10 Avg.  | 3.5                      | 3.8    | 15.6   | 15.6   | 13.7   | 12.0   | 10.7   | 9.7    | 8.8    | 3.7  | 11.7 | 10.3 |  |
|  | Bot. 10 Avg. | 3.5                      | 3.6    | 7.3    | 5.9    | 5.4    | 5.0    | 4.6    | 4.4    | 4.2    | 3.7  | 5.9  | 4.7  |  |
| March 2020                                     | Consensus    | 3.5                      | 3.6    | 3.6    | 3.7    | 3.7    | 3.7    | 3.7    | 3.7    | 3.8    | 3.7  | 3.6  | 3.7  |  |
|  | Top 10 Avg.  | 3.5                      | 3.7    | 3.9    | 4.0    | 4.1    | 4.1    | 4.2    | 4.3    | 4.4    | 3.7  | 3.9  | 4.2  |  |
|  | Bot. 10 Avg. | 3.5                      | 3.5    | 3.4    | 3.4    | 3.4    | 3.4    | 3.3    | 3.3    | 3.3    | 3.7  | 3.4  | 3.3  |  |
| February 2020                                  | Consensus    | 3.5                      | 3.5    | 3.5    | 3.6    | 3.6    | 3.6    | 3.6    | 3.7    | 3.7    | 3.7  | 3.6  | 3.7  |  |
|  | Top 10 Avg.  | 3.5                      | 3.7    | 3.8    | 4.0    | 4.0    | 4.1    | 4.2    | 4.3    | 4.4    | 3.7  | 3.9  | 4.3  |  |
|  | Bot. 10 Avg. | 3.5                      | 3.4    | 3.3    | 3.3    | 3.2    | 3.2    | 3.2    | 3.2    | 3.1    | 3.7  | 3.3  | 3.2  |  |

# **Survey of Professional Forecasters Real GDP Growth Probability Distributions**

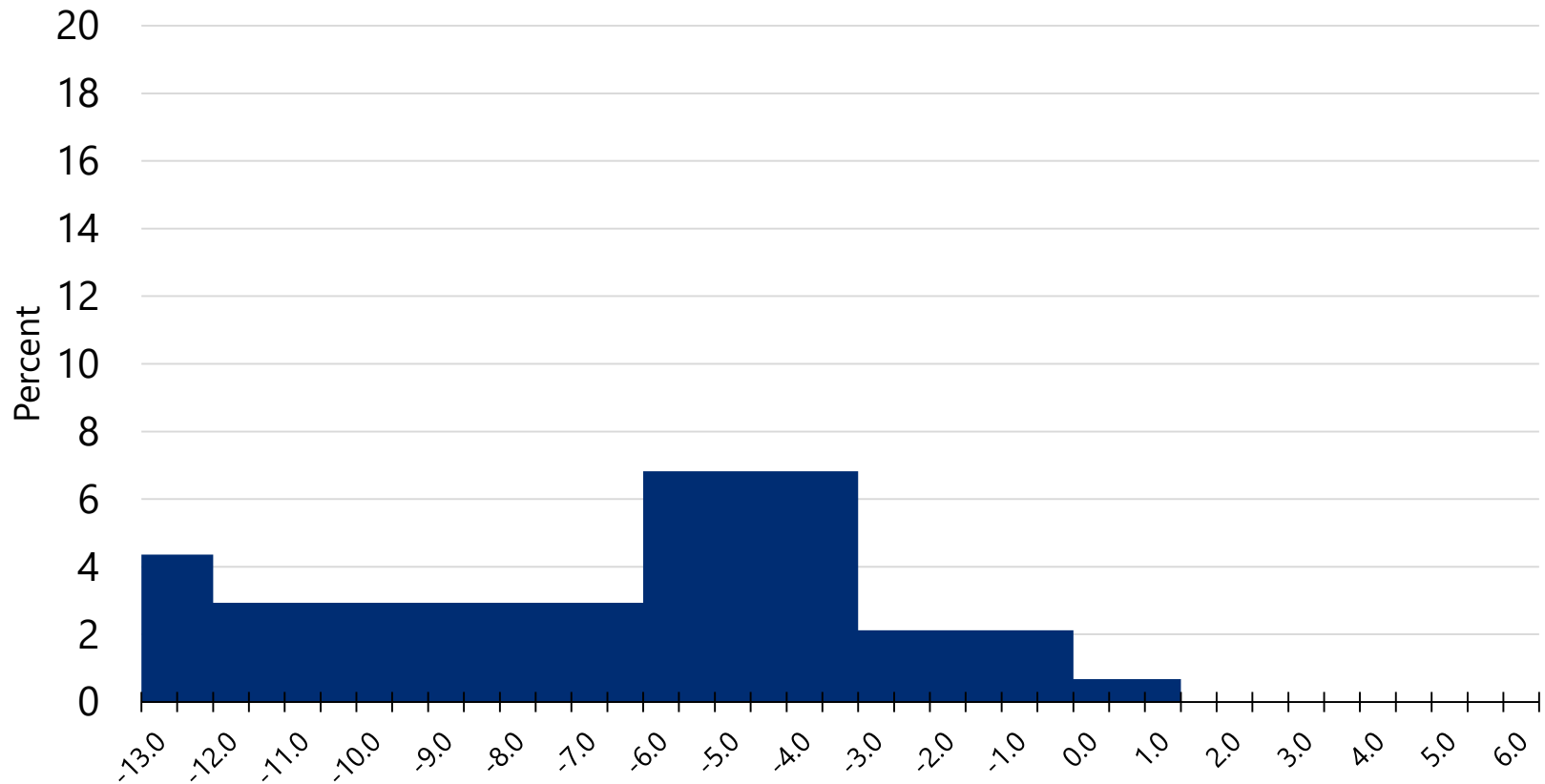
# Survey of Professional Forecasters: 2020 Q1 Release

**Real GDP Growth in 2020**  
(Probability Distribution)



# Survey of Professional Forecasters: 2020 Q2 Release

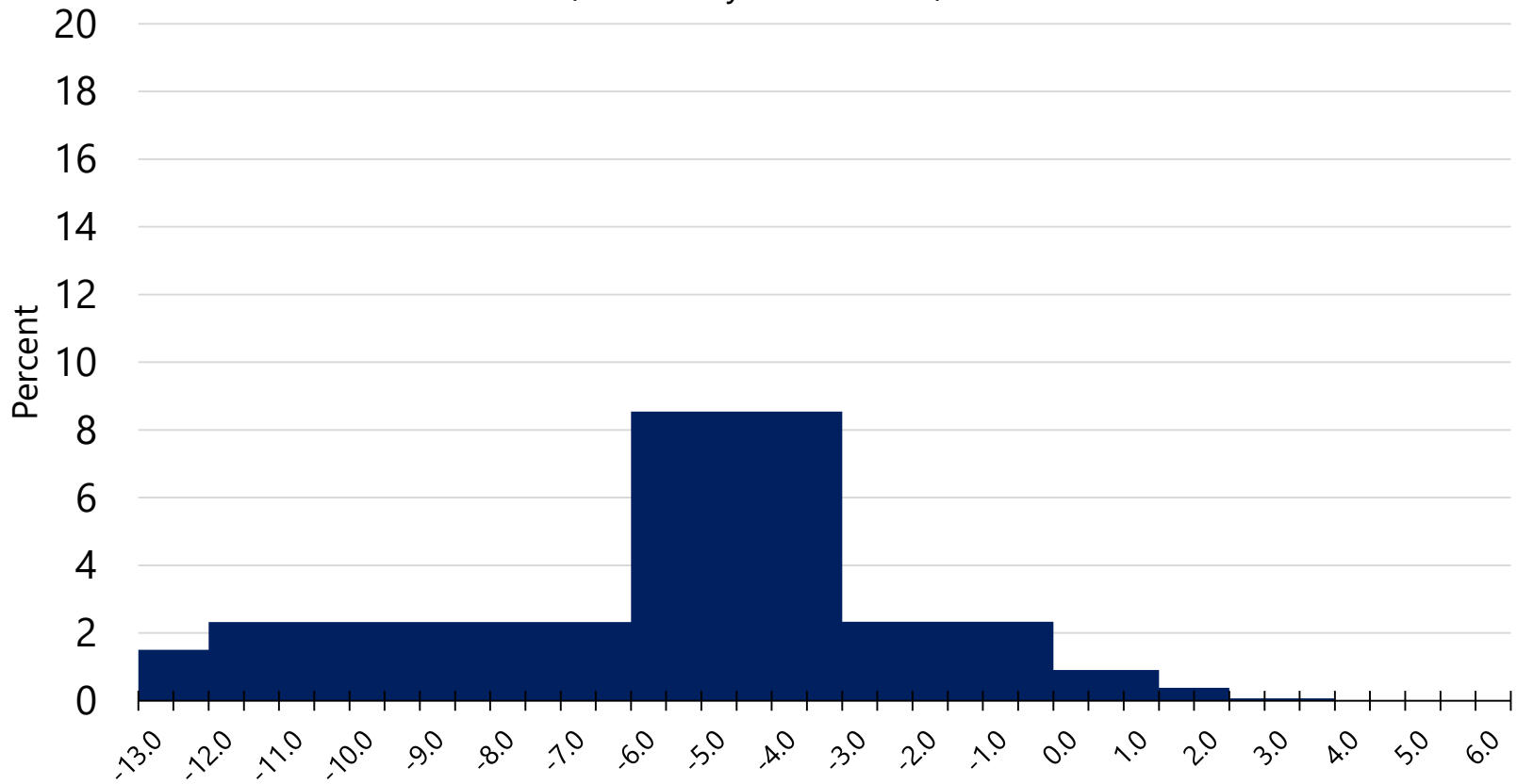
## Real GDP Growth in 2020 (Probability Distribution)





# Survey of Professional Forecasters: 2020 Q3 Release

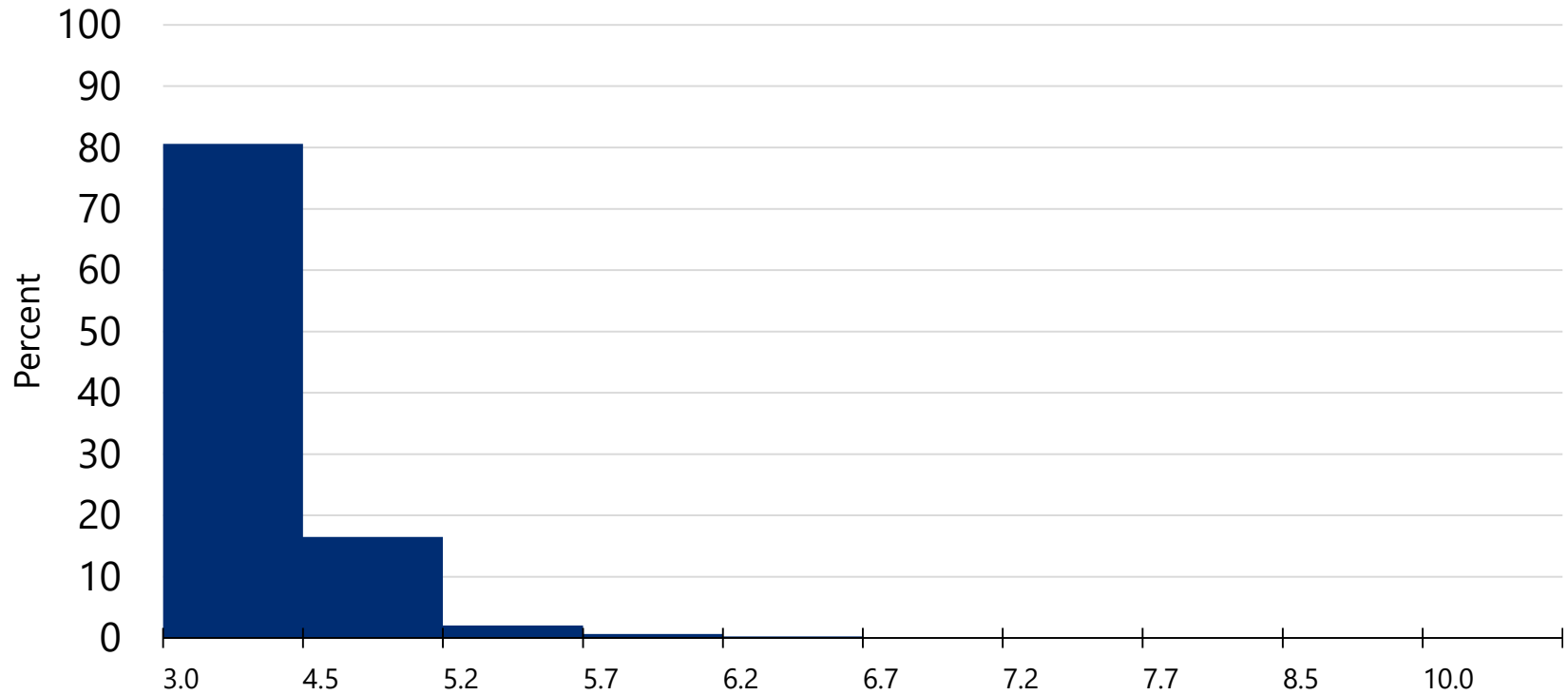
## Real GDP Growth in 2020 (Probability Distribution)



# **Survey of Professional Forecasters Unemployment Probability Distributions**

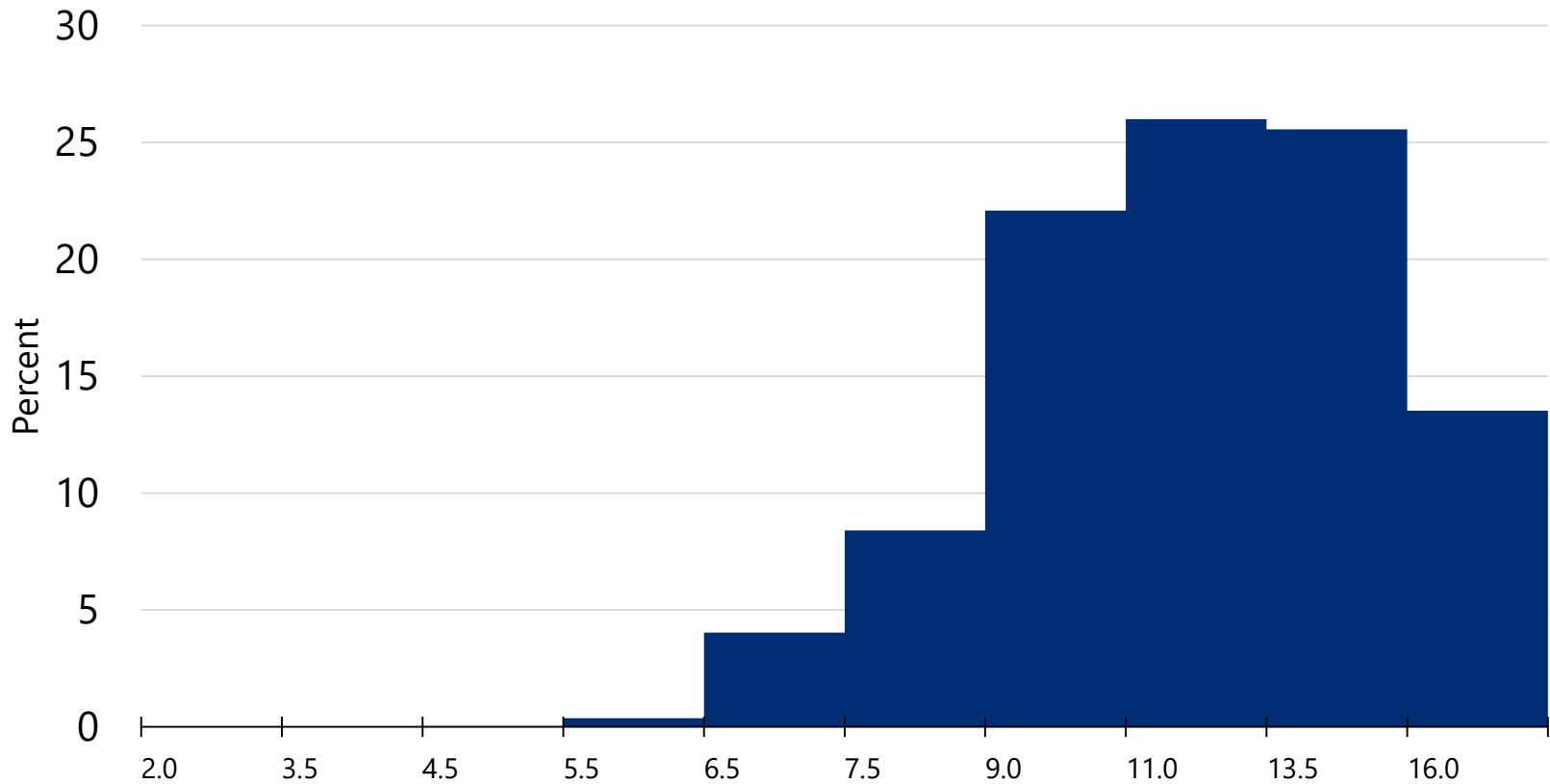
# Survey of Professional Forecasters: 2020 Q1 Release

## Unemployment in 2020 (Probability Distribution)



# Survey of Professional Forecasters: 2020 Q2 Release

## Unemployment in 2020 (Probability Distribution)



# Survey of Professional Forecasters: 2020 Q3 Release

## Unemployment in 2020 (Probability Distribution)

