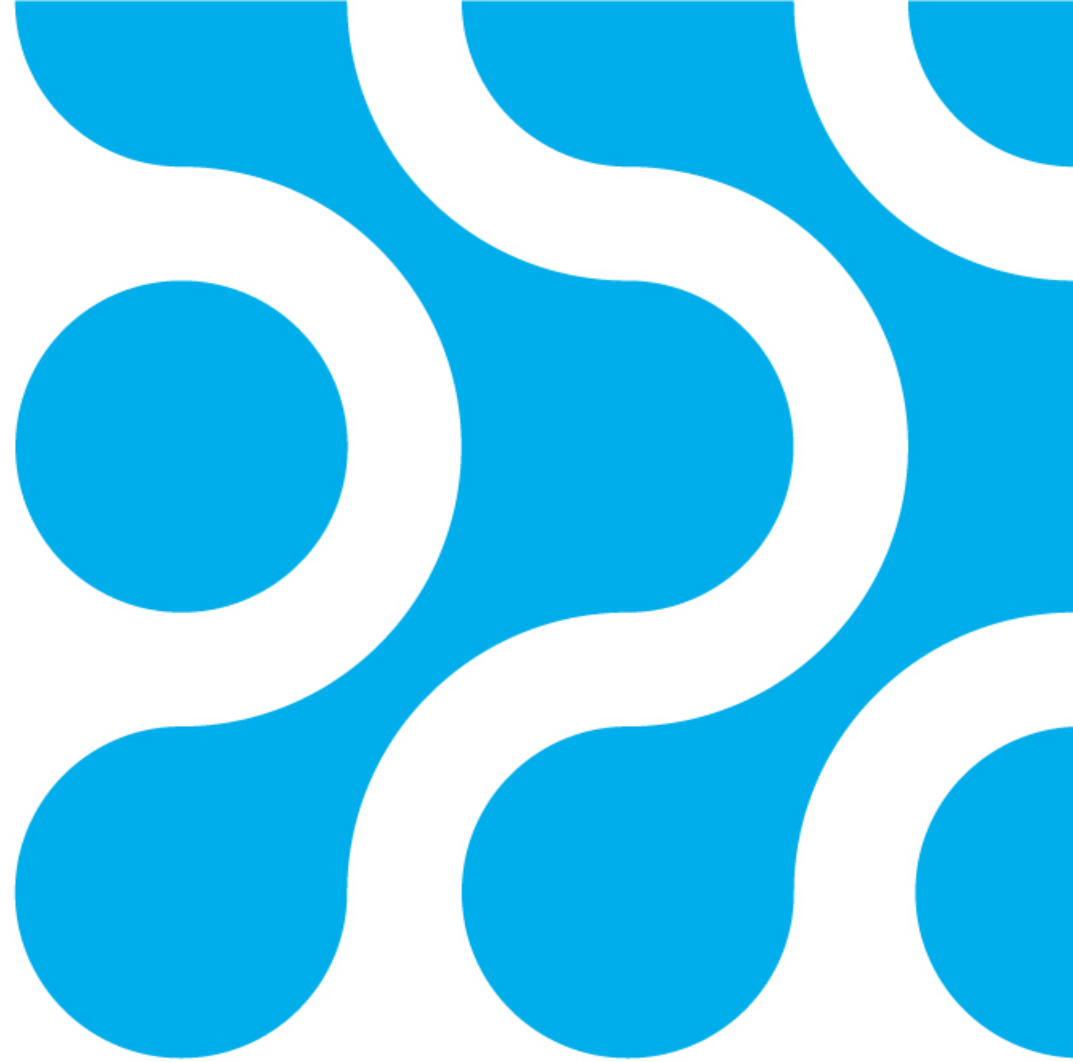




# The Long Electronics Winter is Ending

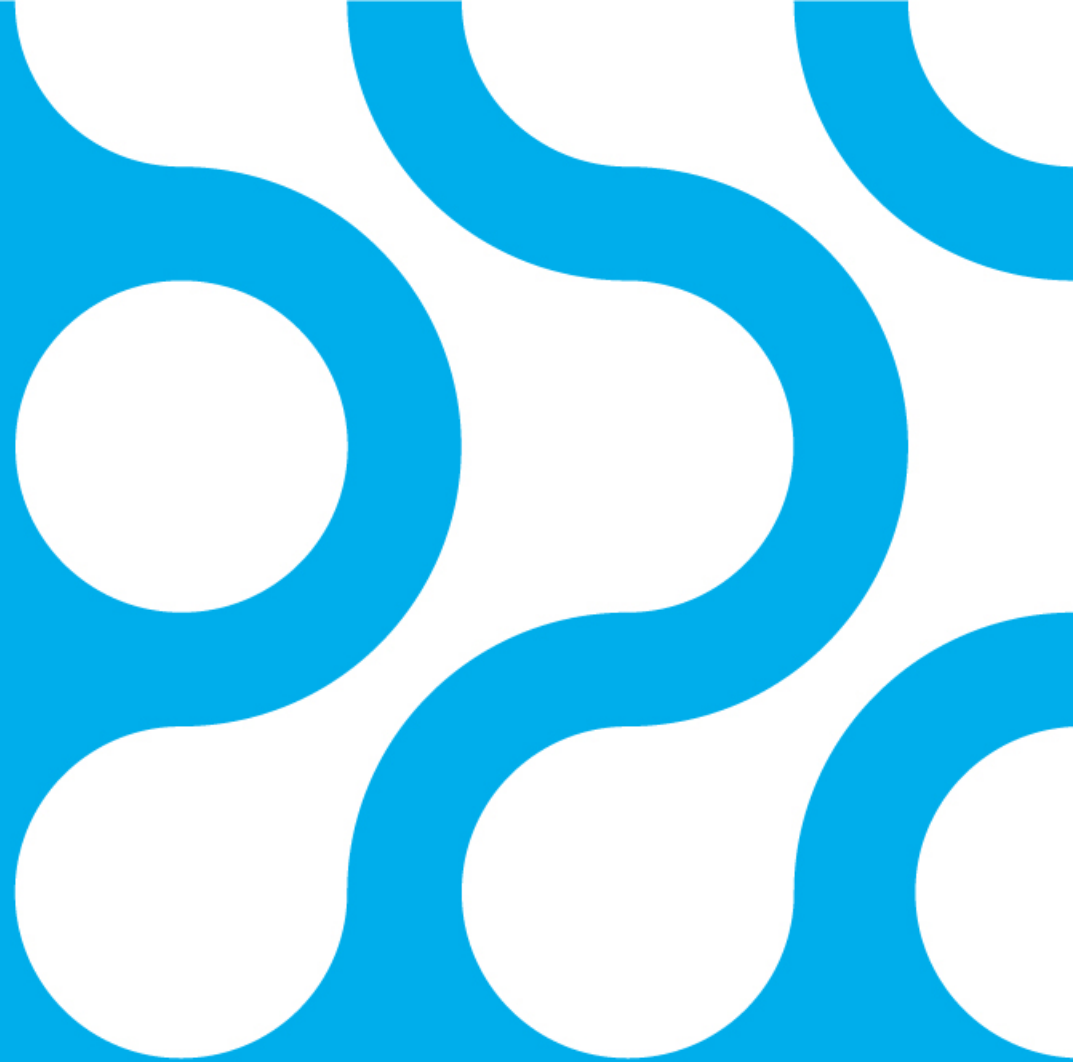
Is Spring in the Air ... or a Virus?

Dale Ford – Chief Analyst  
March 16, 2020



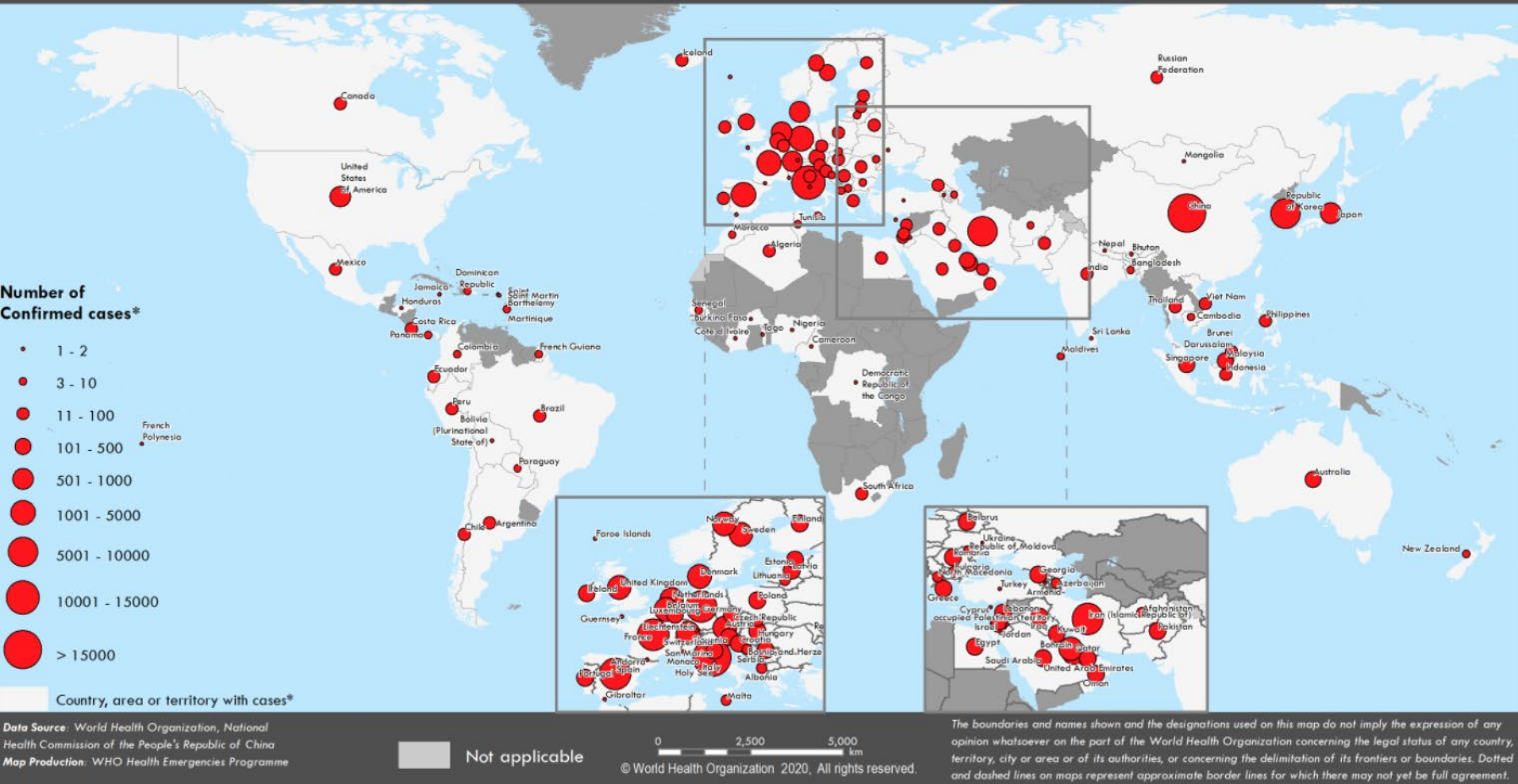
# Coronavirus

Status – March 12



# The Future Was Bright – Then COVID-19 ...

Distribution of COVID-19 cases as of 12 March 2020



# What a Difference a Week Makes

## *Dramatic Changes on the Global Stage*

- Declaration of Global Pandemic adds fuel to the fire
  - Will it burn down the economic house?
- US strategy shifts from “Containment” to “Mitigation”
- Stock market lurches from “Correction” to “Collapse”
- Impact no longer limited to challenge of China supply chain disruption and demand loss
- Leaders now scrambling to avoid a potential global recession
- Losses no longer limited to travel, automotive, pharmaceutical, etc.
- It seems every dimension of the economy is in jeopardy
- “This too will pass” BUT – Will it pass like a kidney stone?

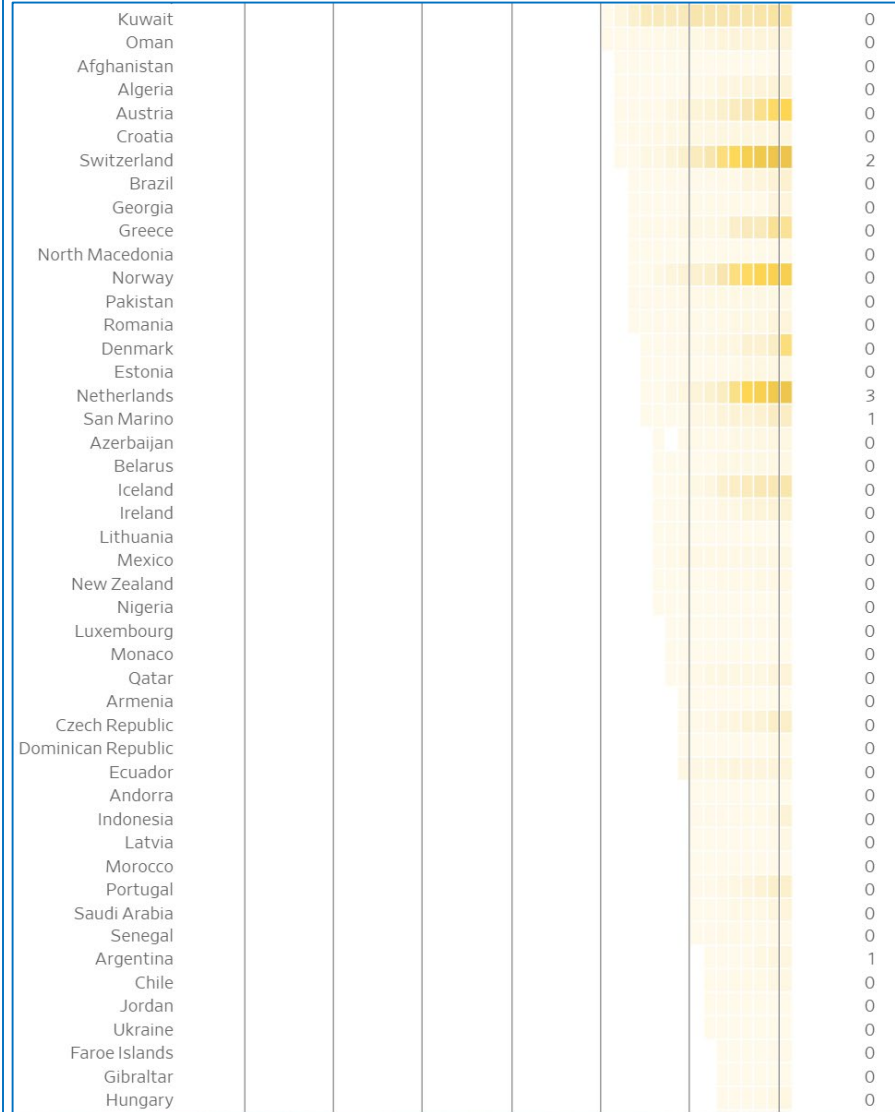
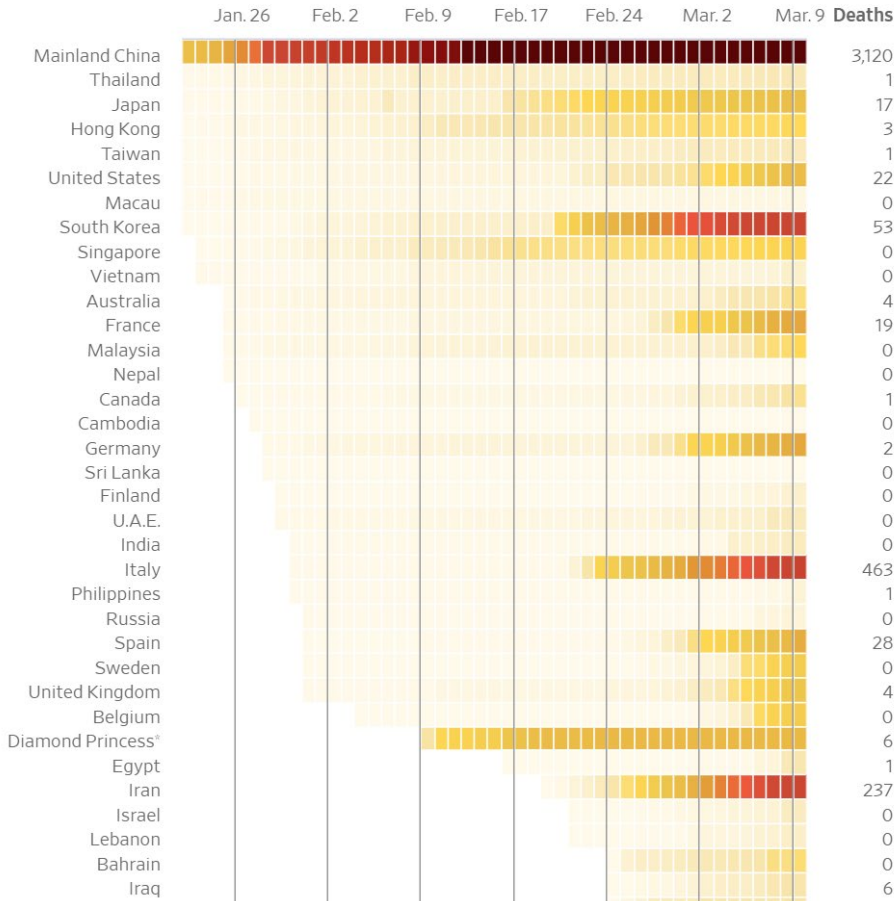
# The Global Spread of COVID-19

## Global Spread

Locations ordered by date of first reported infection.

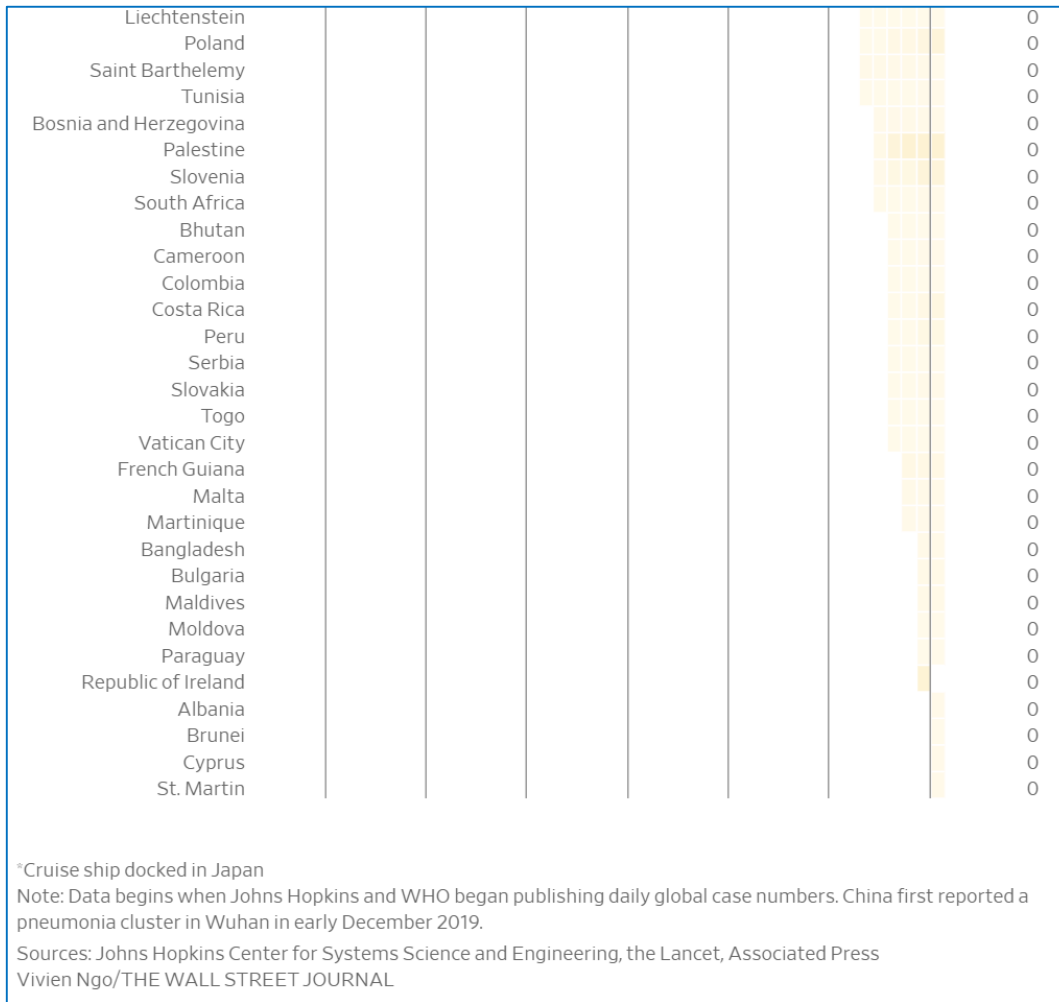
## Cumulative daily reported infections

Updated March 10, 2020 6:30 p.m. ET



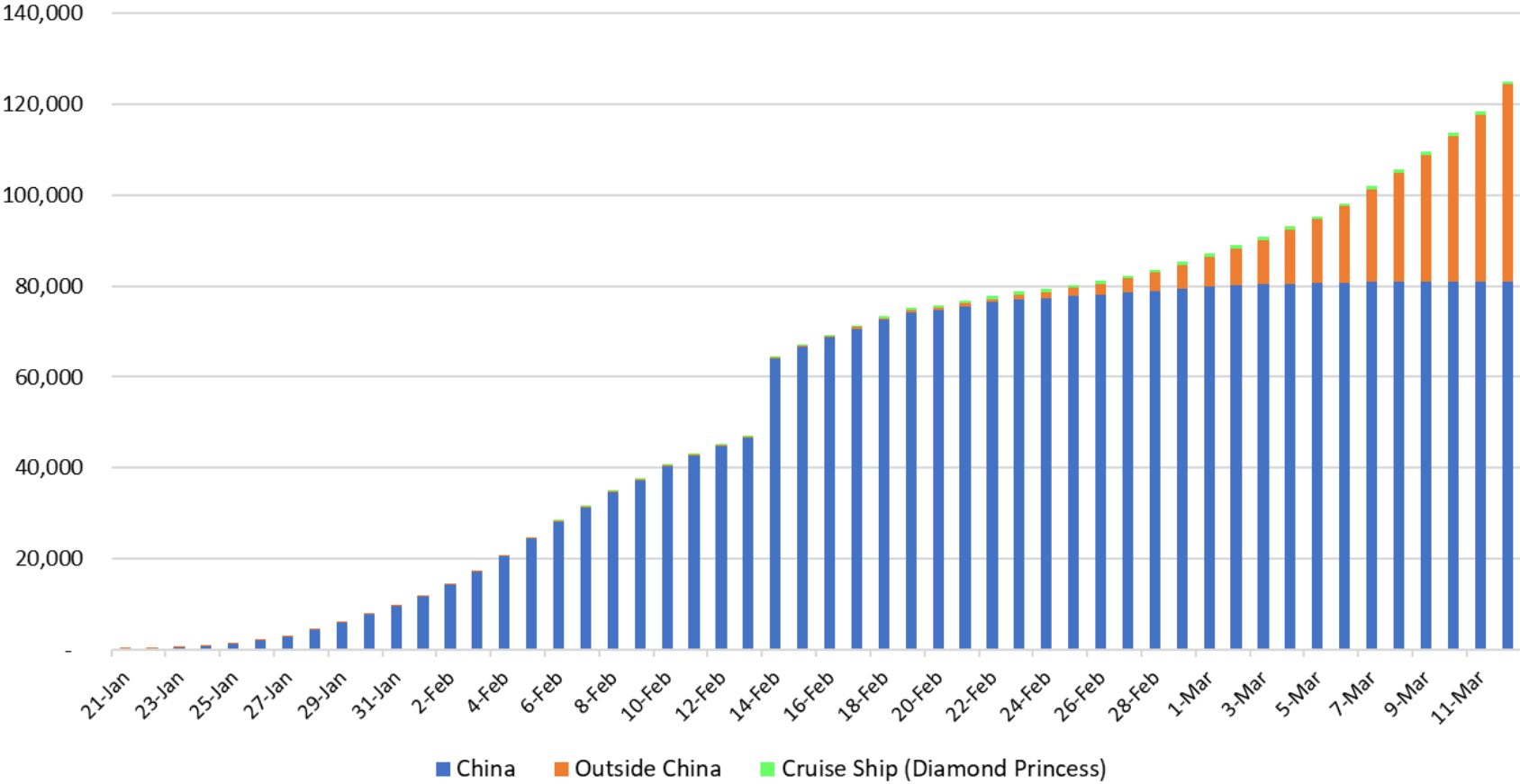
Source: Johns Hopkins, the Lancet, AP, WSJ

# The Global Spread of COVID-19



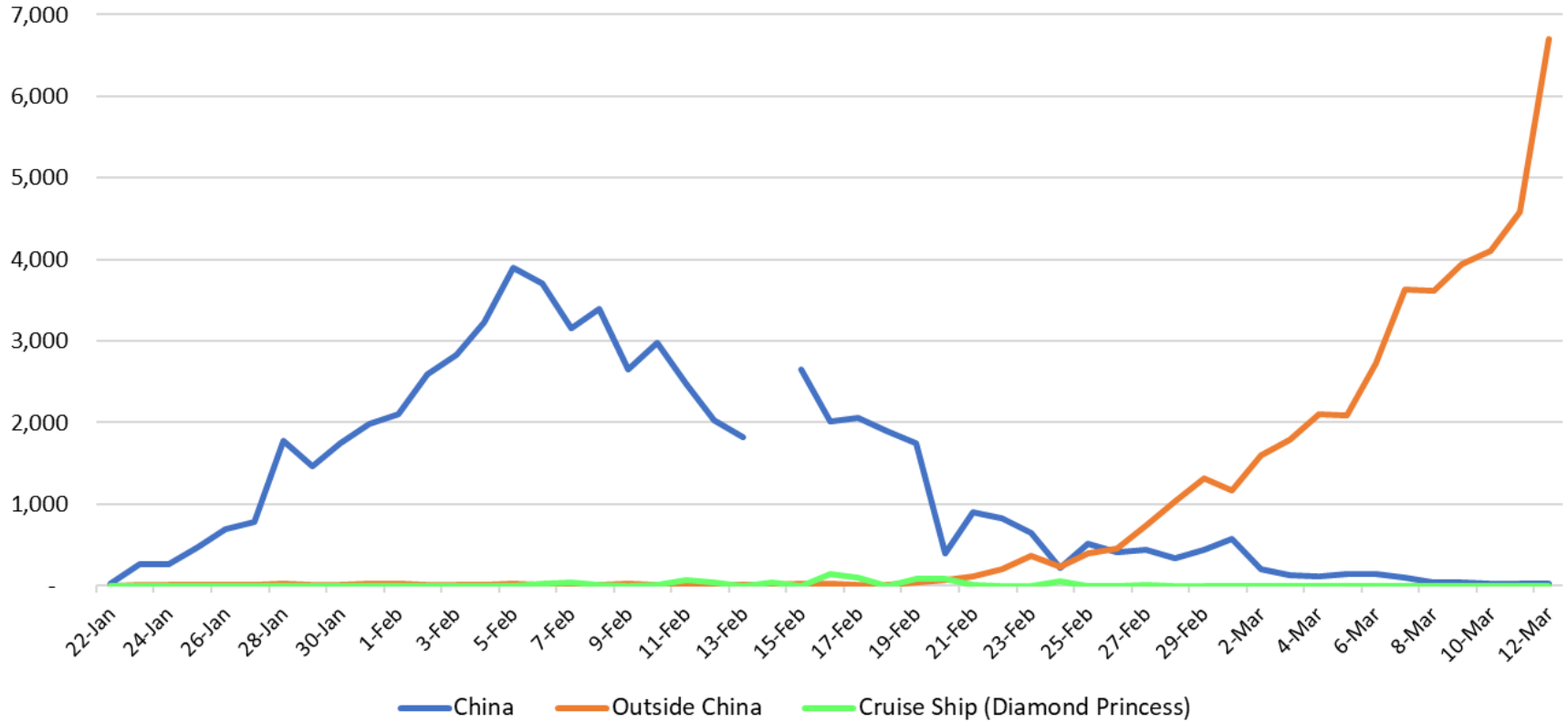
- Confirmed cases in 117 countries/territories
- These countries represent 6.8 billion people; 87% of the global population
- Typically spreading to 4 new countries/territories each day
- Strongest presence in northern hemisphere where it is colder

### TOTAL CONFIRMED CORONAVIRUS CASES



Source: WHO

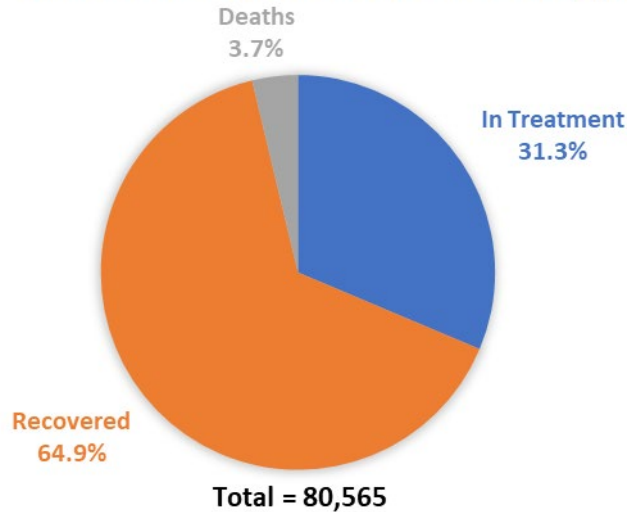
### NEW CORONAVIRUS CASES (DAILY)



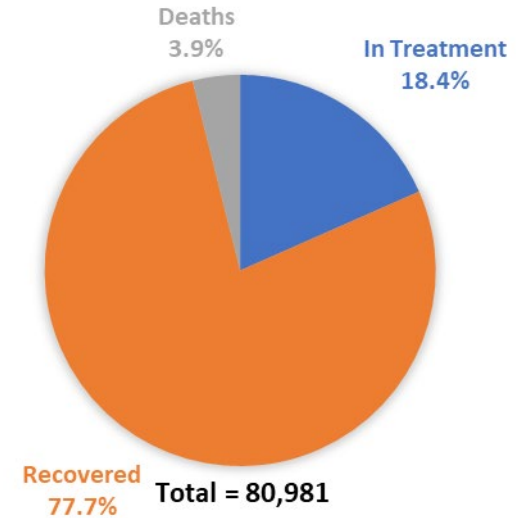
Source: WHO



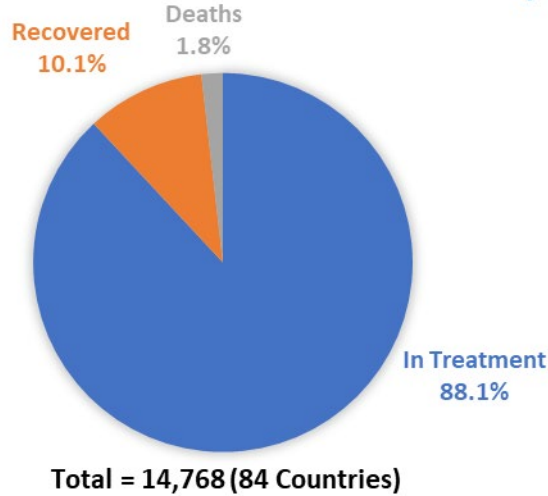
### CHINA CORONAVIRUS STATUS (3/5)



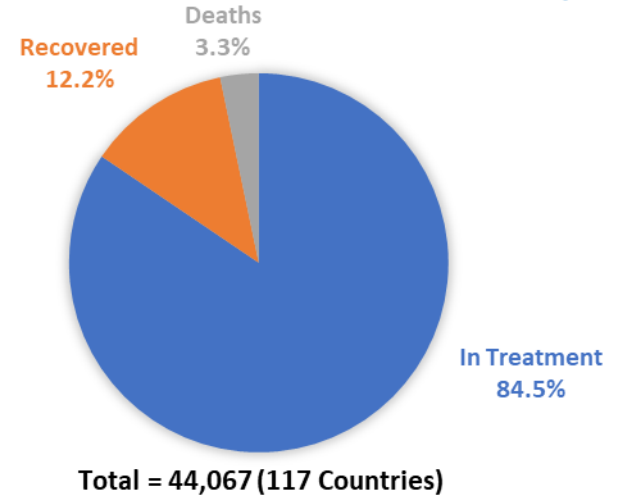
### CHINA CORONAVIRUS STATUS (3/12)



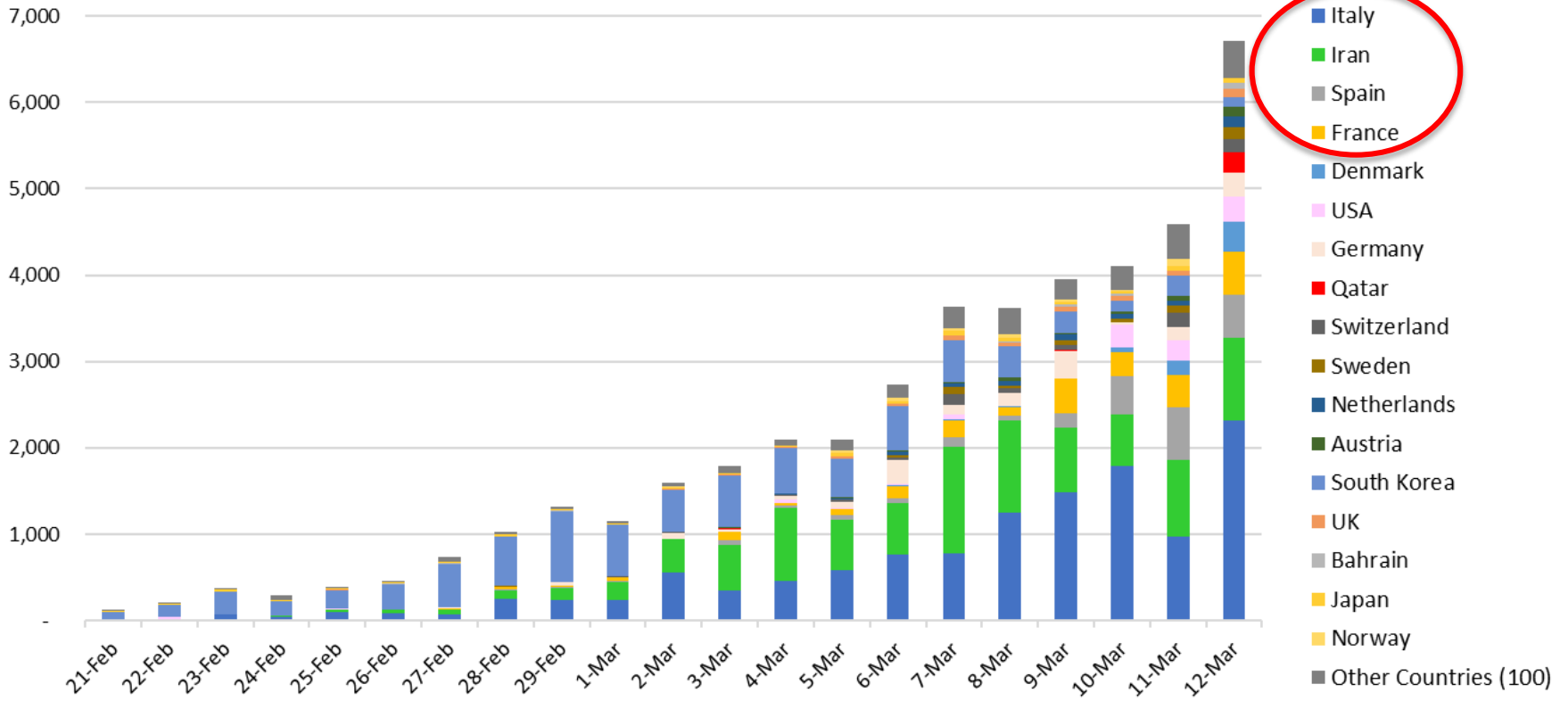
### OUTSIDE CHINA CORONAVIRUS STATUS (3/5)



### OUTSIDE CHINA CORONAVIRUS STATUS (3/12)

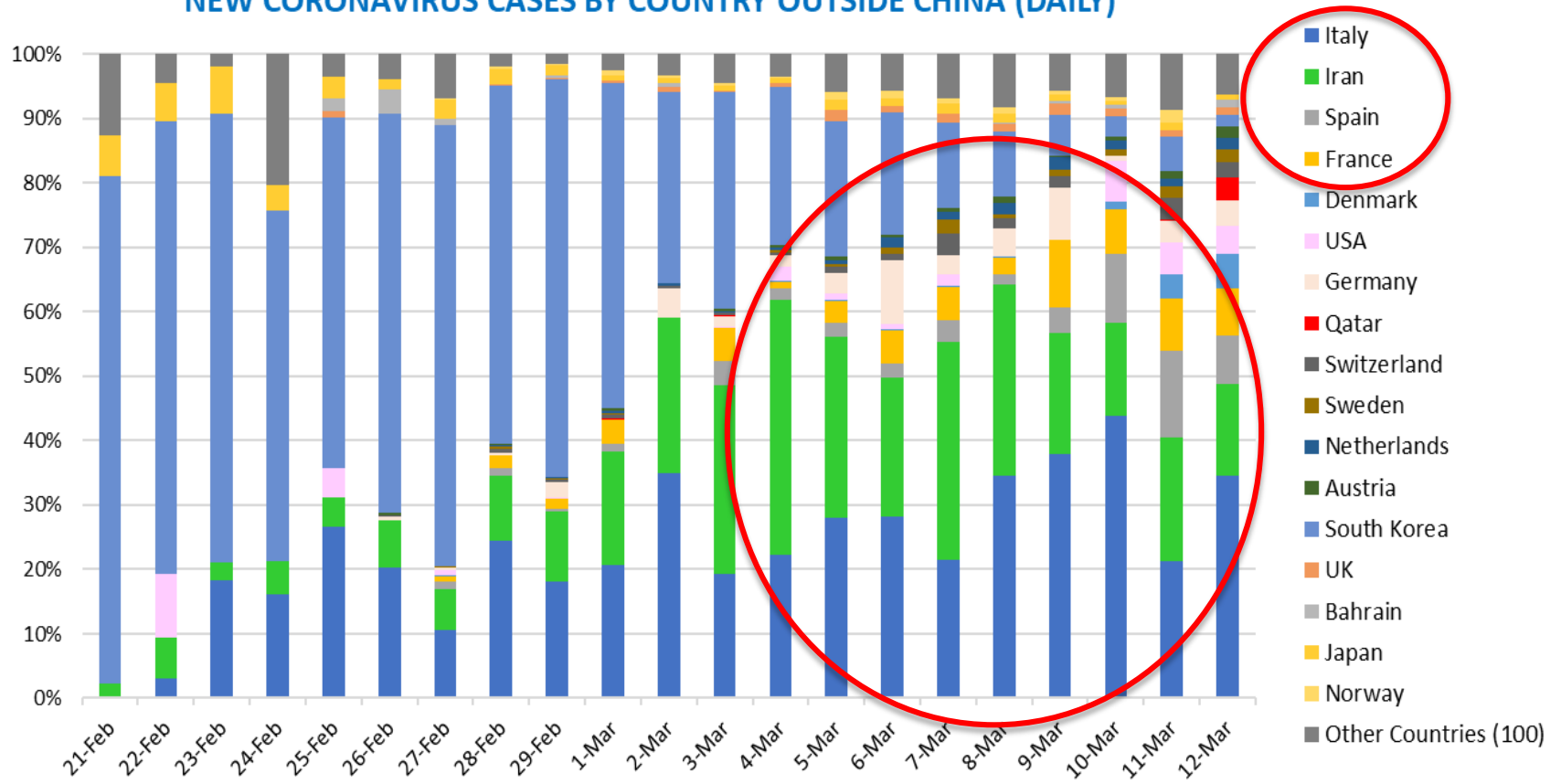


## NEW CORONAVIRUS CASES BY COUNTRY OUTSIDE CHINA (DAILY)



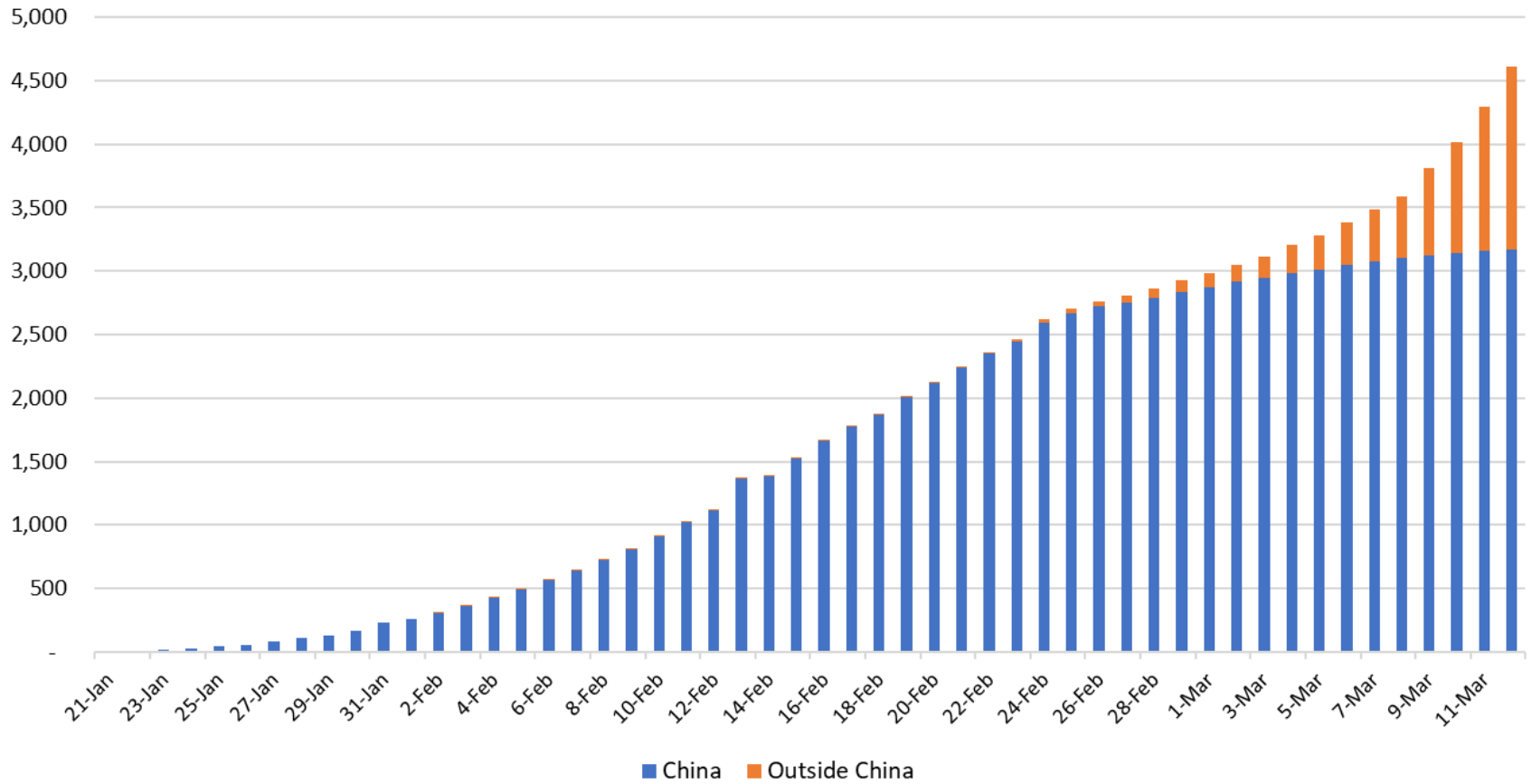
Source: WHO

## NEW CORONAVIRUS CASES BY COUNTRY OUTSIDE CHINA (DAILY)

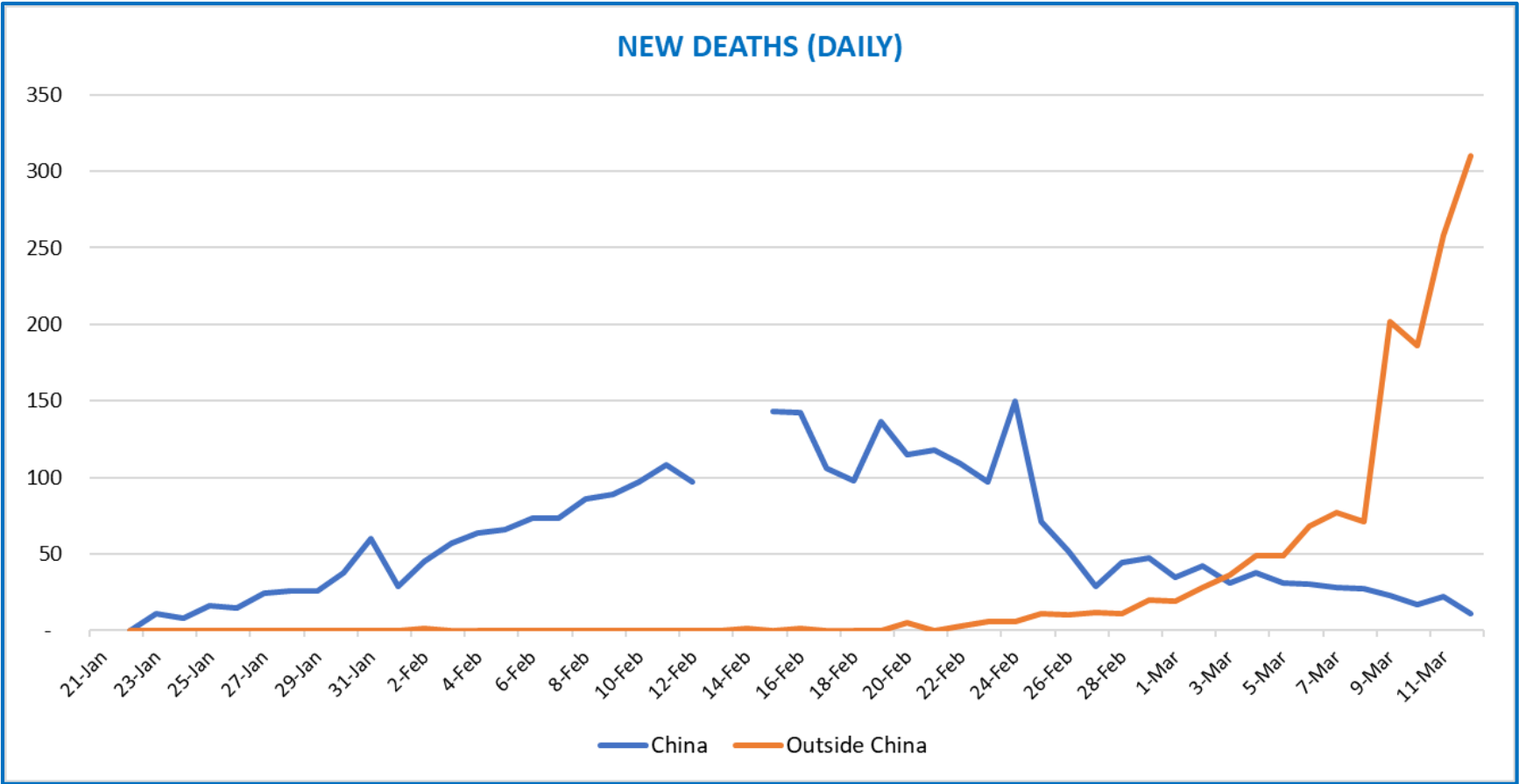


Source: WHO

## DEATHS DUE TO CORONAVIRUS

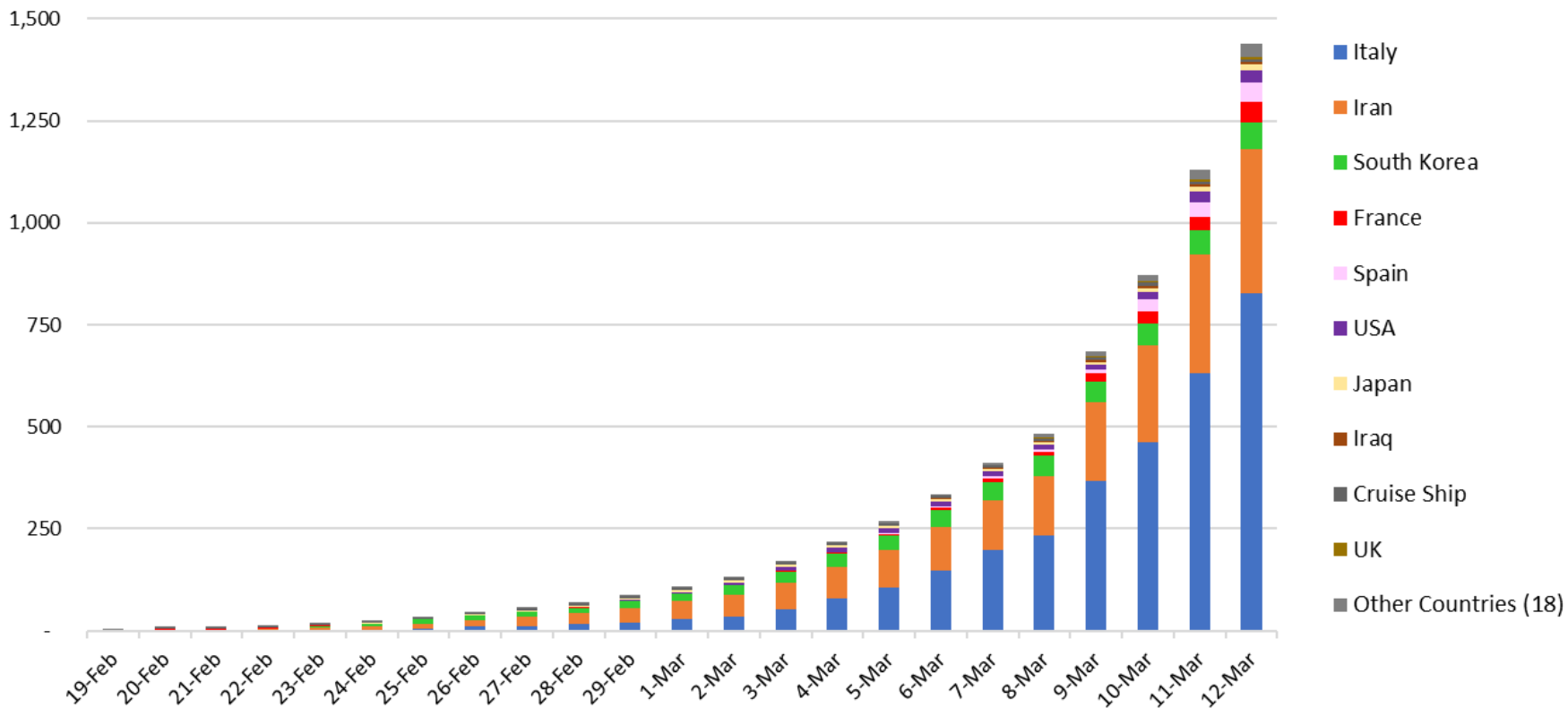


Source: WHO



Source: WHO

## DEATHS BY COUNTRY OUTSIDE CHINA



Source: WHO

# Placing Viruses in Perspective

VIRUS	YEAR IDENTIFIED	CASES	DEATHS	FATALITY RATE	NUMBER OF COUNTRIES
Marberg	1967	466	373	80.0%	11
Ebola	1976	33,577	13,562	40.4%	9
Hendra	1994	7	4	57.1%	1
H5N1 Bird Flu	1997	861	455	52.8%	18
Nipah	1998	513	398	77.6%	2
SARS	2002	8,096	774	9.6%	29
H1N1*	2009	1,632,258	284,500	17.4%	214
MERS	2012	2,494	858	34.4%	28
H2N9 Bird Flu	2013	1,568	616	39.3%	3
COVID-19**	2020	125,048	4,613	3.7%	117

\* *Between 2009 and 2010;* \*\* *As of March 12, 2020*

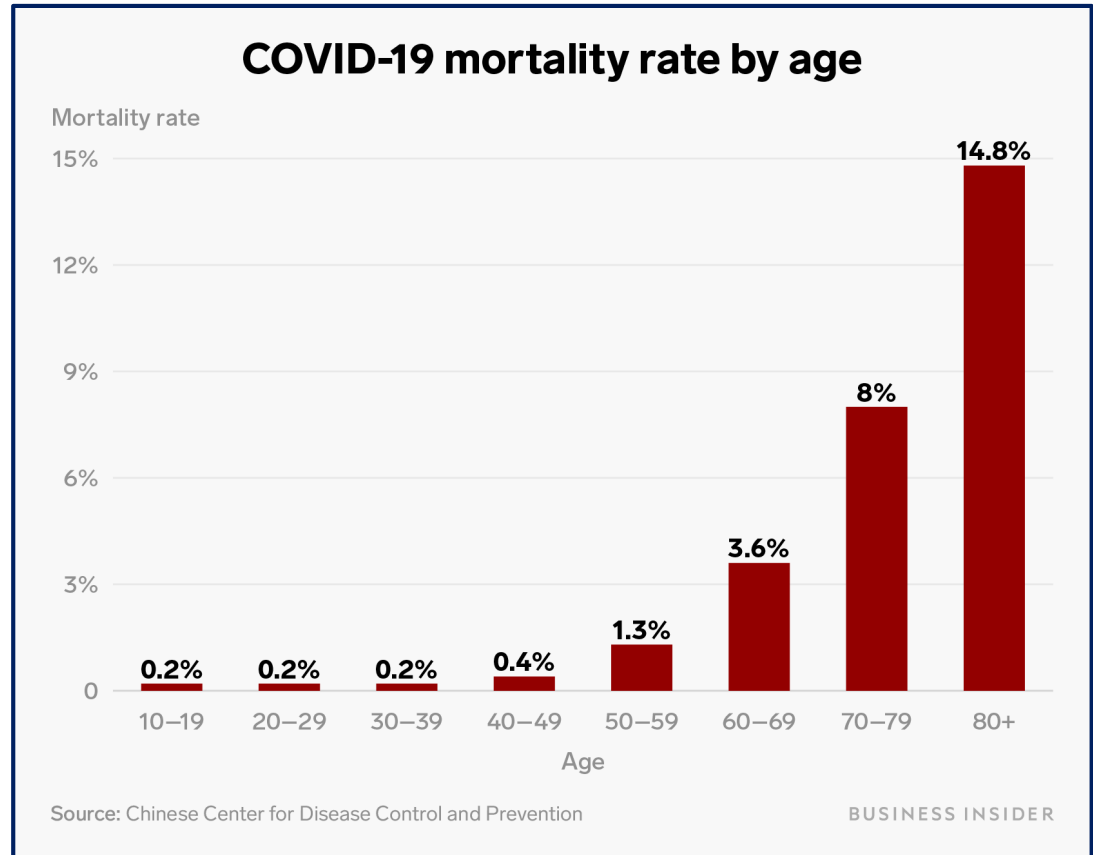
Sources: CDC; UN; World Health Organization; New England Journal of Medicine; Malaysian Journal of Pathology; CGTN; The Lancet

In 2020 alone, so far there have been 18,000 deaths and 32 million infected with the flu in the United States.

*Source: CDC*

# Risk Factors

- Location of Treatment
- Age
- Pre-existing Health Conditions
- Weak Immune Systems

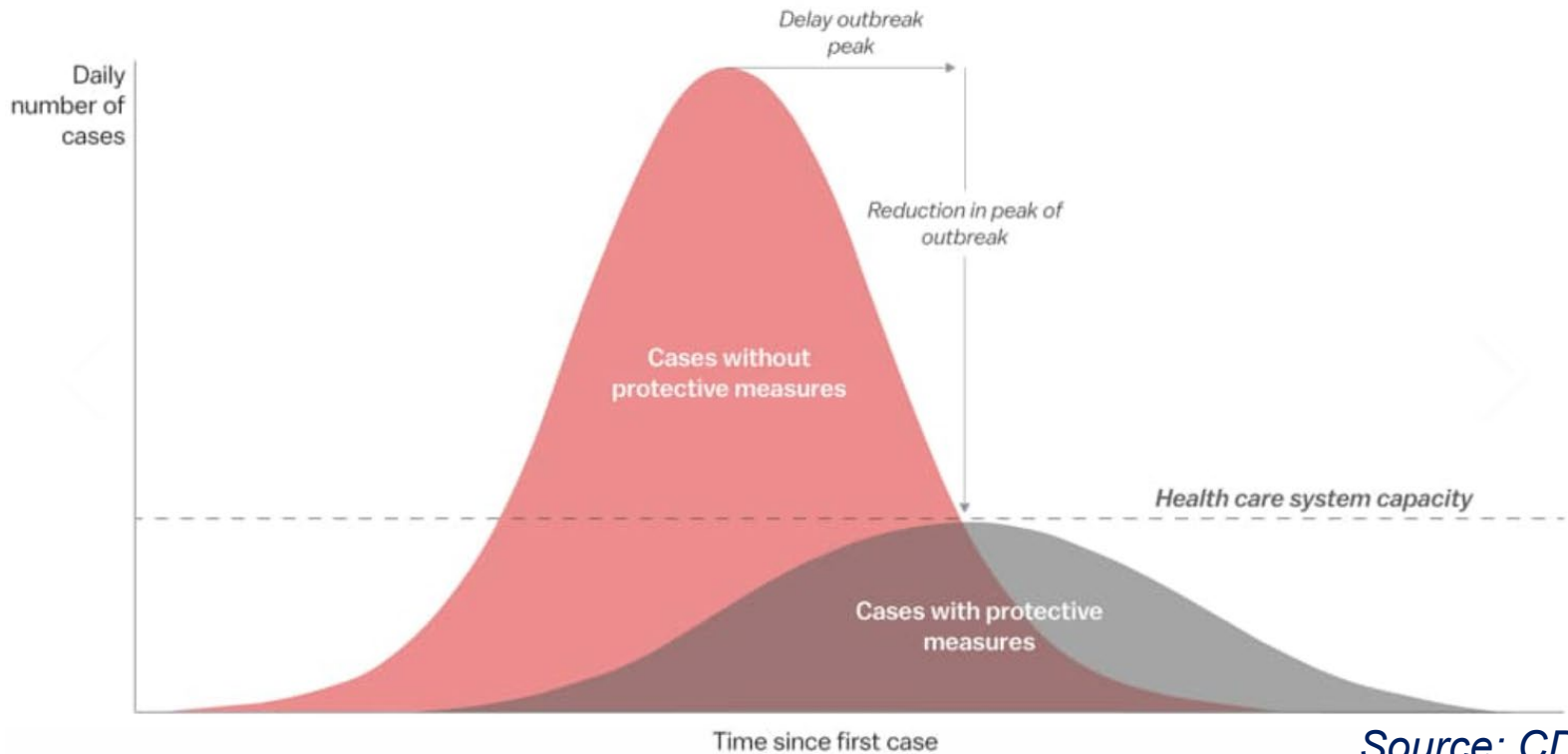






# Mitigation is Now the U.S. Strategy

## Flattening the curve



“A shift from containment to mitigation would be wrong and dangerous.  
**This is a controllable pandemic.**” ~ WHO Situation Report, March 12, 2020

# Setting Expectations

"Most of us are going to get this virus. It's undeniable. You won't find a single expert out there who is saying that this is going to be contained."

"And, the more we learn about it, the more we see that the spread is going to be global and, for the most part, that's OK because the data we know from China shows that roughly 98 to 99 percent of us are going to do very, very, well."

*- Dr. James Philips; George Washington University School of Medicine*

- More testing kits and increased availability of tests will identify a growing number of infected individuals
- How will markets, government officials and company leaders respond? – Perception is Reality



**Coronavirus**

**Economic Impact**

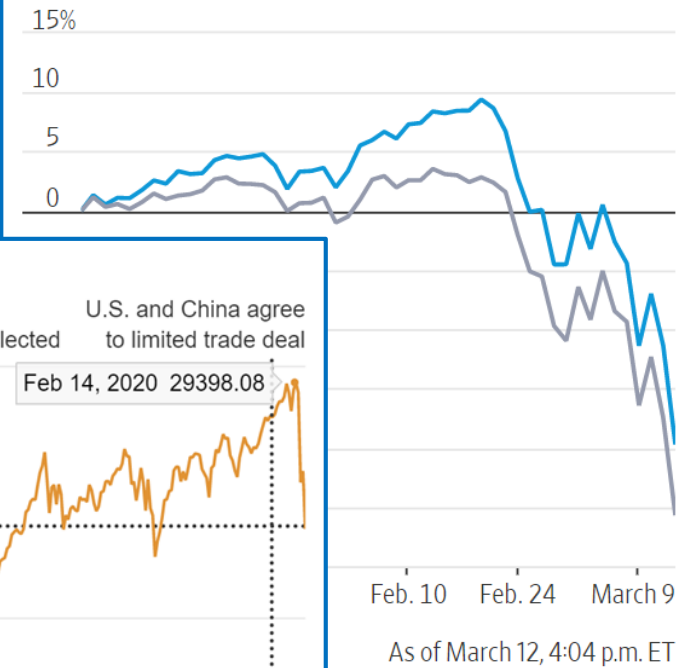
# Bears Maul Wall Street Starting Feb 24

## Mar 12 – Worst Day Since 1987

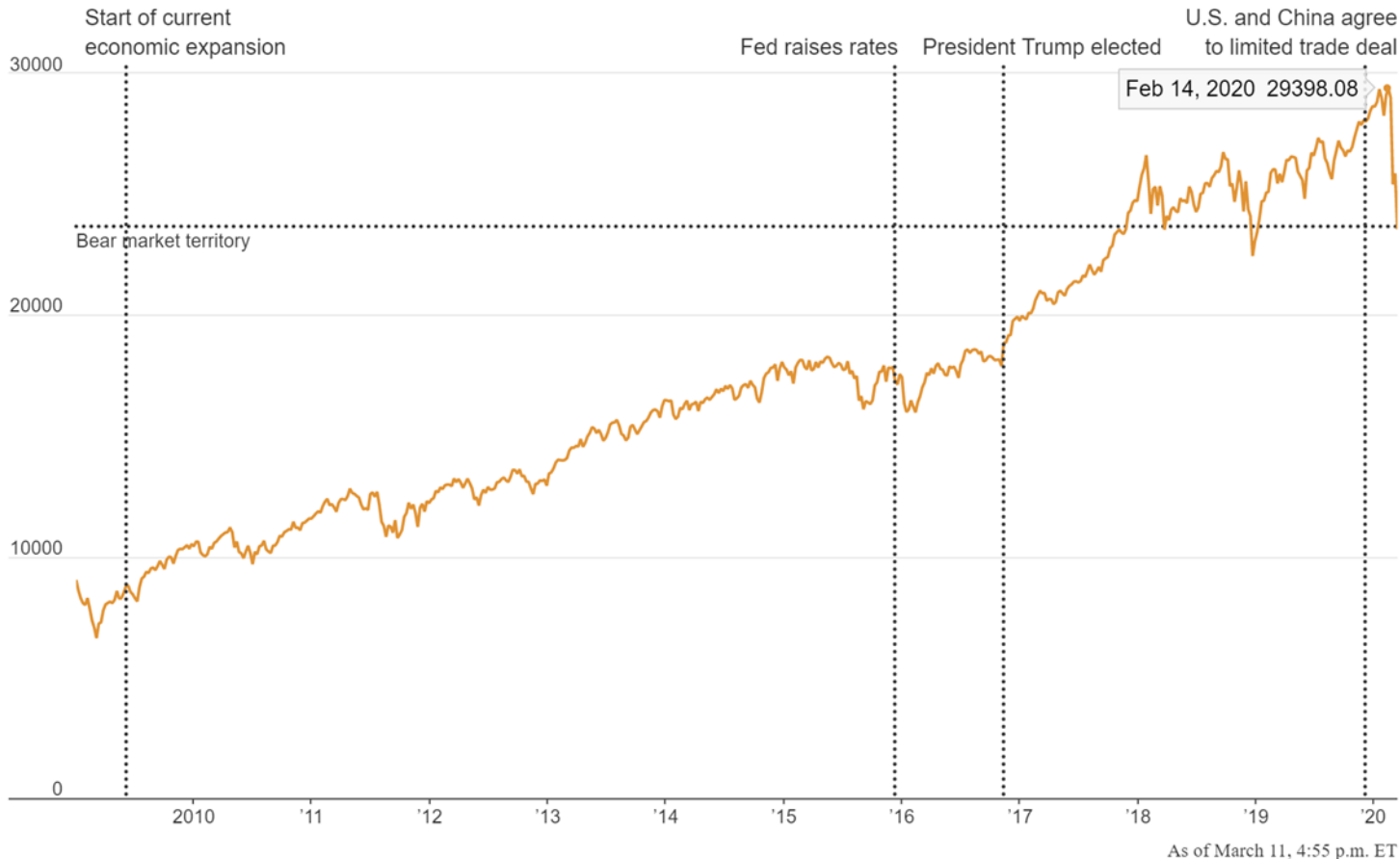
- The definition of FUD
- “Known Knowns, Known Unknowns, Unknown Unknowns”

### 2020 Performance

■ Nasdaq Composite ■ Dow industrials

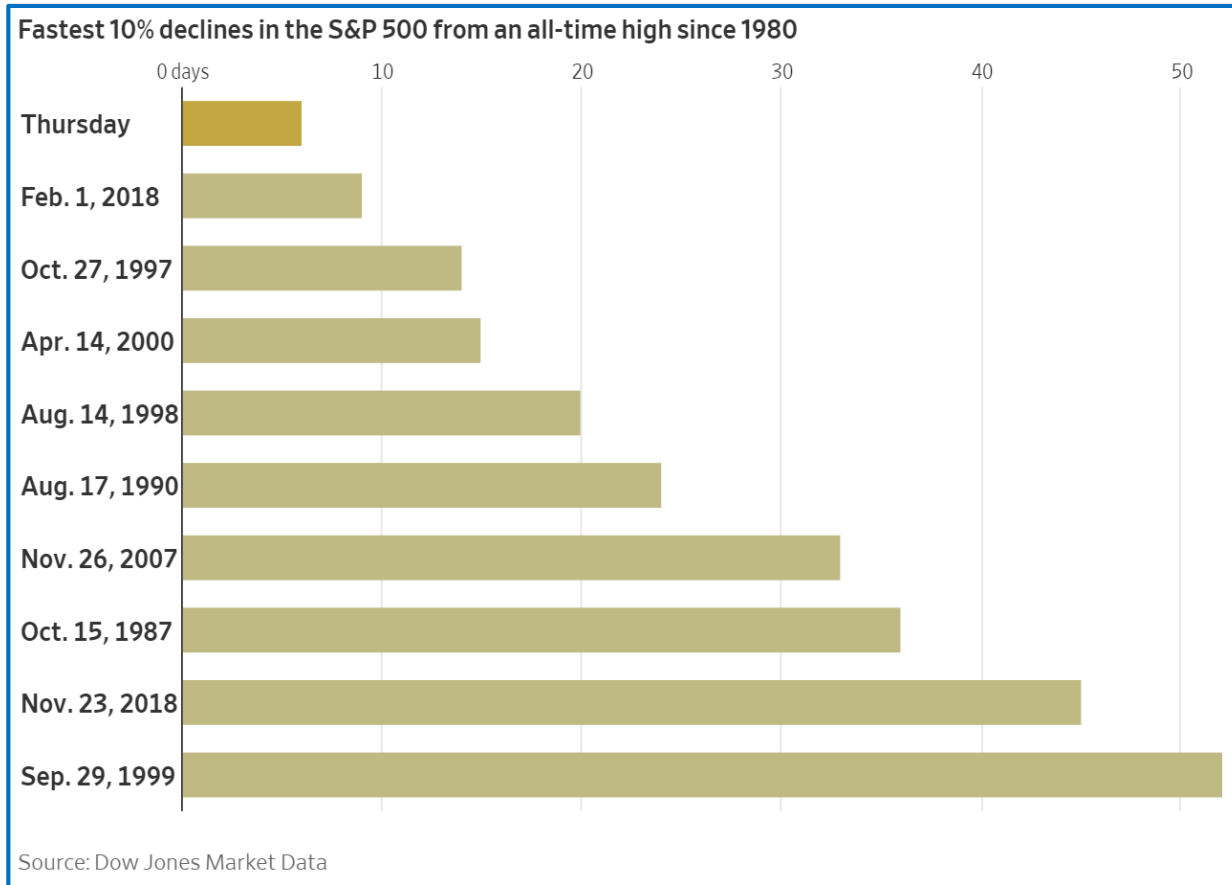


### Dow Jones Industrial Average



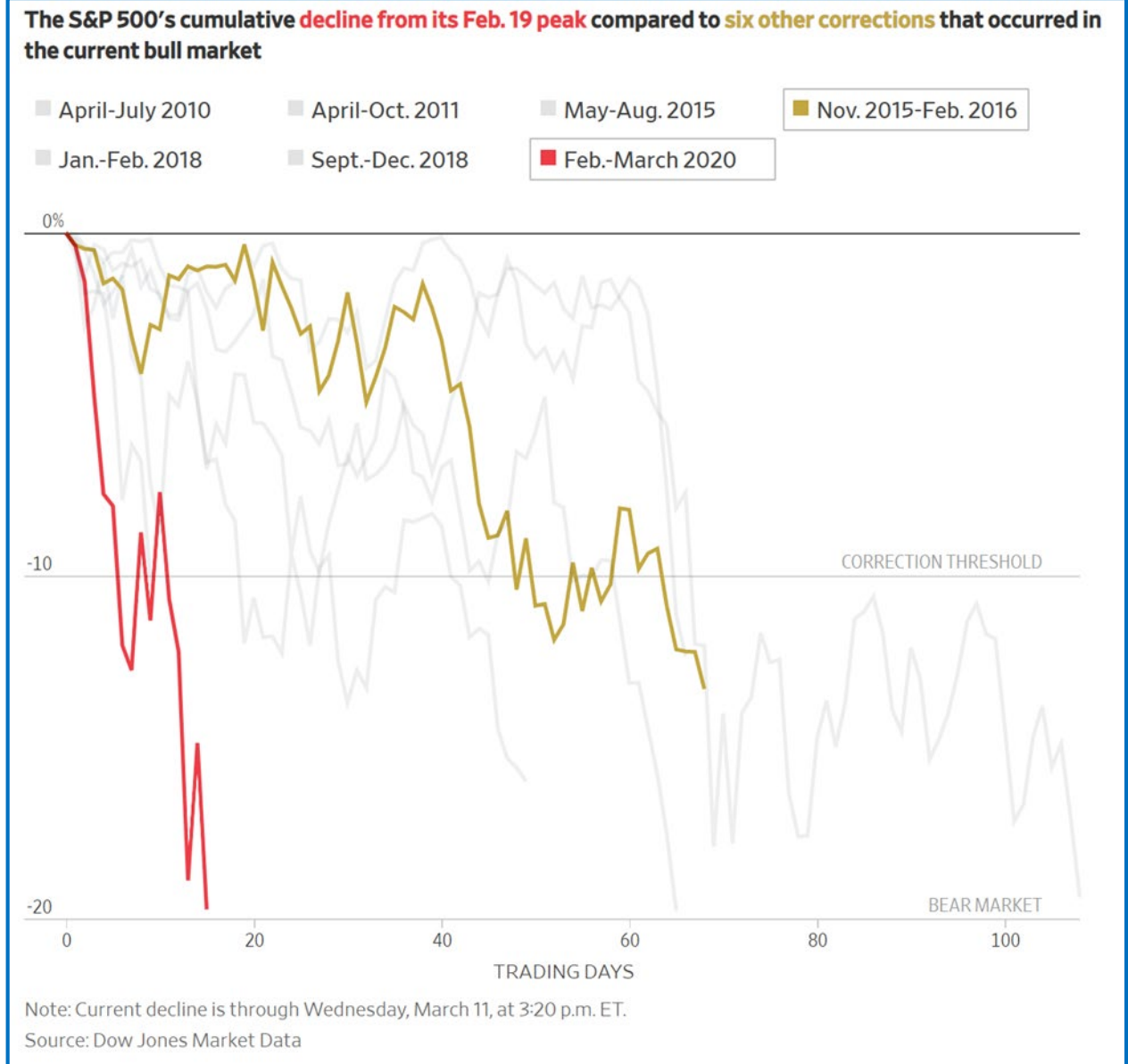
Source: FactSet

# Record Setting Market Correction – Feb 24, 2020

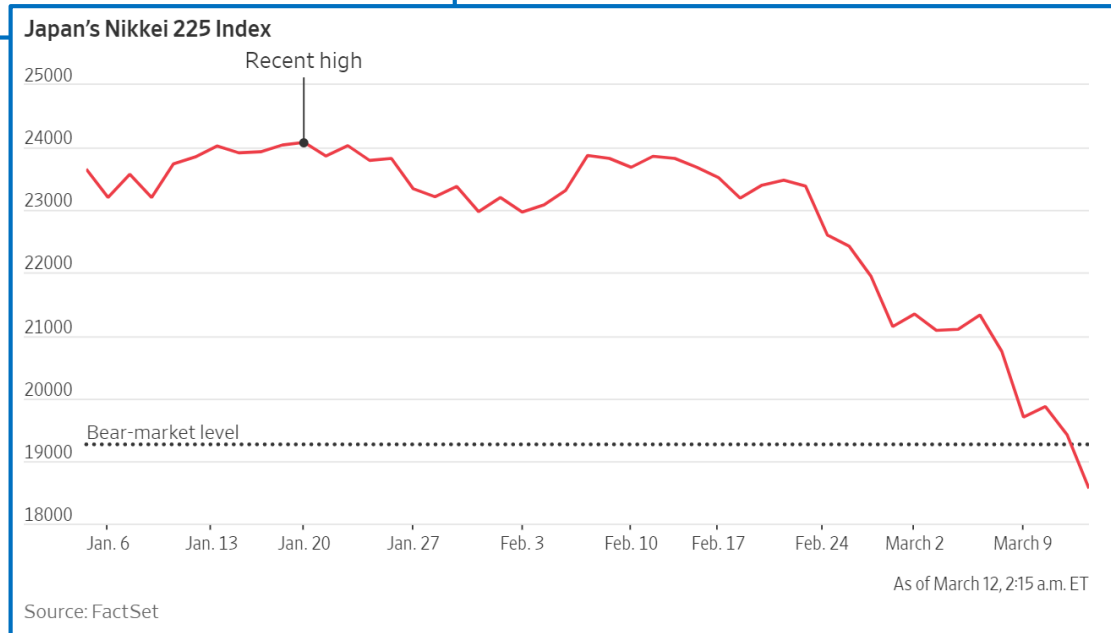
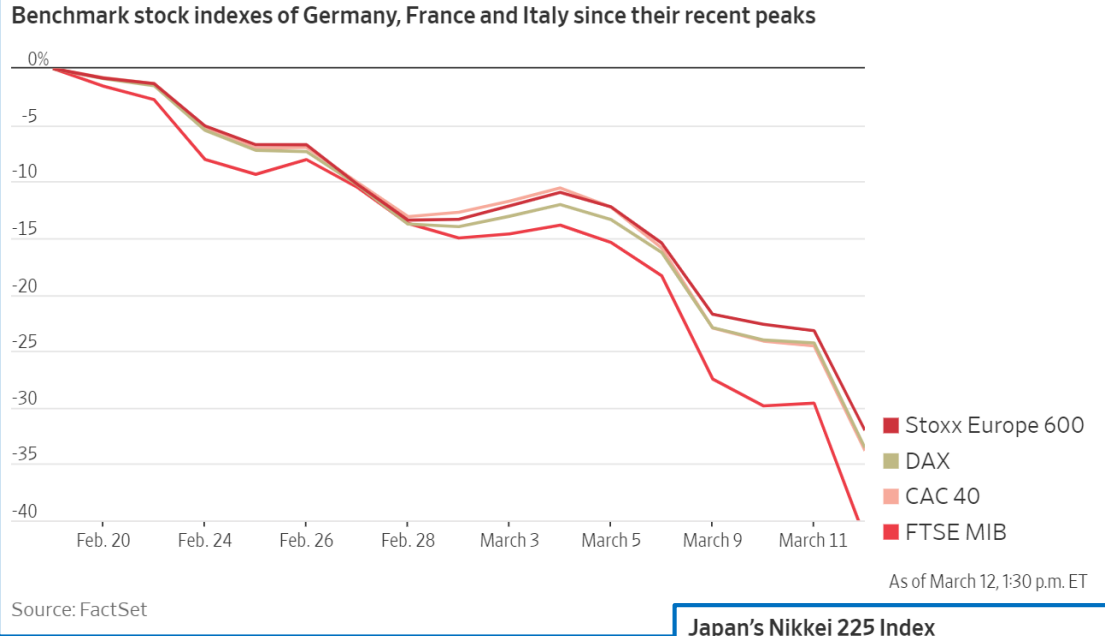


# A Stunning Collapse

The S&P 500's cumulative decline from its Feb. 19 peak through Mar. 11 compared to each of the six corrections that have occurred in the current bull market

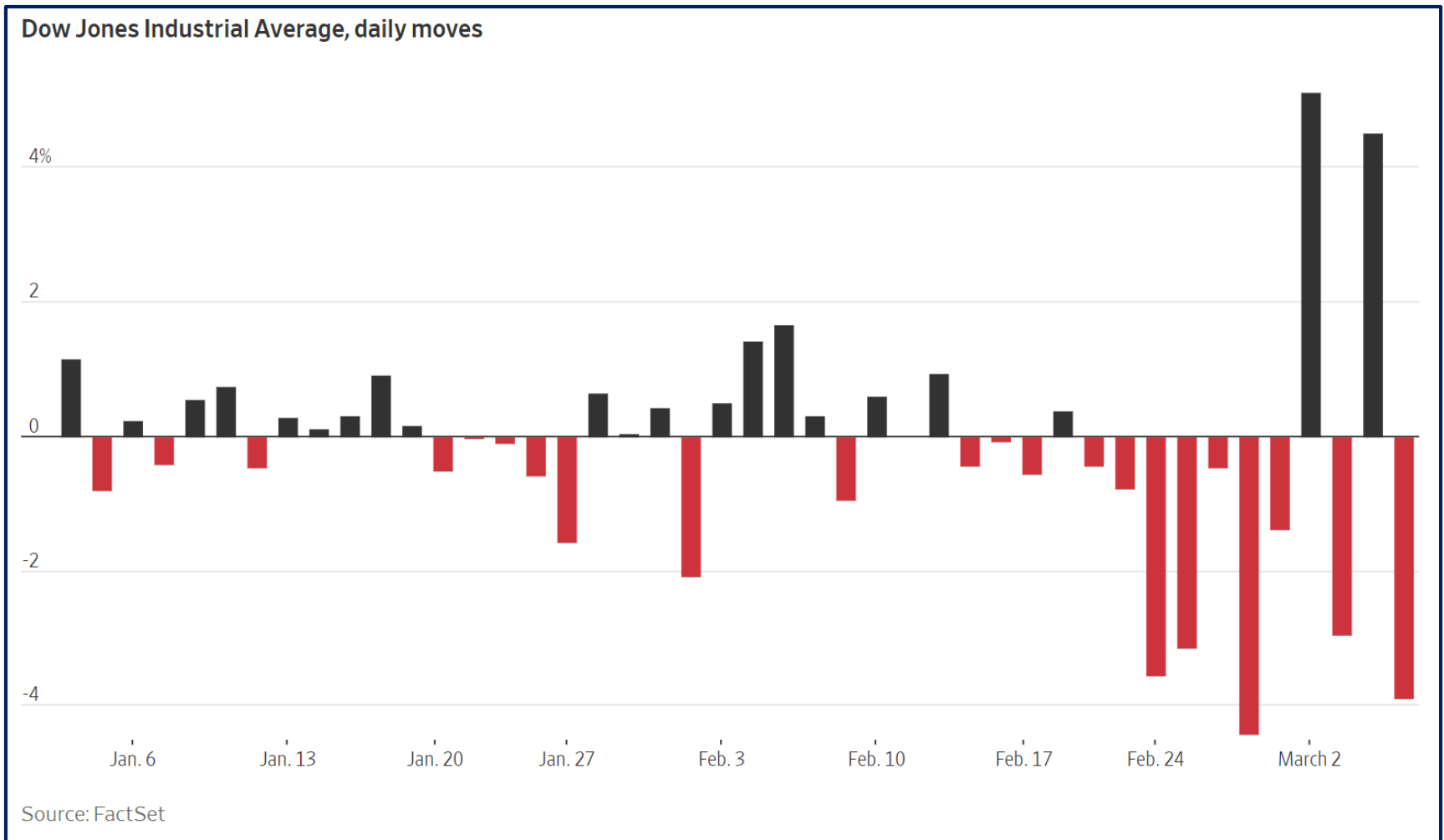


# The Impact is Global

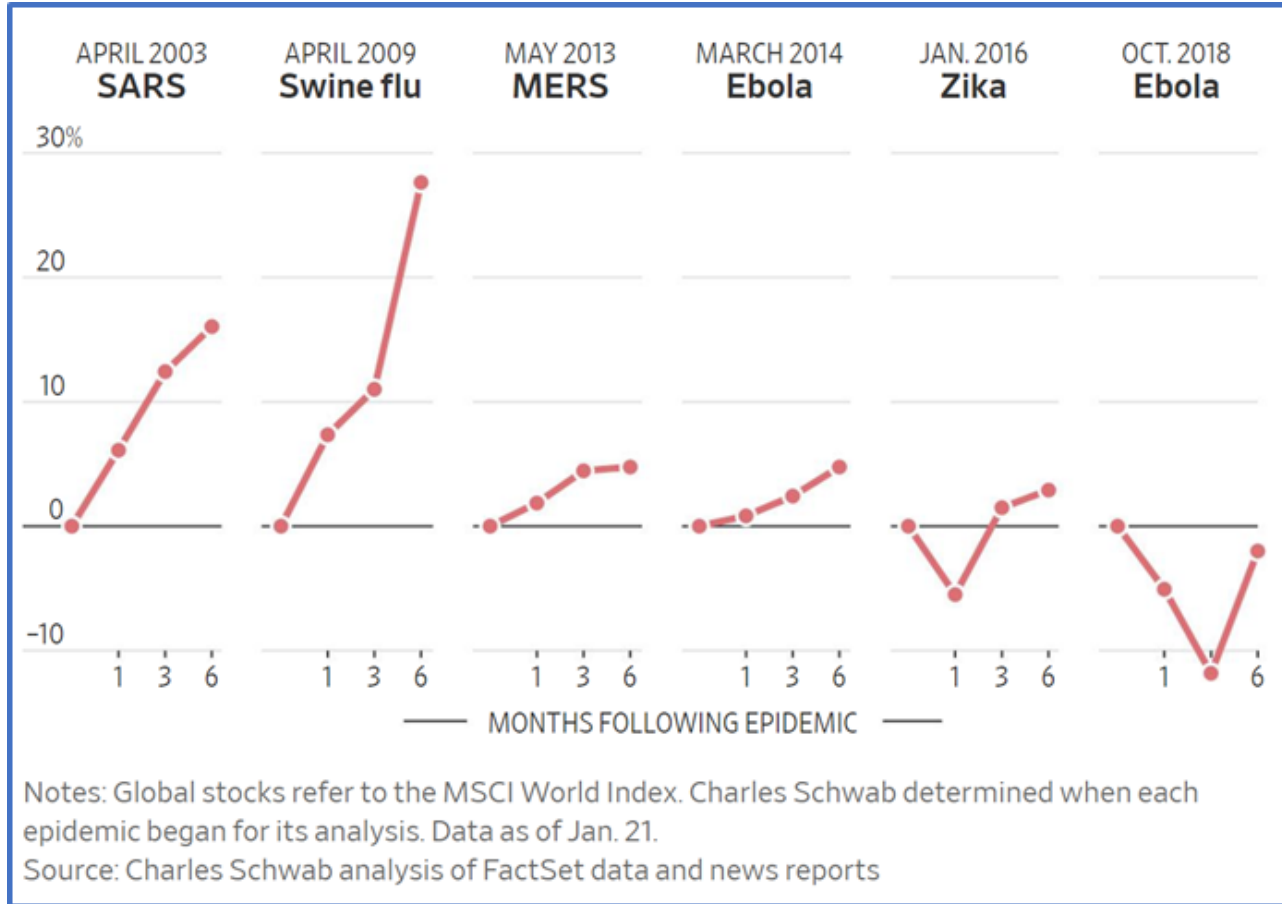




# FUD Drives Volatility

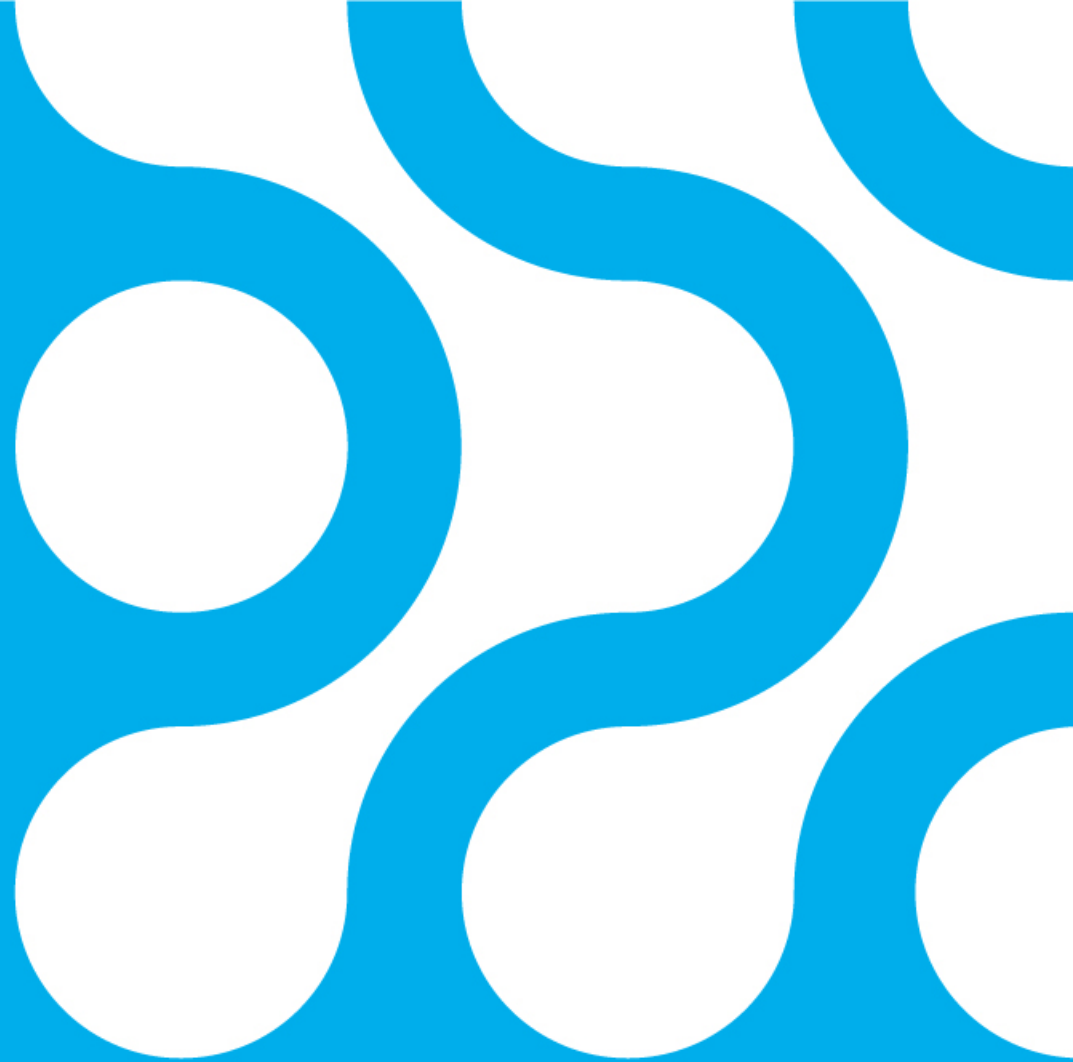


# Global Stock Performance Following Epidemics



# Coronavirus

## Electronic Supply Chain Impact



# The Scope of Electronics Component Manufacturing Impact in China

Electronic Component Mfr Sites in China Impacted	5,057
Electronic Component Mfr Sites Completely Shutdown	43
Electronic Component Suppliers Impacted	3,855

\* According to X2Data, these are the statistics of companies which have been effected due to the virus (as of Feb 18)

- Many impacted sites only operating at 50% to 60% manned capacity
  - Many suppliers only operating on 1 to 2 months cash
  - No banking access – financially viable?
- Supply AND Demand are both impacted
- High volume manufacturers production declines for different reasons
  - Xiaomi, Huawei, etc – Collapse of China demand
  - Apple, Microsoft, etc – Supply limitations
- China production resuming with government support
  - Due to diminishing concerns about health crisis?
  - Or due to government concerns about economy?
- China deployed AI and Big Data to combat virus spread?

# Shipping & Logistics Challenges

- February Air Cargo Down 9% Compared to Year Ago
- Chinese Trucking Still Crippled by Coronavirus; Trucking in China Moves 73% of Its Freight
  - Citywide lockdowns/quarantines are keeping half of China's truck drivers off the roads
  - Trucking in the south is closer to pre-virus levels of activity, operating at 60%
- Chinese Ports Resume Normal Activity
  - Workers moving cargo that was set to be shipped after the Lunar New Year
  - Could be idled again if there are continued supply chain disruptions or reduced demand
  - Canceled containership sailings are also down
- U.S. Ports Expect Activity to Drop
  - Expecting a 20% drop in cargo
  - Expecting recovery after several weeks
  - Over 100 transpacific ships to North America have been canceled between February and April

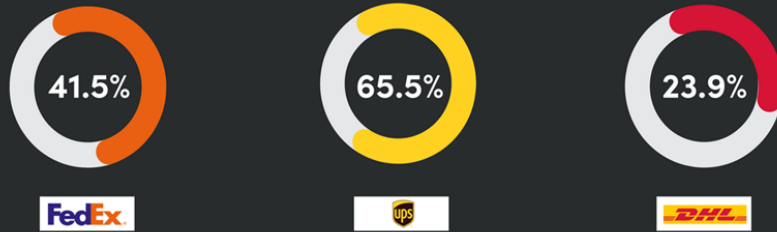
Source: [Thomasnet.com](https://www.thomasnet.com)



# Shipping & Logistics Challenges

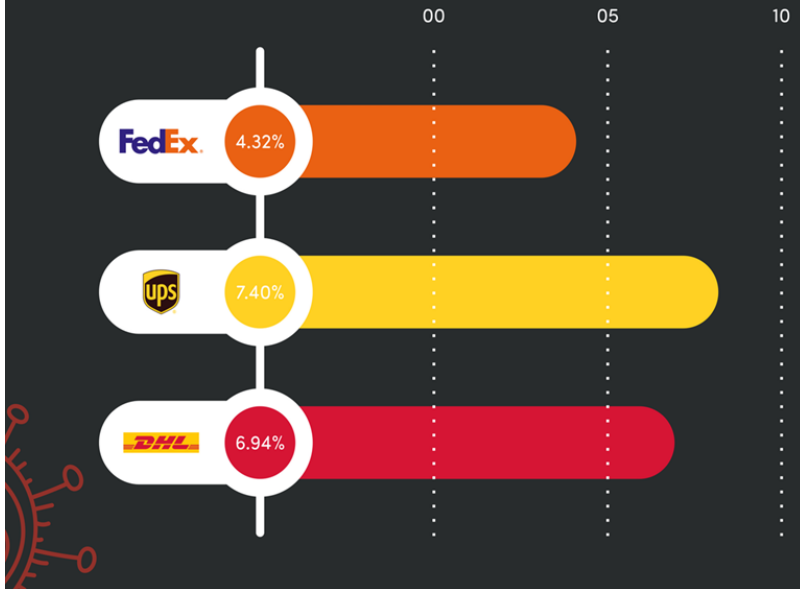
## Slump in international shipping volume

Percentage decrease in small parcel volume post Coronavirus outbreak across FedEx, UPS and DHL



## Increase in international delivery delays

Percentage increase in late deliveries due to Coronavirus outbreak across FedEx, UPS and DHL

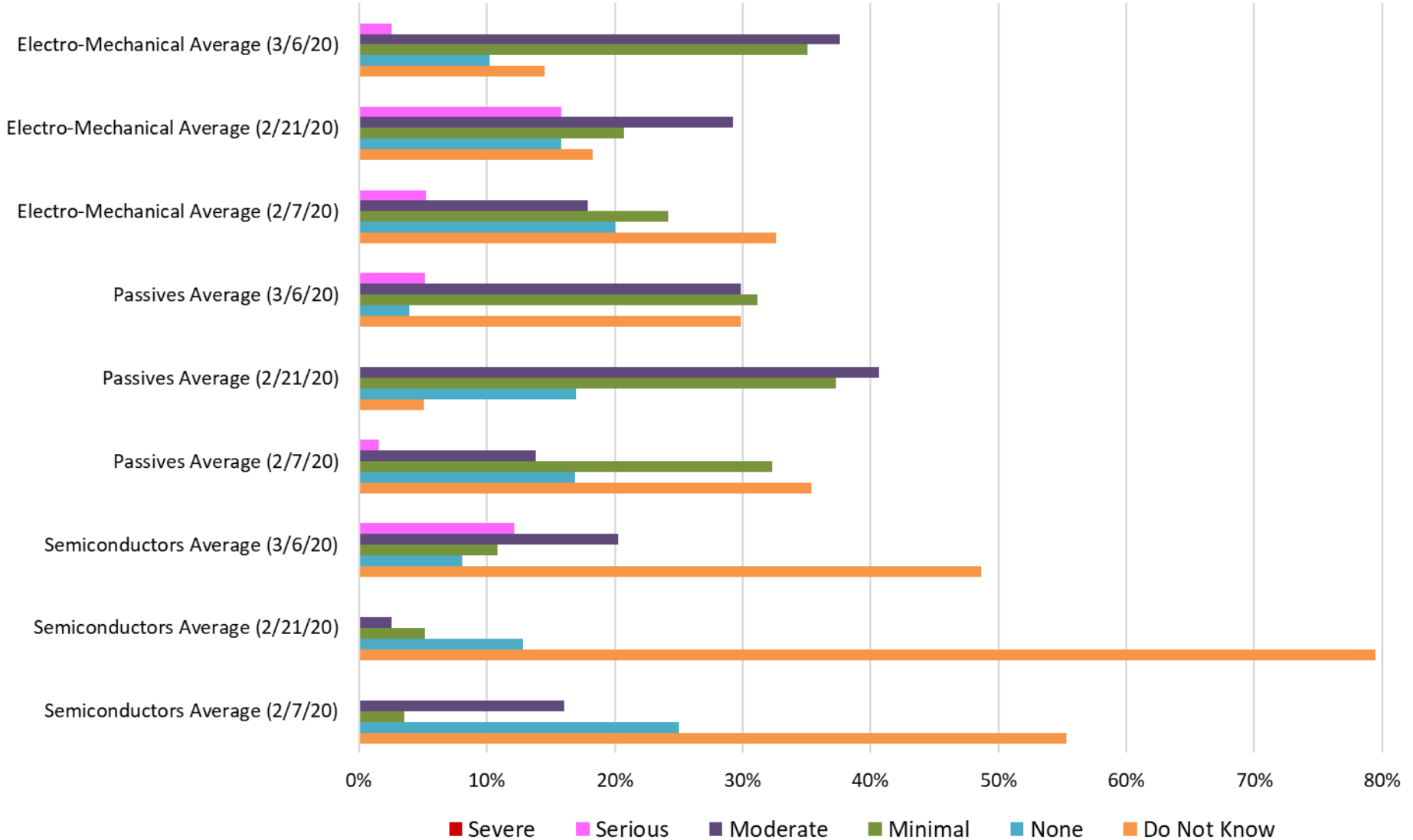


## Retail industries impacted the most due to Coronavirus

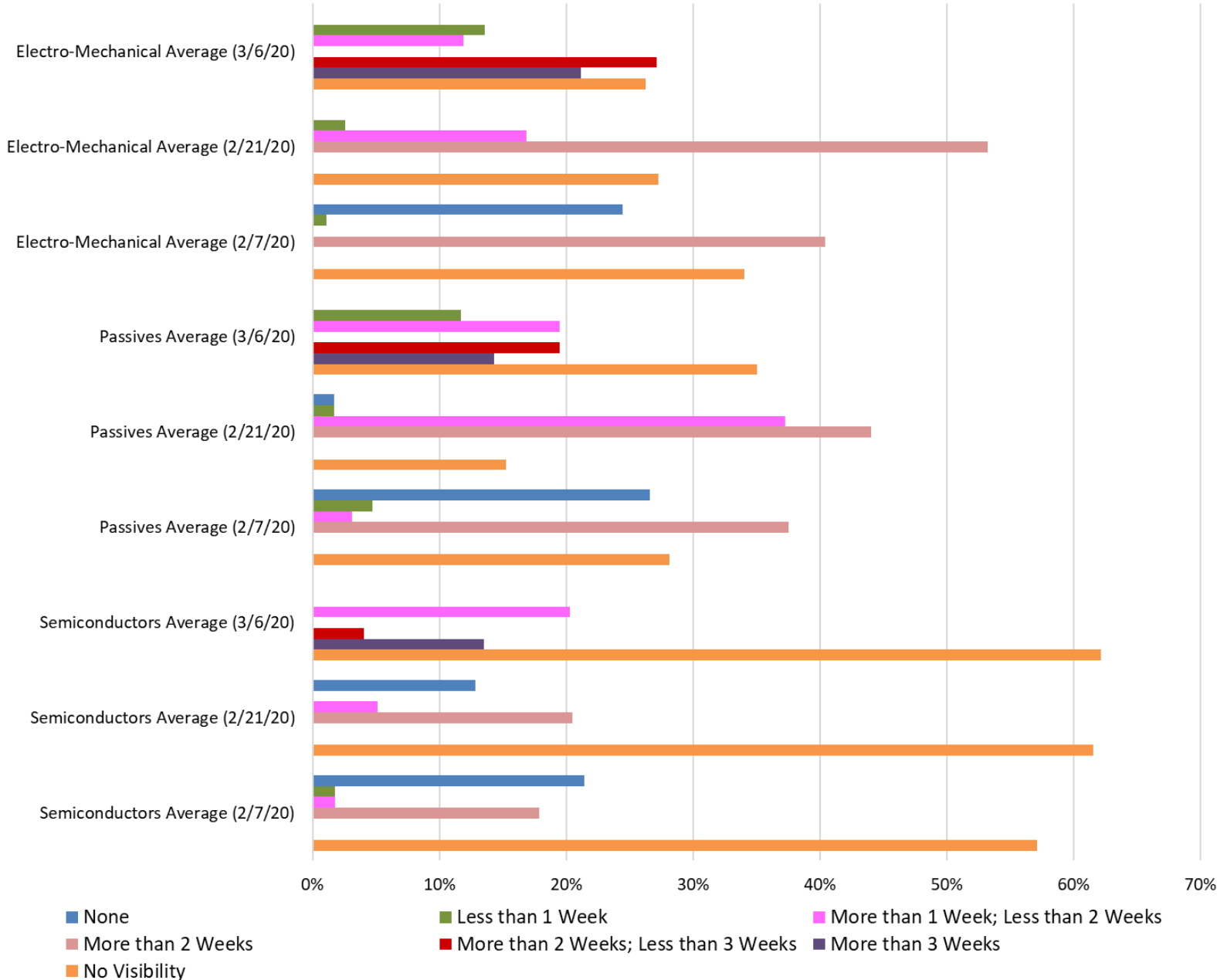
- Auto Parts
- Aviation Parts
- Electronic goods
- Apparel
- Healthcare
- Hardware

Source: [AuditShipment.com](https://www.auditshipment.com)

# What is the impact level of the Coronavirus on your company's ability to supply your customers on time? - CATEGORY AVERAGE



# How much will the loss of supply in your markets due to Coronavirus increase overall lead times (not just for your company)? - CATEGORY AVERAGE



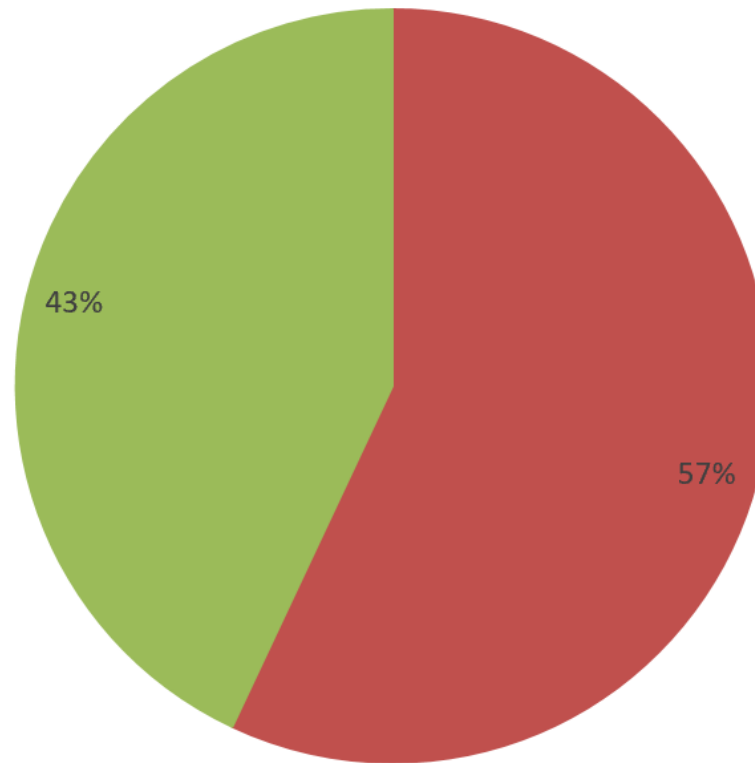


The latest ECIA survey on the Coronavirus/  
COVID-19 impact on the electronic  
components supply chain starts today

Please Support This Survey!!

# Have you seen any additional negative impact to component demand and/or production due to the COVID-19 over the last 2 weeks?

Survey Date: March 5-8 Respondents: ~4000 Location: Worldwide/China focus (~85% China) Who: Active Electronics Industry Professionals

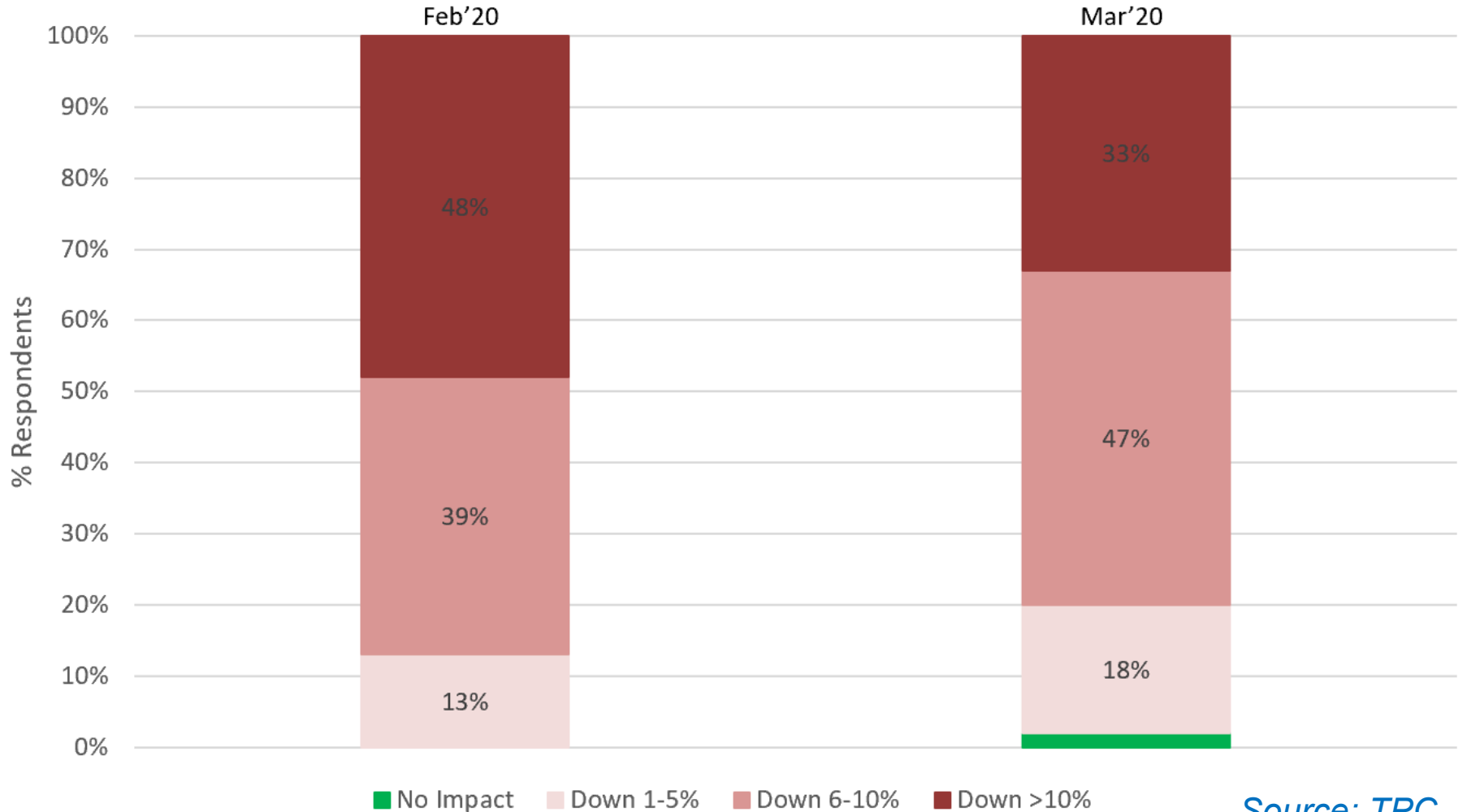


■ Yes ■ No

Source: TPC

# What % do you think this will impact C1Q's electronics production vs. previous plans?

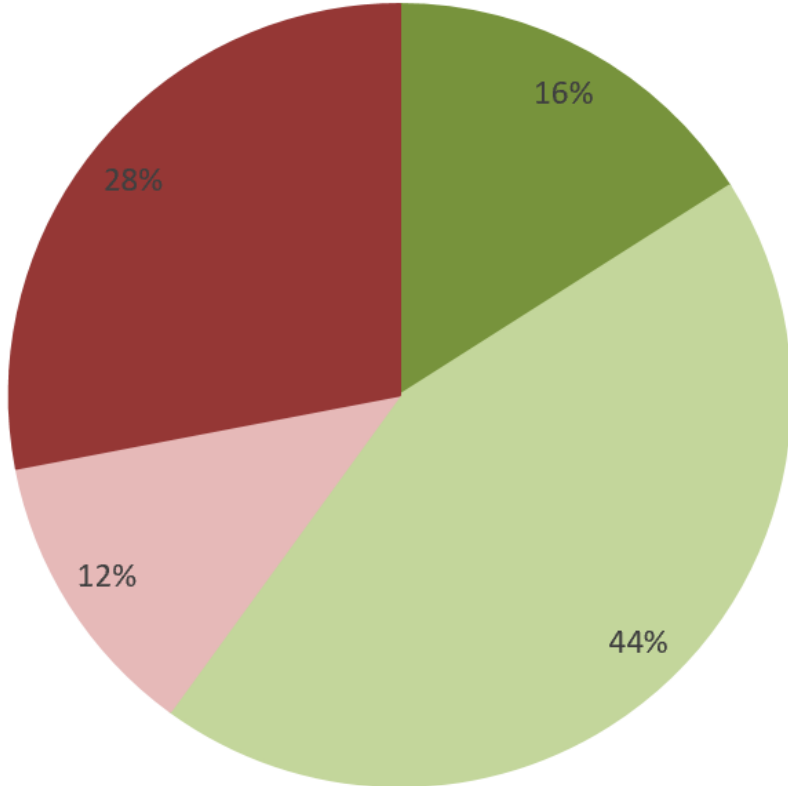
Survey Date: March 5-8 Respondents: ~4000 Location: Worldwide/China focus (~85% China) Who: Active Electronics Industry Professionals



Source: TPC

# When do you think this shortfall in production delta will be made up?

Survey Date: March 5-8   Respondents: ~4000   Location: Worldwide/China focus (~85% China)   Who: Active Electronics Industry Professionals

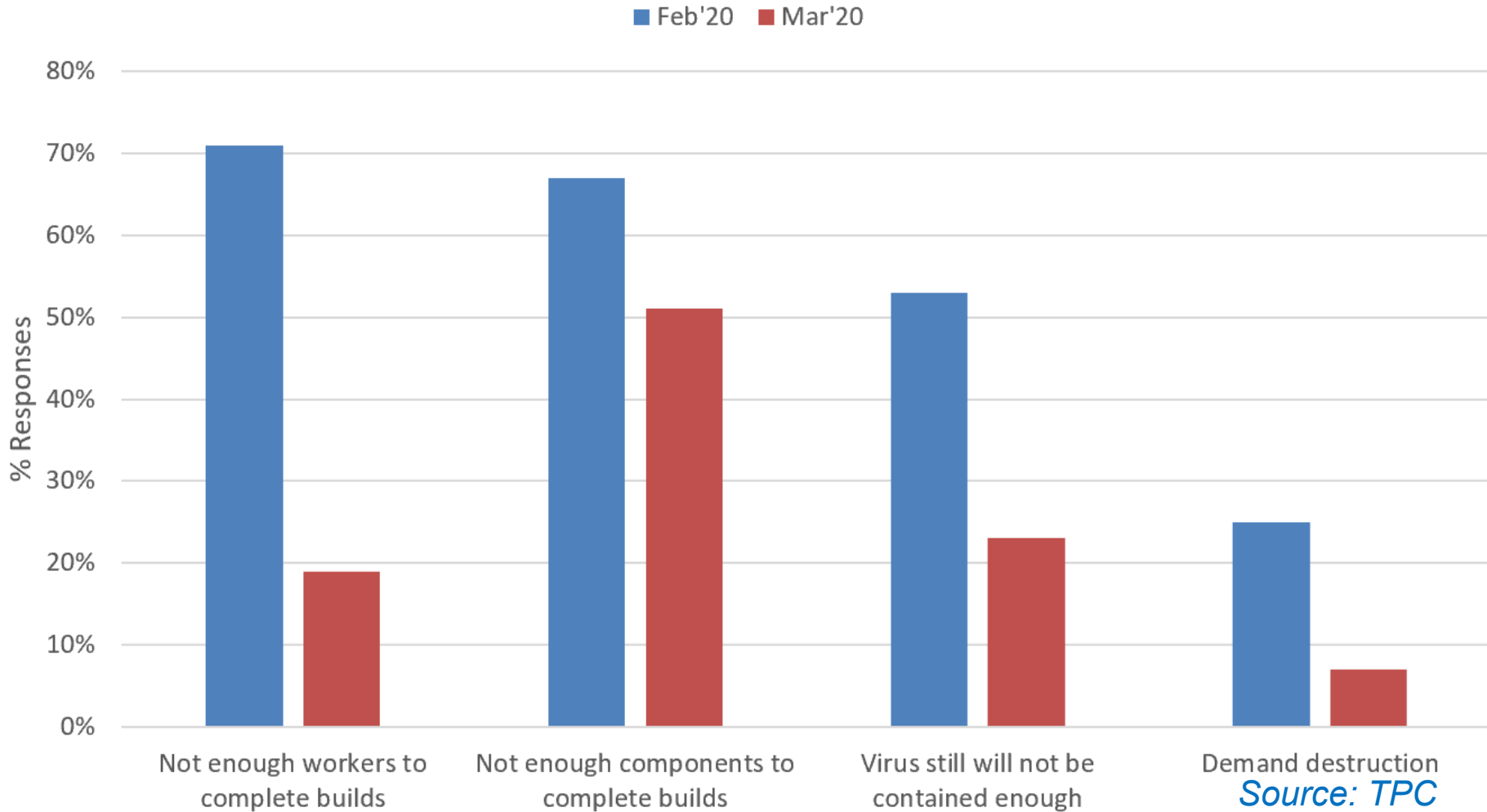


■ C2Q   ■ C3Q   ■ C4Q   ■ Never

Source: TPC

# If production delta will not be recovered in C2Q, why? (multiple answers OK)

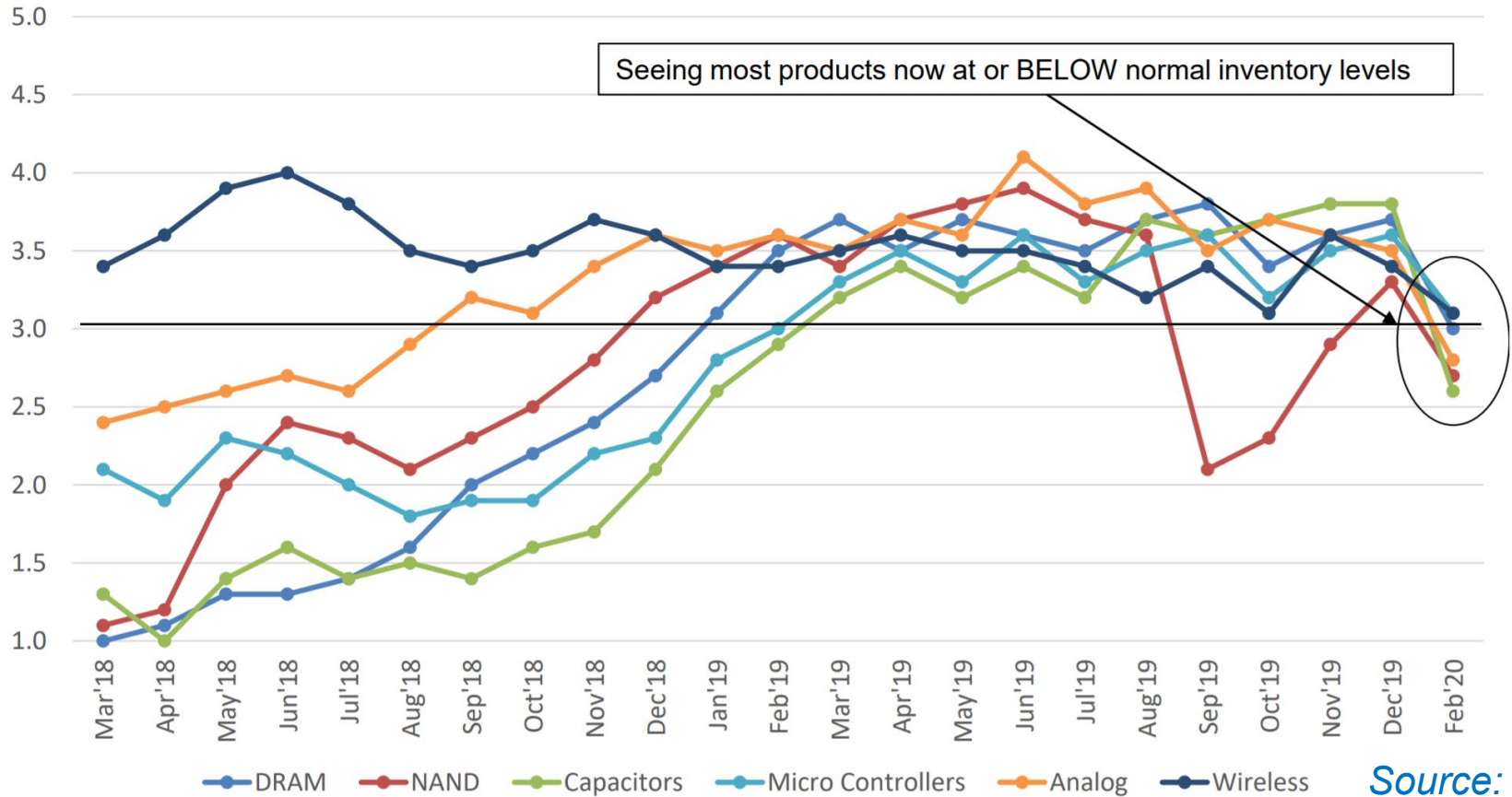
Survey Date: March 5-8 Respondents: ~4000 Location: Worldwide/China focus (~85% China) Who: Active Electronics Industry Professionals



Source: TPC

# Inventory Status

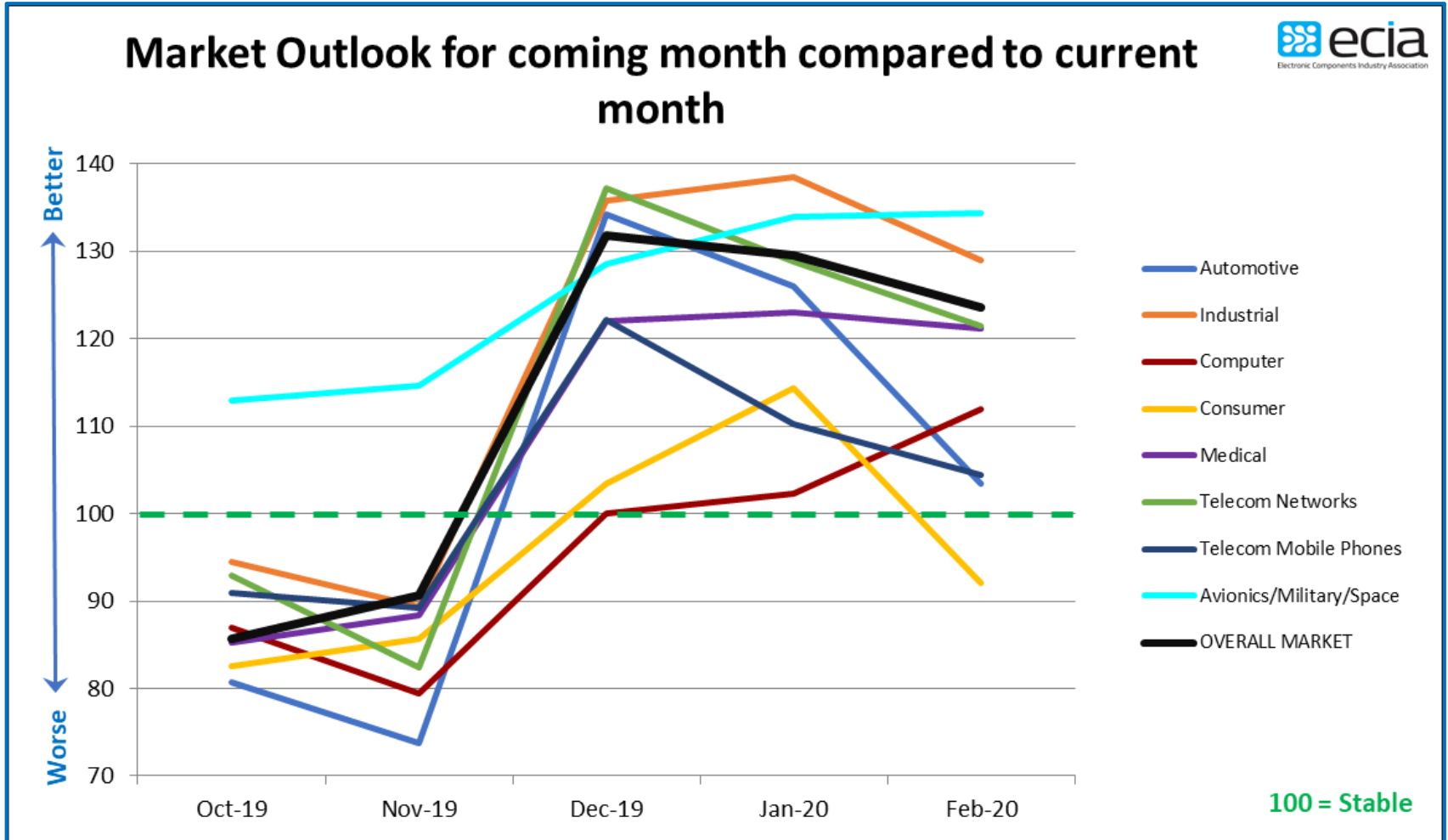
(Using a scale of 1 to 5 with 1 being extremely low inventory, 3 being the normal amount, and 5 being extremely high; how do you view inventory levels for the following products?)



Source: TPC



# North America Sentiment Survey Trends Turning Down



Source: ECIA Electronic Component Sales Trends Survey



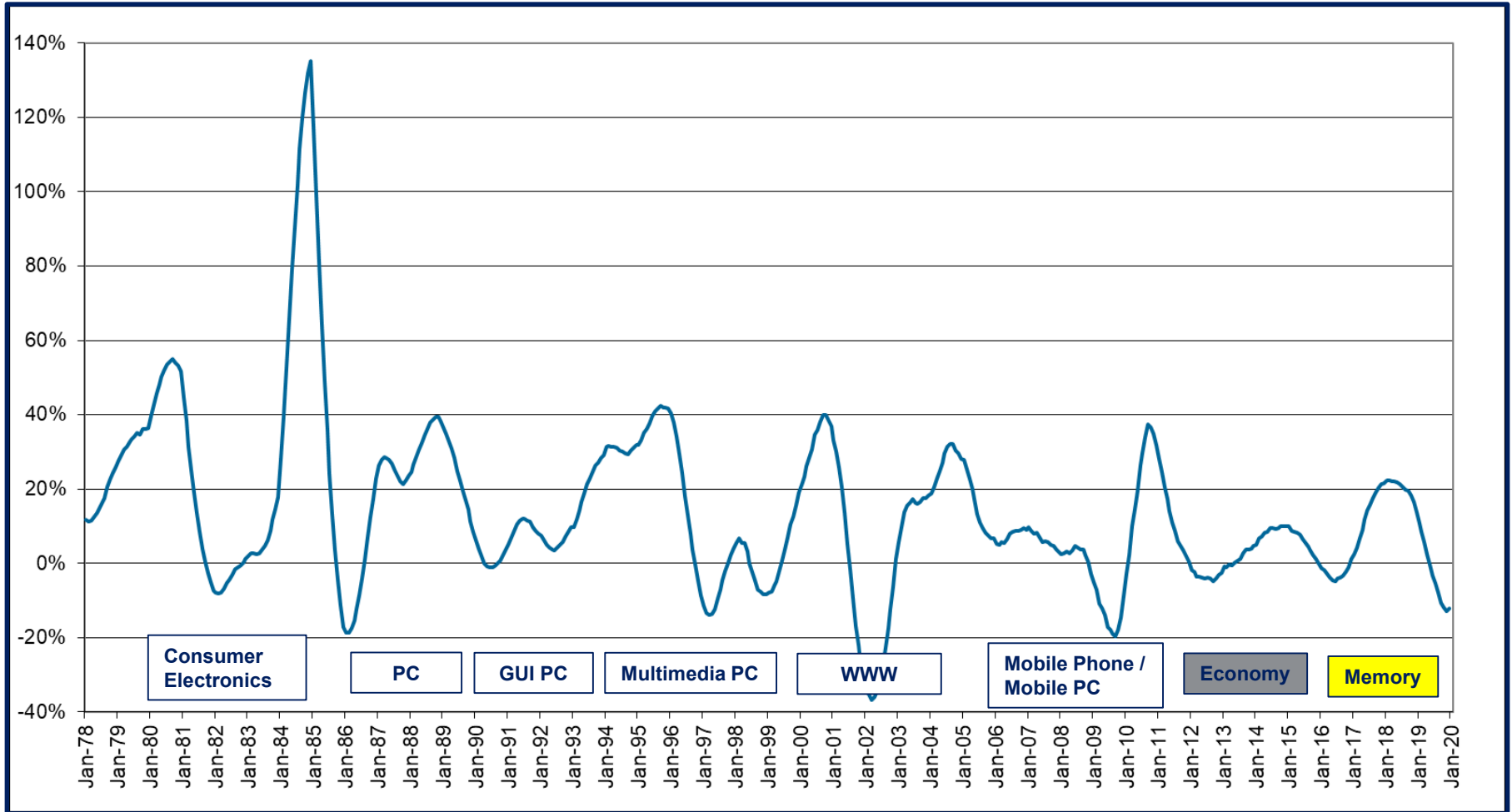
**Global  
Semiconductor  
Sales Trends**

~ March 2020 ~



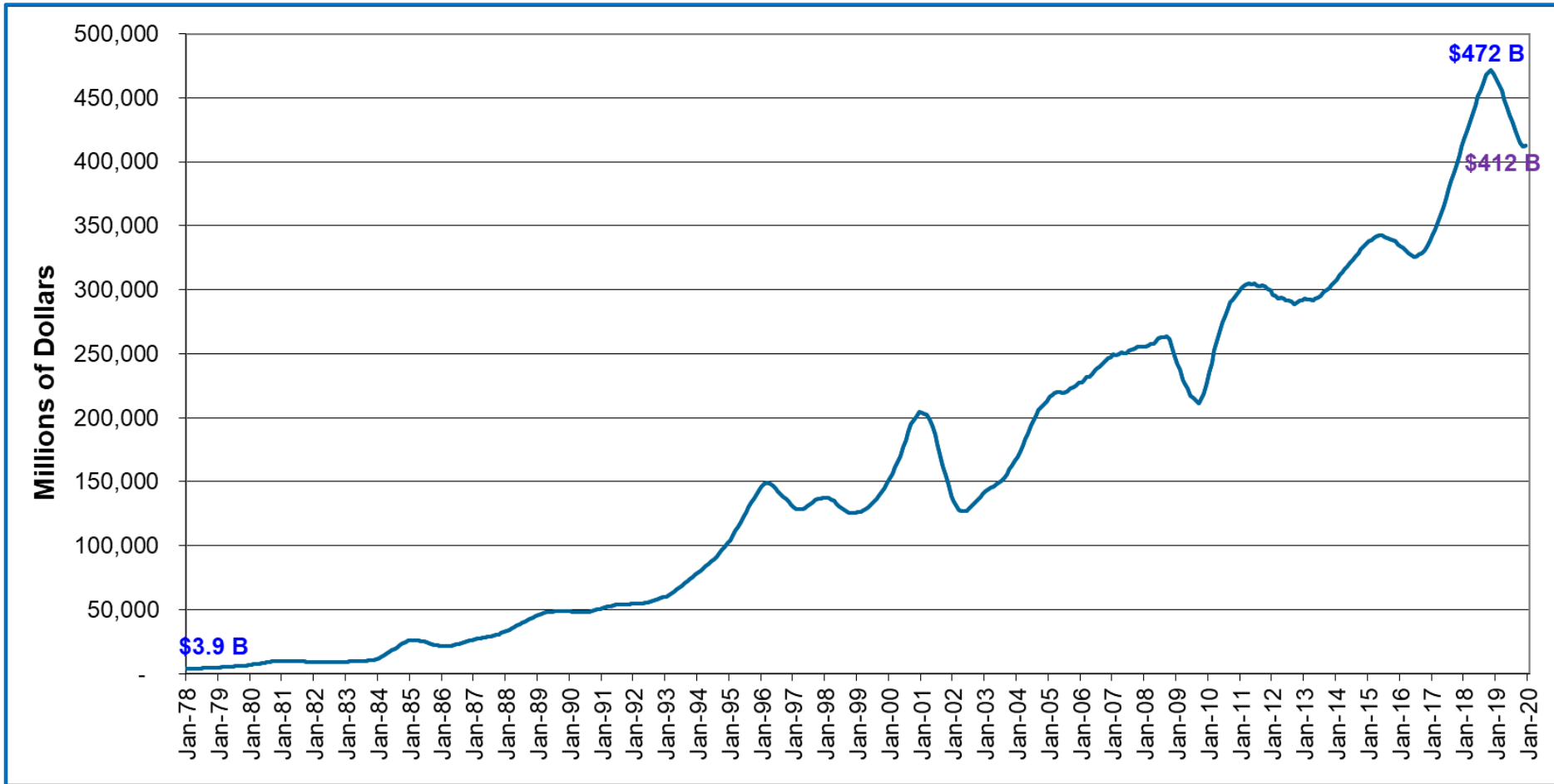
# The Annualized Semiconductor Growth Cycle

40 Years of History



Source - WSTS

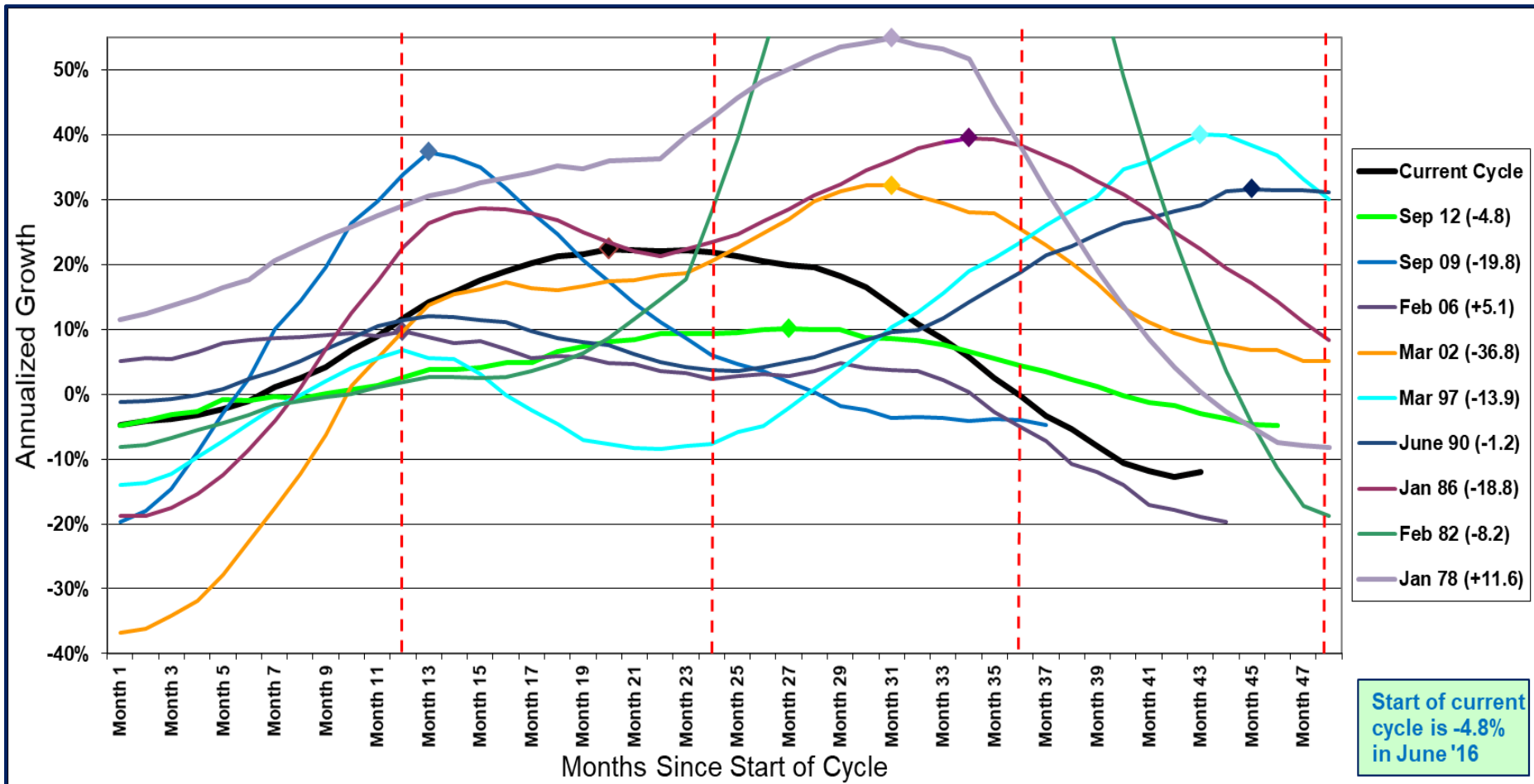
# Long-term Semiconductor Growth Trends



Source - WSTS

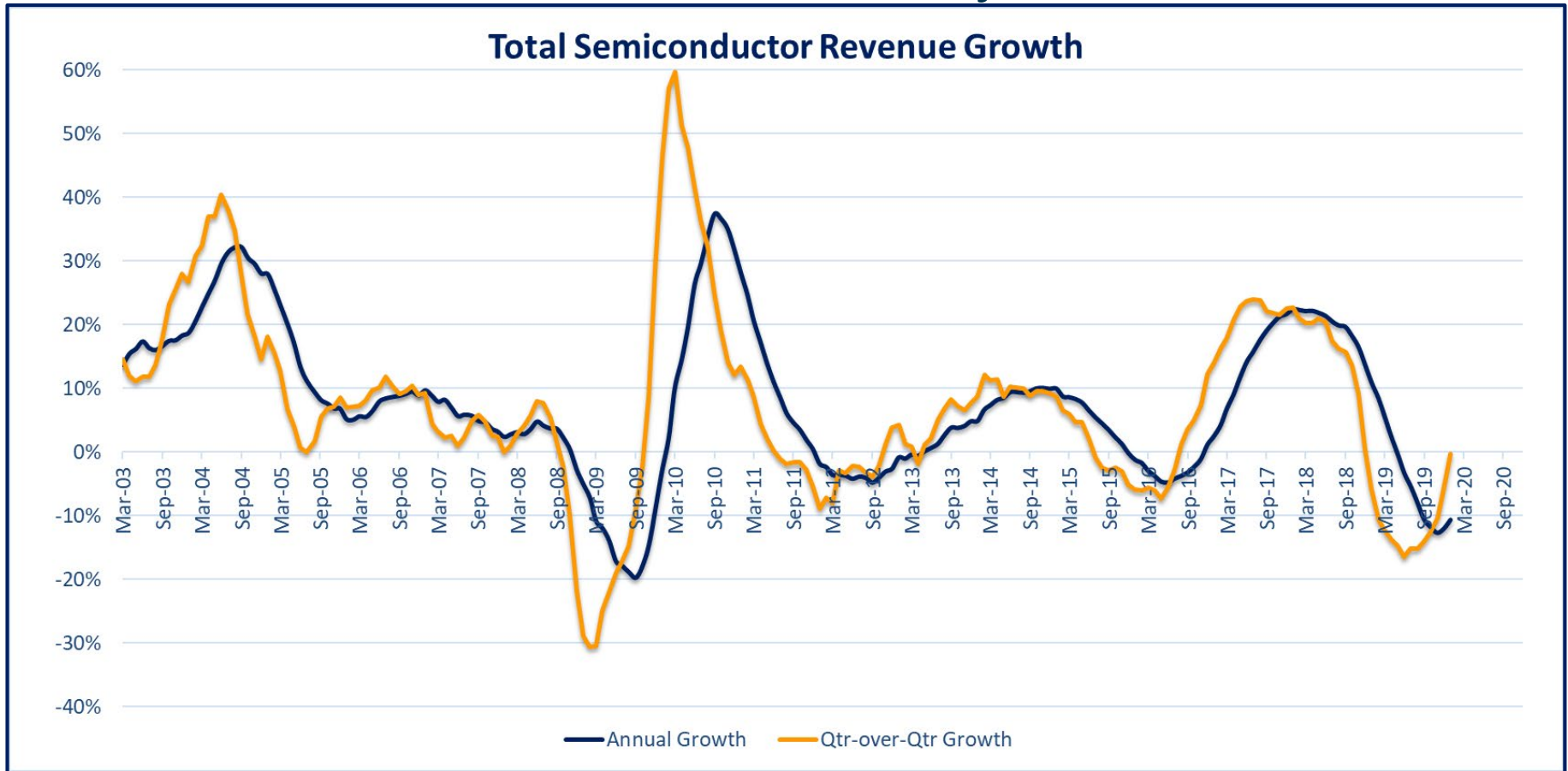
# June 2016 – Start of the tenth semiconductor cycle

Most cycles last roughly four years



Source – WSTS

# Semiconductor Revenue Growth Cycle

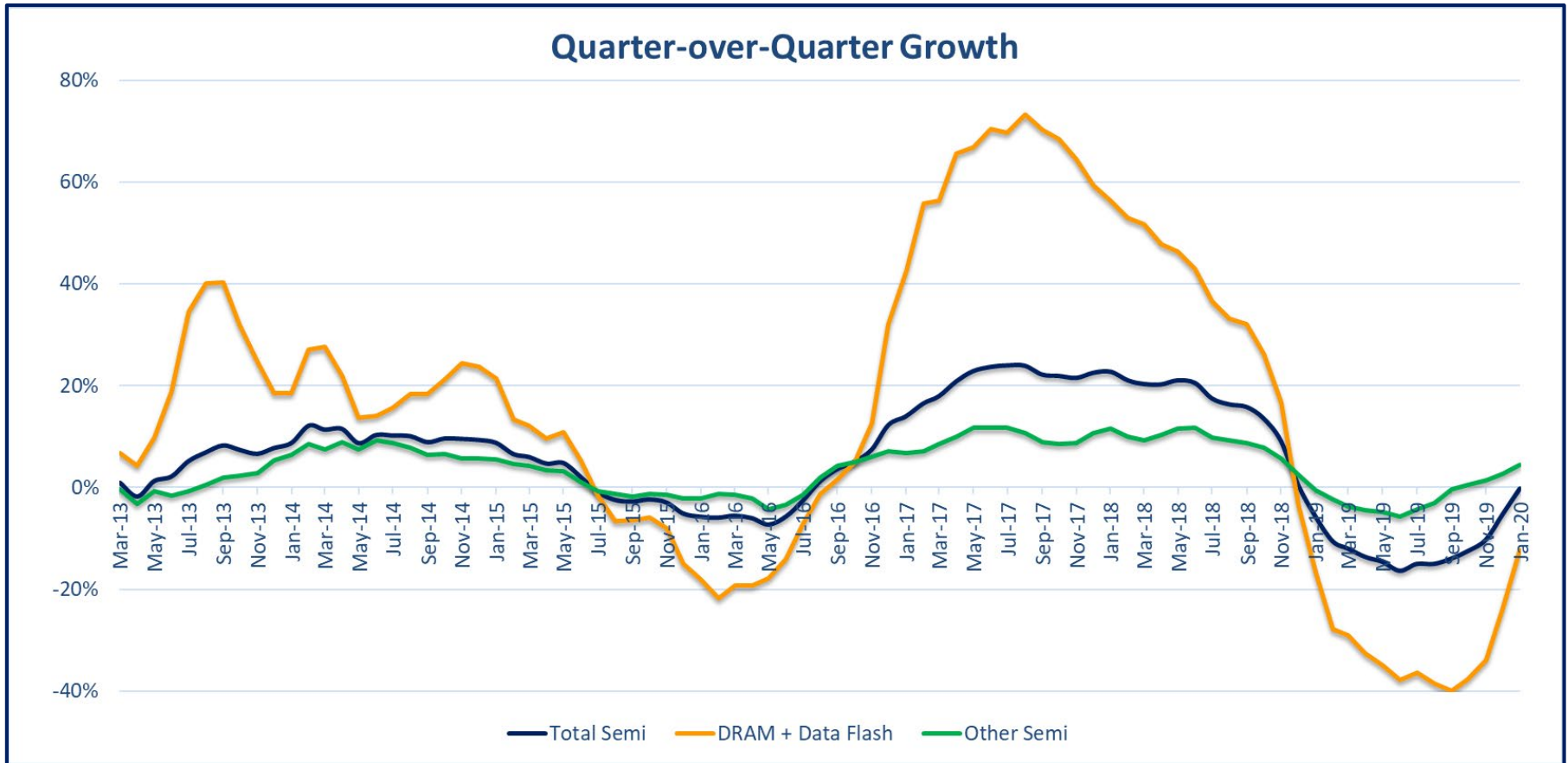


Source – WSTS

- Strong annual market downturn started 26 months ago
- Quarter-over-Quarter trend solid indicator of recovery
- Positive Q-over-Q growth trending toward Q1 2020
- But then Coronavirus hits

Connect. Influence. Optimize.

# Overall Semiconductor Growth Cycle Aligned

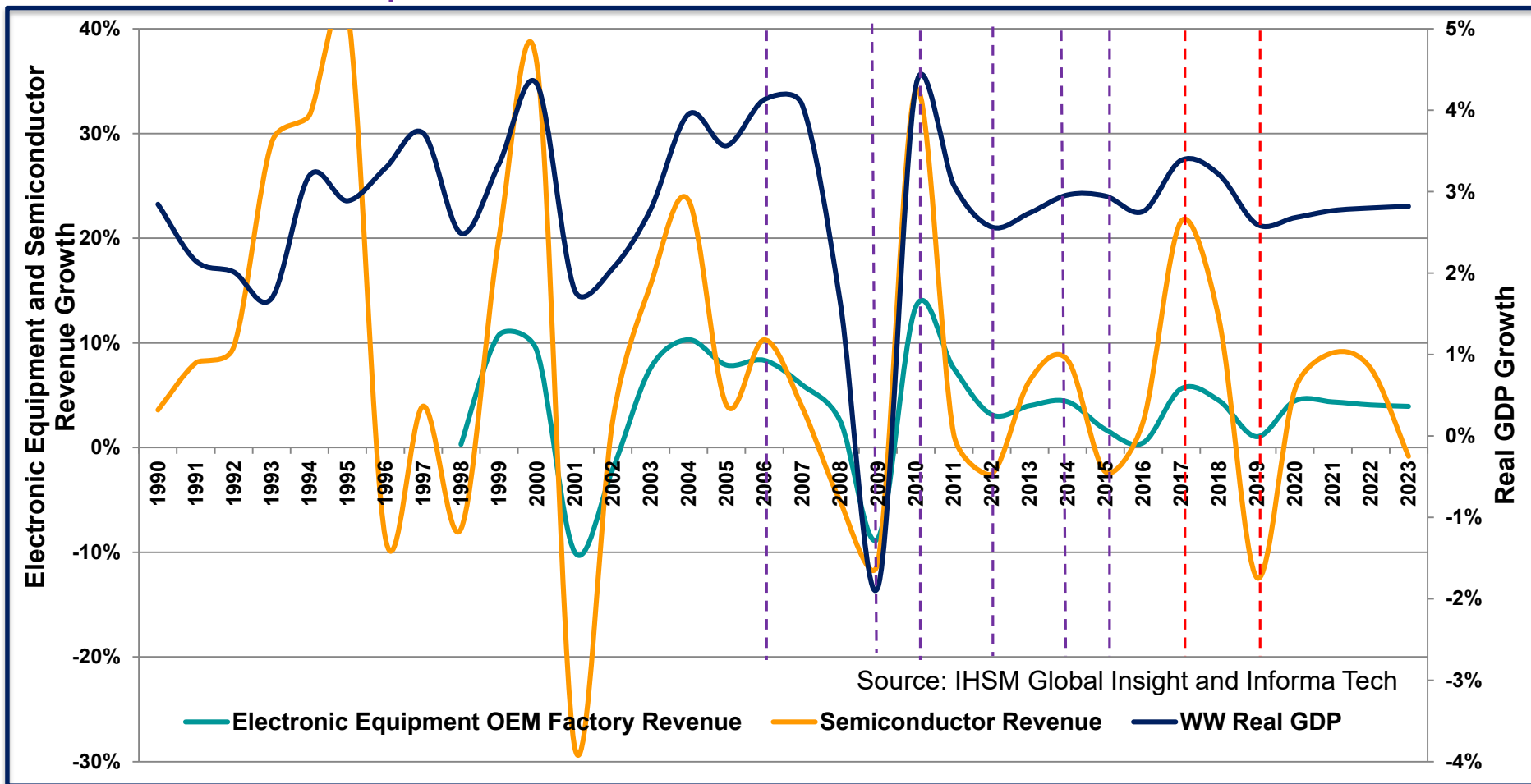


Source – WSTS

- Memory ICs pull out of their steep dive
- Other Semiconductors break into positive growth by end of 2019
- Likely dip/pause in Q1 with potential to resume growth by summer

# Semiconductor Revenue Growth Cycle

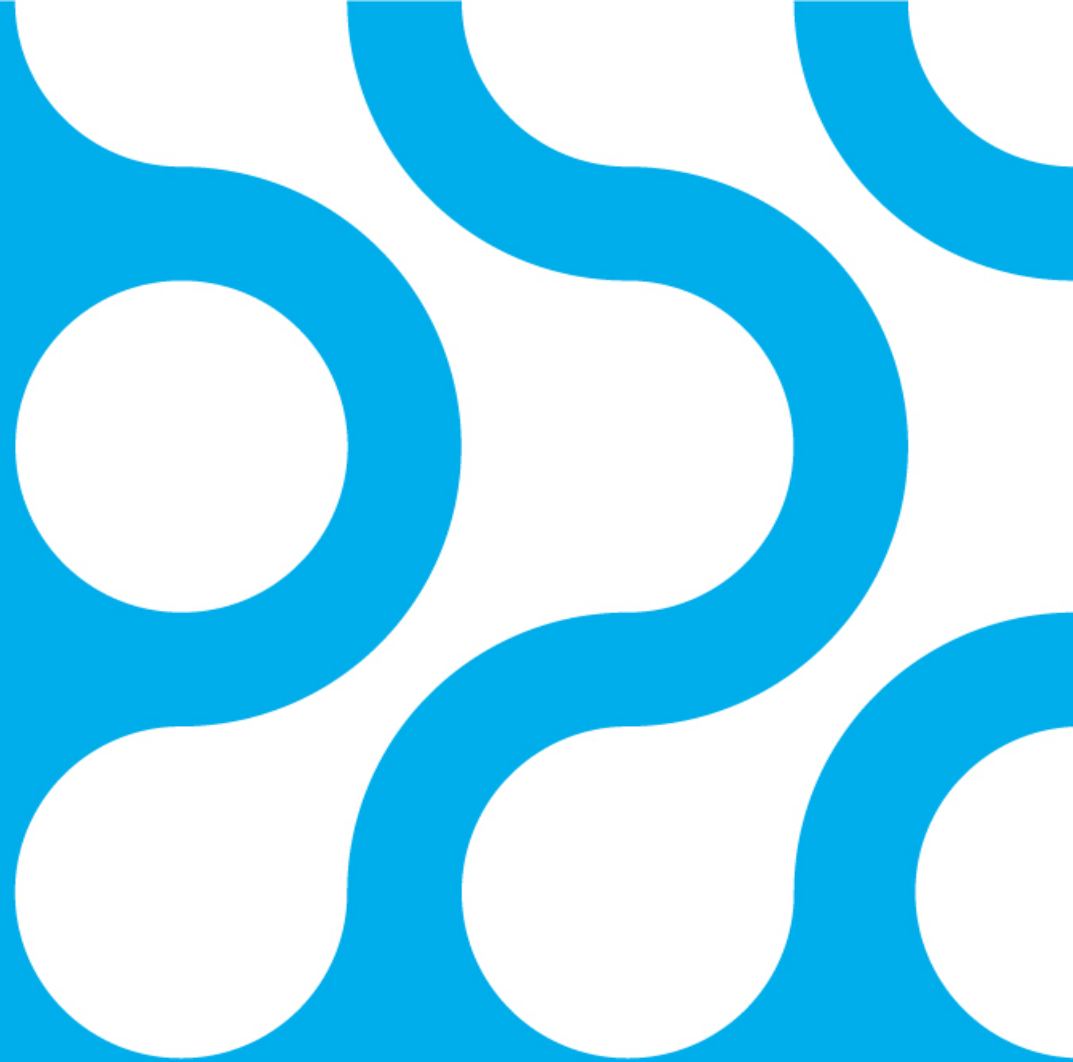
## GDP Relationship



- Current Cycle – Continues 20-year pattern of alignment with GDP
- Technology/Market forces aligning to support growth in 2020+

Connect. Influence. Optimize.

# **Semiconductor Market Outlook**



# Semiconductor / Electronics Components Market Outlook – Near-Term

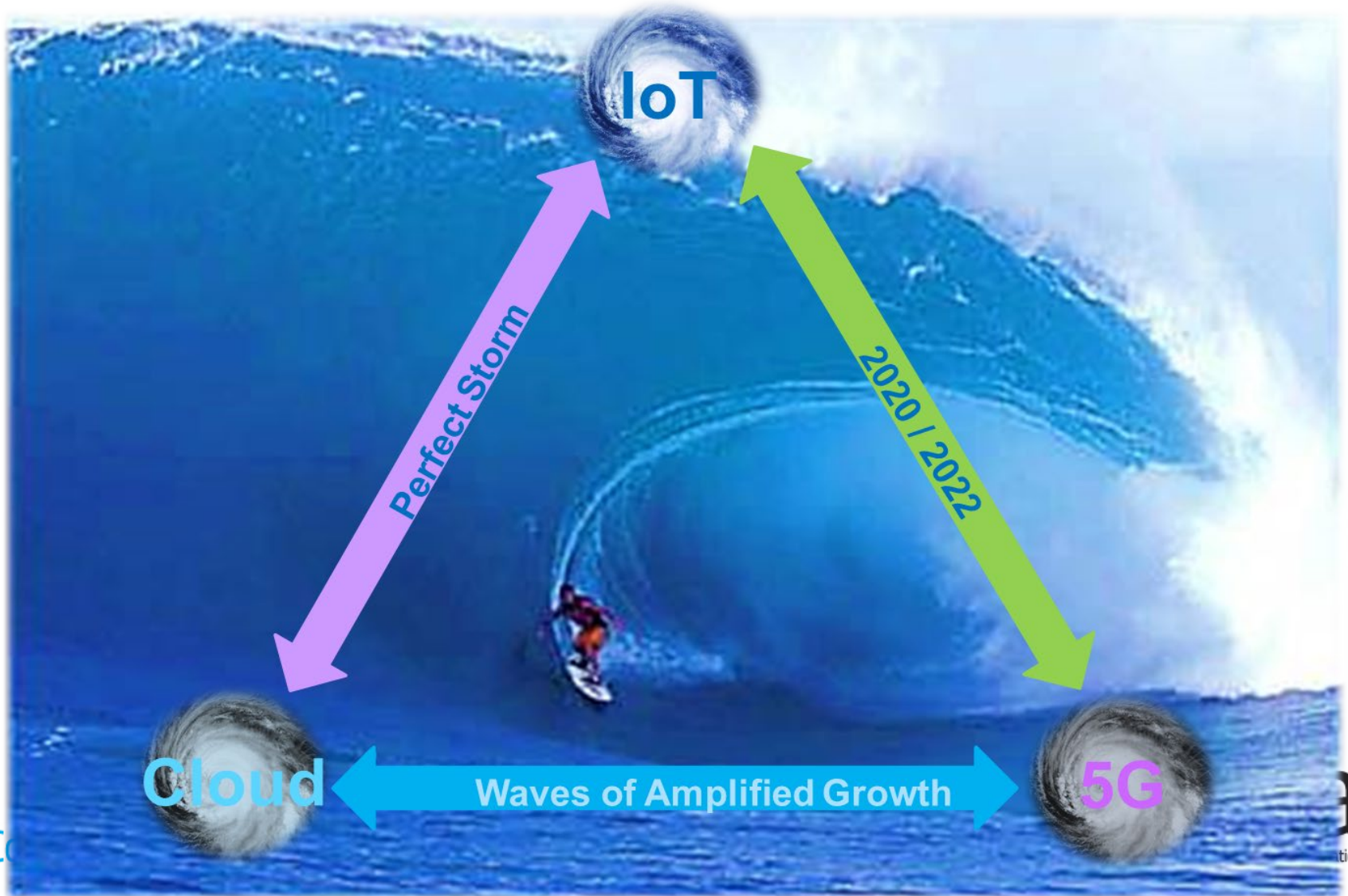
## Multiple potential scenarios:

- “Containment” of virus by March / April
  - Market dip through H1
  - Market snapback in H2 that could drive revenue growth up to 3% to 5%
- Large, regionally focused outbreaks extend into Q3
  - Market will not recover in 2020 and potential for revenue collapse by 20%
- Global pandemic continues into Q4
  - Global economic decline could suppress semiconductor market for multiple years
  - Potential for multiple company failures and market consolidation



# Market Outlook – Long Term Future Still Bright!

## The Developing Technology Triumverate



# Qualcomm Describes a Revolution

“5G mobile technology will, like electricity or the automobile, benefit entire economies and benefit entire societies. This is because the global 5G standard (5G New Radio) will advance mobile from largely a set of technologies connecting people-to-people and people-to-information to a unified connectivity fabric connecting people to everything.”

# Opportunities Go Beyond 5G

## MIT Technology Review

Annual list of technological advances that we believe will make a real difference in solving important problems. How do we pick? We avoid the one-off tricks, the overhyped new gadgets. Instead we look for those breakthroughs that will truly change how we live and work.

1. Unhackable Internet
2. Hyper-personalized medicine
3. Digital Money
4. Anti-aging Drugs
5. AI-discovered Molecules
6. Satellite Mega-Constellations
7. Quantum Supremacy
8. Tiny AI
9. Differential Privacy
10. Climate Change Attribution

“We only have so many productive mental calories to burn a day.

Fear burns more than any.

So, we need to focus them on what we can control, what is in our immediate control.”



Thank you!

