DPU SR-02
Attachment 1

DUFF & PHELPS

April 16, 2020

Coronavirus: Cost of Capital Considerations in the Current Environment

Duff & Phelps Presenters

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Director

DUFF & PHELPS

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~4,000
TOTAL PROFESSIONALS GLOBALLY

MORE THAN
19,000
ENGAGEMENTS PERFORMED IN 2019

13,500
CLIENTS INCLUDING NEARLY 47% OF THE S&P 500

THE AMERICAS
~2,000
PROFESSIONALS

EUROPE AND MIDDLE EAST
1100+
PROFESSIONALS

ASIA PACIFIC
700+
PROFESSIONALS

ONE COMPANY

ACROSS 25 COUNTRIES WORLDWIDE

THE AMERICAS

Addison
Atlanta
Austin
Bogota
Boston
Buenos Aires
Cayman Islands
Chicago
Dallas
Denver
Houston
Libertyville
Los Angeles
Mexico City
Miami
Milwaukee
Minneapolis
Morristown
Nashville
New York
Philadelphia
Reston
St. Louis
San Francisco
São Paulo
Seattle
Secaucus
Silicon Valley
Toronto
Washington, D.C.
Westlake

EUROPE AND MIDDLE EAST

Abu Dhabi
Agrate Brianza
Amsterdam
Barcelona
Bari
Berlin
Bilbao
Birmingham
Channel Islands
Dubai
Dublin
Frankfurt
Hamburg
Lisbon
London
Longford
Luxembourg
Madrid
Manchester
Milan
Moscow
Munich
Padua
Paris
Pesaro
Riyadh
Rome
Turin
Warsaw
Zurich

ASIA PACIFIC

Bangalore
Beijing
Guangzhou
Hanoi
Hong Kong
Hyderabad
Melbourne
Mumbai
New Delhi
Shanghai
Shenzhen
Singapore
Sydney
Taipei
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- Alternative Asset Advisory
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- Contract Review
- Corporate Actions
- Class Action

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- Carla Nunes is a Managing Director in the in the Office of Professional Practice, where she provides firm-wide technical guidance on a variety of valuation, financial reporting and tax issues. As part of that role, she also co-authors Duff & Phelps' annual U.S. and European Goodwill Impairment Studies.
- She is also the Global Leader of Duff & Phelps's Valuation Digital Solutions group, which produces cost of capital thought leadership content and data housed in the Cost of Capital Navigator.
- In 2011, Carla completed a one-year rotation in Duff & Phelps' London office, where she promoted the firm's IFRS education efforts and marketing initiatives, as well dealing with IFRS implementation issues.
- Prior to this role, Carla was part of the Valuation Advisory Services business unit, performing engagements primarily for financial reporting and tax purposes at Duff & Phelps and its predecessor firms, PricewaterhouseCoopers and Standard & Poor's.
- Carla is a co-author of the (previously published) "Valuation Handbook" series and is a co-creator of the Duff & Phelps Cost of Capital Navigator.

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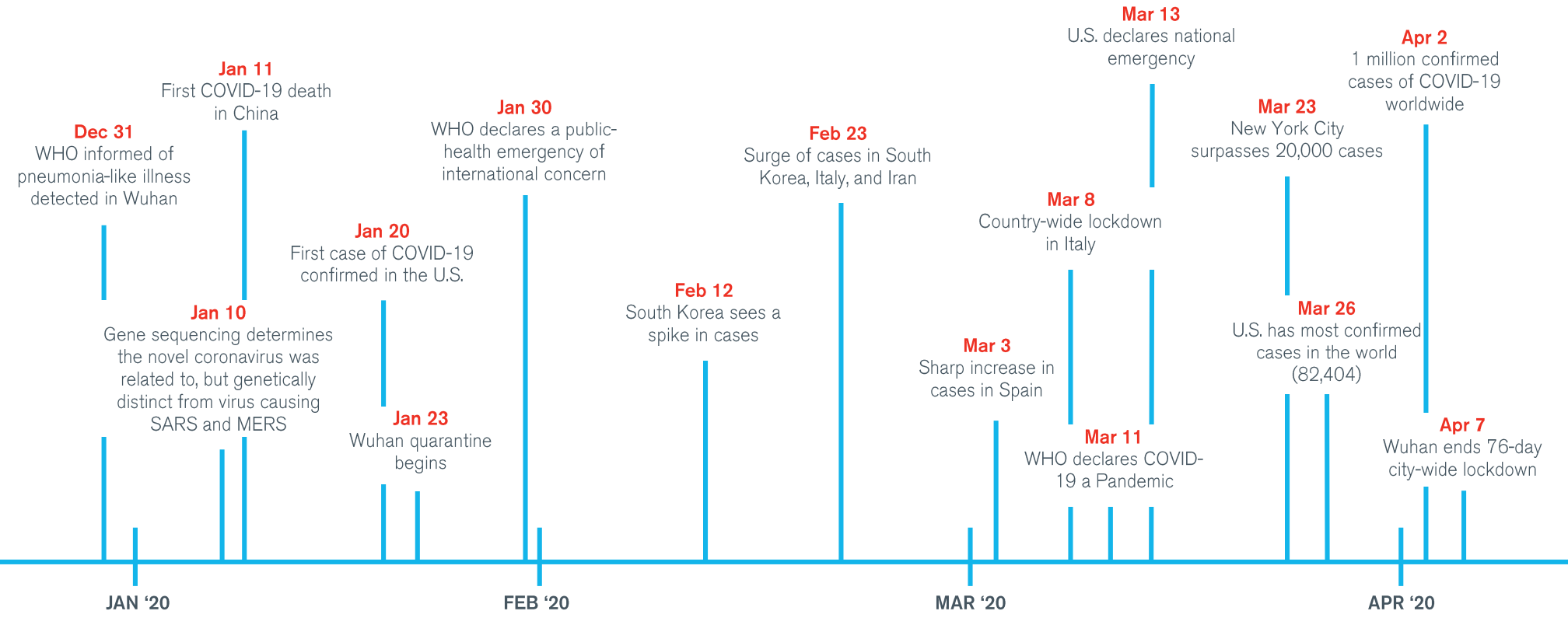
- Jim is a leading contributor to Duff & Phelps' efforts in the development of studies, surveys, online content and tools, firm-wide valuation models, data distribution platforms, and published thought leadership.
- Previously, Jim was director of valuation research in Morningstar's Financial Communications Business.
- James is a co-author of the (previously published) "Valuation Handbook" series and is a co-creator of the Duff & Phelps Cost of Capital Navigator.

Today's Presentation

1. Coronavirus Timeline
2. Valuation Framework
3. Projected Growth
4. Financial Market Performance
5. Risk-free Rate Analysis
6. Equity Risk Premium
7. Country Risk
8. Other Cost of Capital Inputs

Coronavirus Timeline

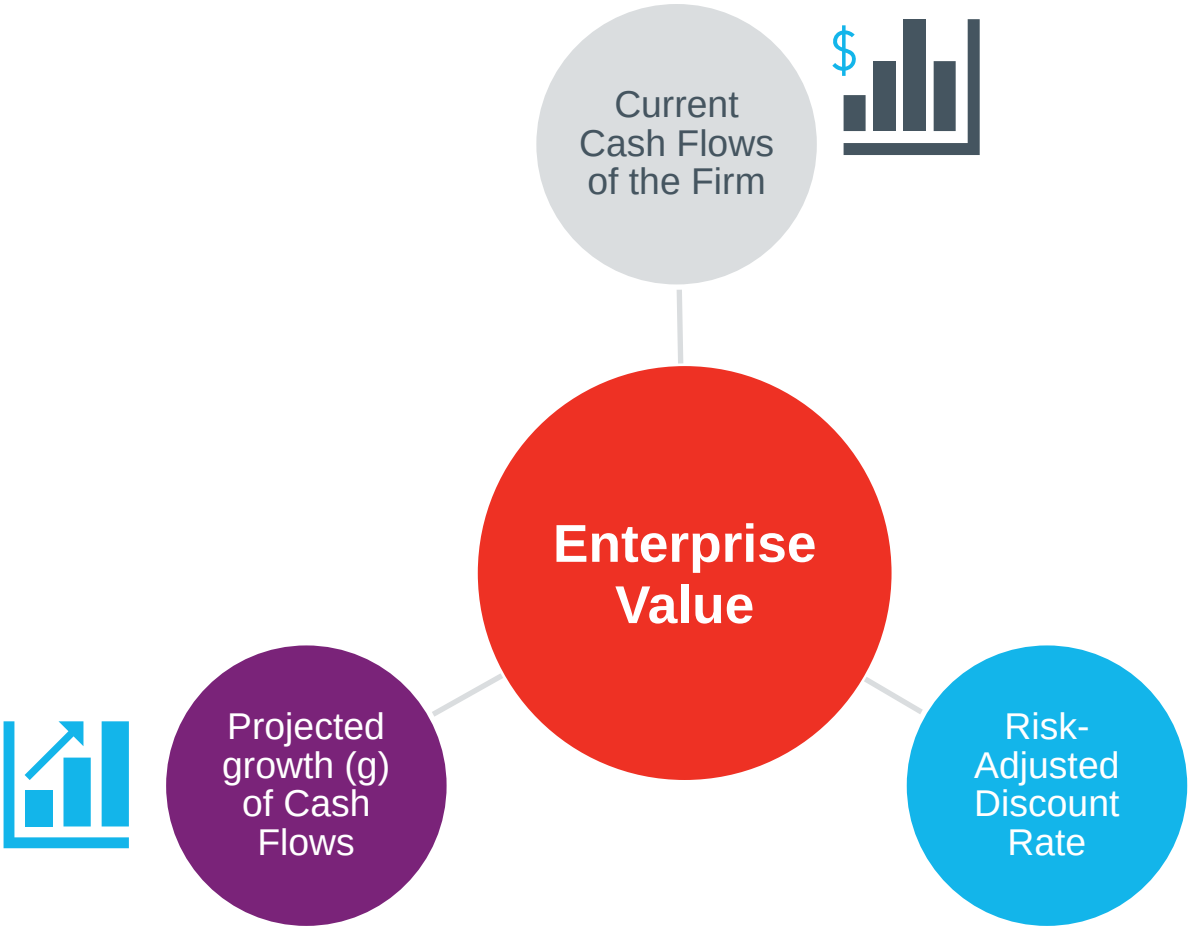
COVID-19 Brief Timeline



Valuation Framework: Back to the Basics

Value of a Business – Using a Discounted Cash Flow (DCF) Method

3 Key Value Drivers



Value of a Business – Using a DCF Method
In Good Times: Economic Expansion

Growth rate (g) is positive

$$\text{Enterprise Value} = \frac{FCF_0 * (1+ g_1)}{(1+WACC)^{1}} + \frac{FCF_1 * (1+ g_2)}{(1+WACC)^{2}} + \frac{\dots \text{ n periods}}{(1+WACC)^{n}} + \frac{\text{Terminal Value} = FCF_n * (1 + g_{LT})}{(WACC - g_{LT})^{n}}$$

Discount Rate is lower

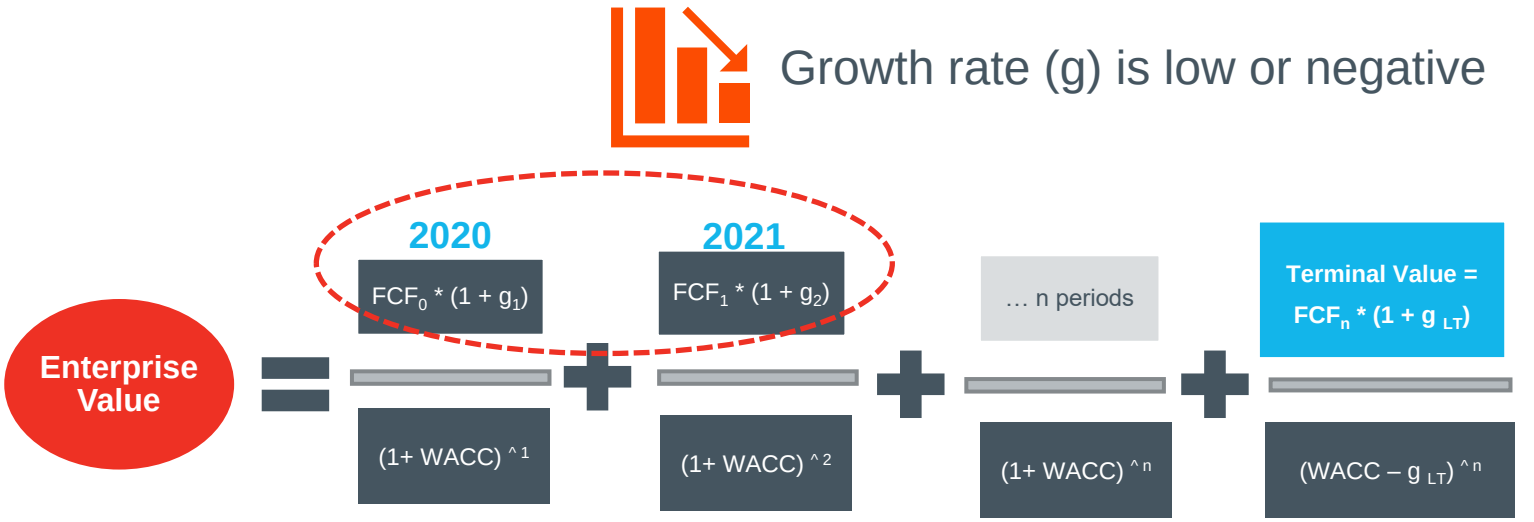
WACC = Weighted Average Cost of Capital

Value is higher

Projected future cash flows are discounted to present value using a discount rate

Definitions:
g_{LT} = Long-term Growth Rate
FCF = Free Cash Flows

Value of a Business – Using a DCF Method
In Bad Times: Economic Recession



Projected future cash flows are discounted to present value using a discount rate

Value is lower

Definitions:
g_{LT} = Long-term Growth Rate
FCF = Free Cash Flows

Projected Growth: Economy & Earnings

Where We Stand: the Status of the Global Economy

> Just three months ago, we expected positive per capita income growth in over 160 of our member countries in 2020. Today, that number has been turned on its head: we now project that over 170 countries will experience *negative* per capita income growth this year.

– "Confronting the Crisis: Priorities for the Global Economy", speech by Kristalina Georgieva, IMF Managing Director on April 9, 2020

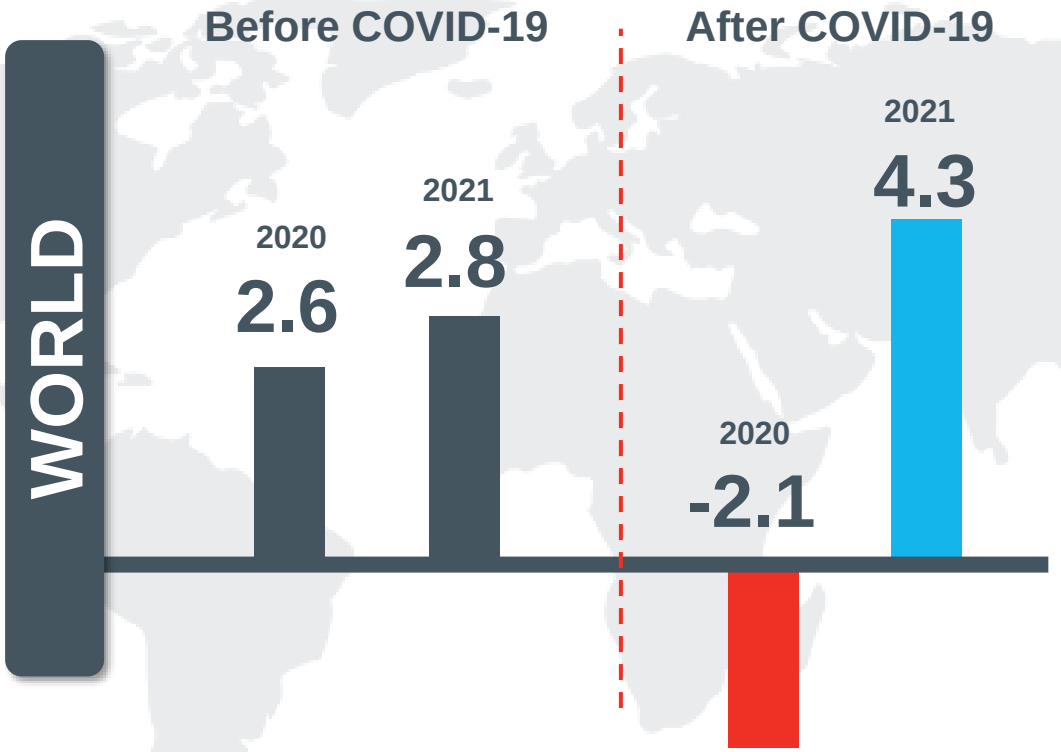
Real GDP Growth – Sources of Estimates

We reviewed multiple sources of Real GDP Growth forecasts:

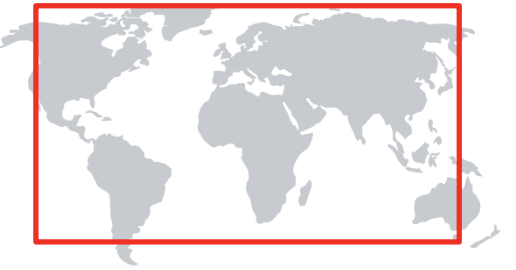
1. International Monetary Fund (IMF)
2. Organisation for Economic Co-operation and Development (OECD)
3. Blue Chips Economic Indicators
4. Consensus Economics
5. Economist Intelligence Unit (EIU)
6. Fitch Ratings
7. IHS Markit
8. Moody's Analytics
9. Oxford Economics
10. Standard & Poor's

Real GDP growth (%) estimates by region: World

Data as of April 14, 2020

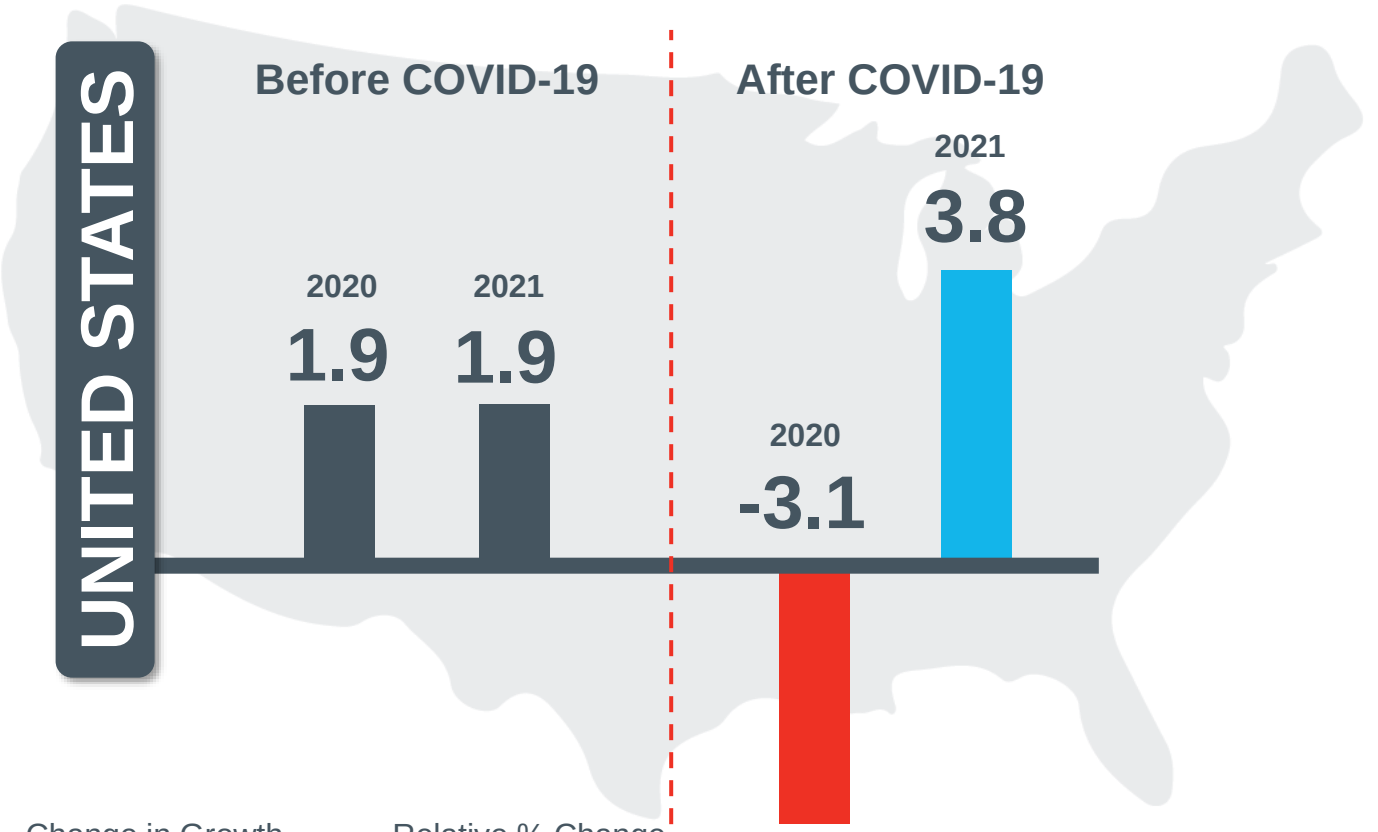


	Change in Growth	Relative % Change
2020 Median	-4.7	-182%
2021 Median	1.5	55%



Real GDP growth (%) estimates by region: United States

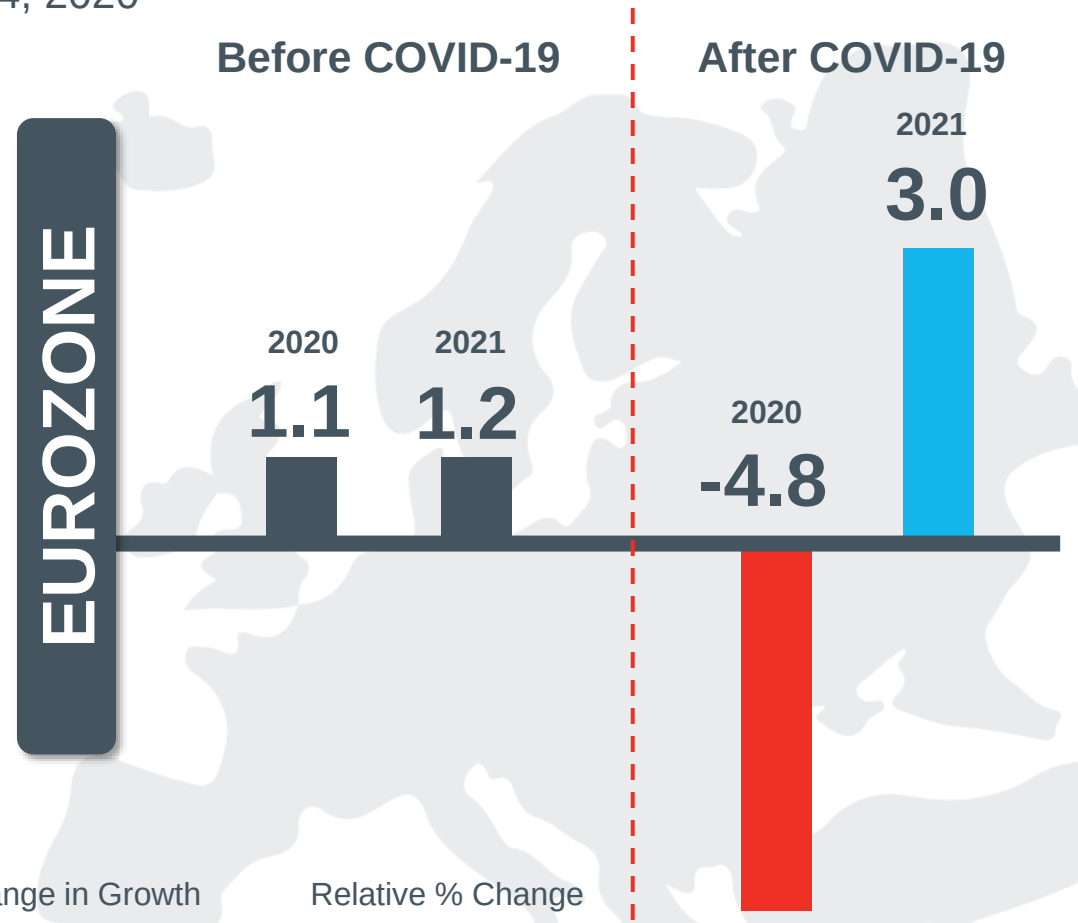
Data as of April 14, 2020



	Change in Growth	Relative % Change
2020 Median	-5.0	-263%
2021 Median	1.9	101%

Real GDP growth (%) estimates by region: Eurozone

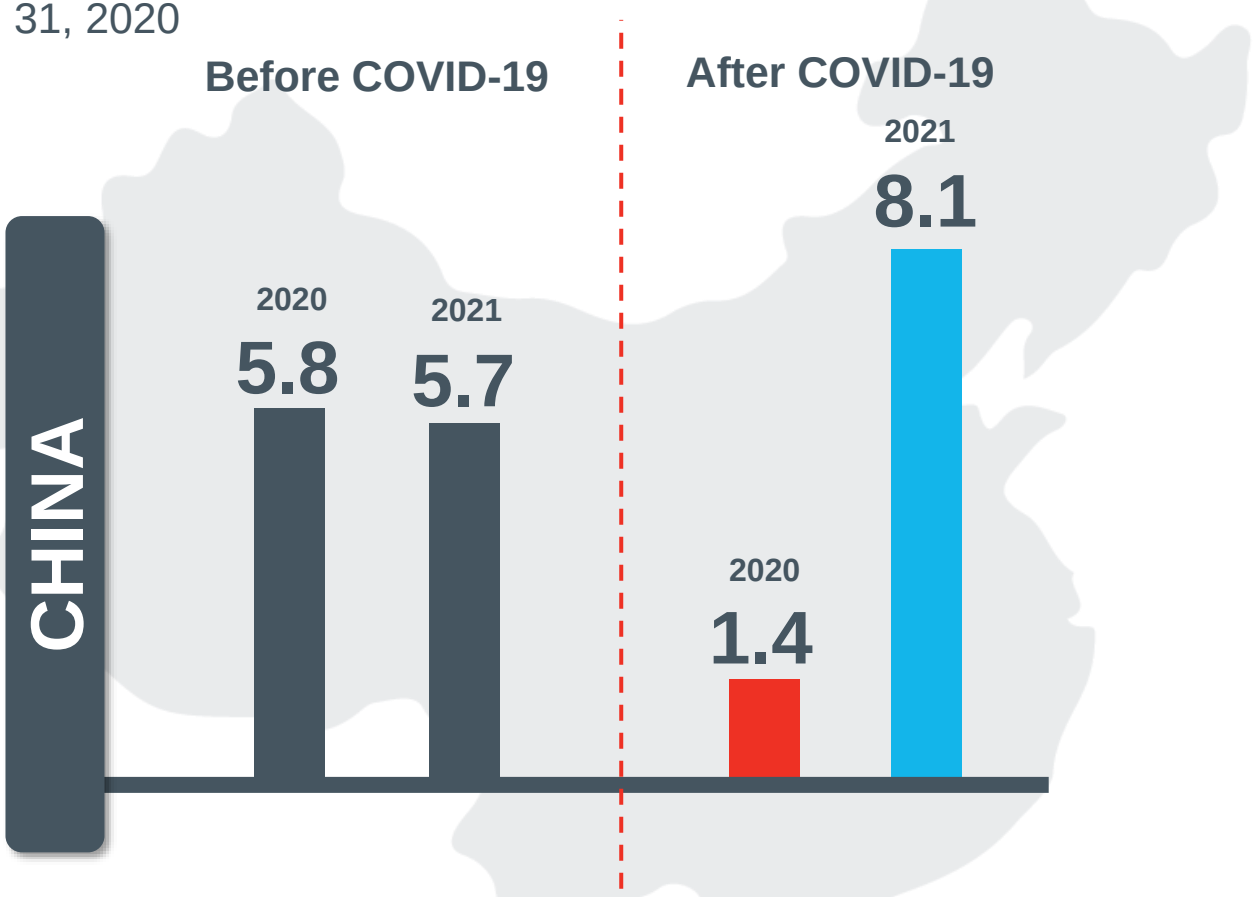
Data as of April 14, 2020



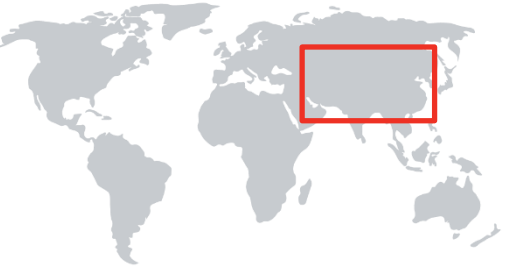
	Change in Growth	Relative % Change
2020 Median	-5.9	-558%
2021 Median	1.8	150%

Real GDP growth (%) estimates by region: China

Data as of March 31, 2020



	Change in Growth	Relative % Change
2020 Median	-4.4	-76%
2021 Median	2.4	42%

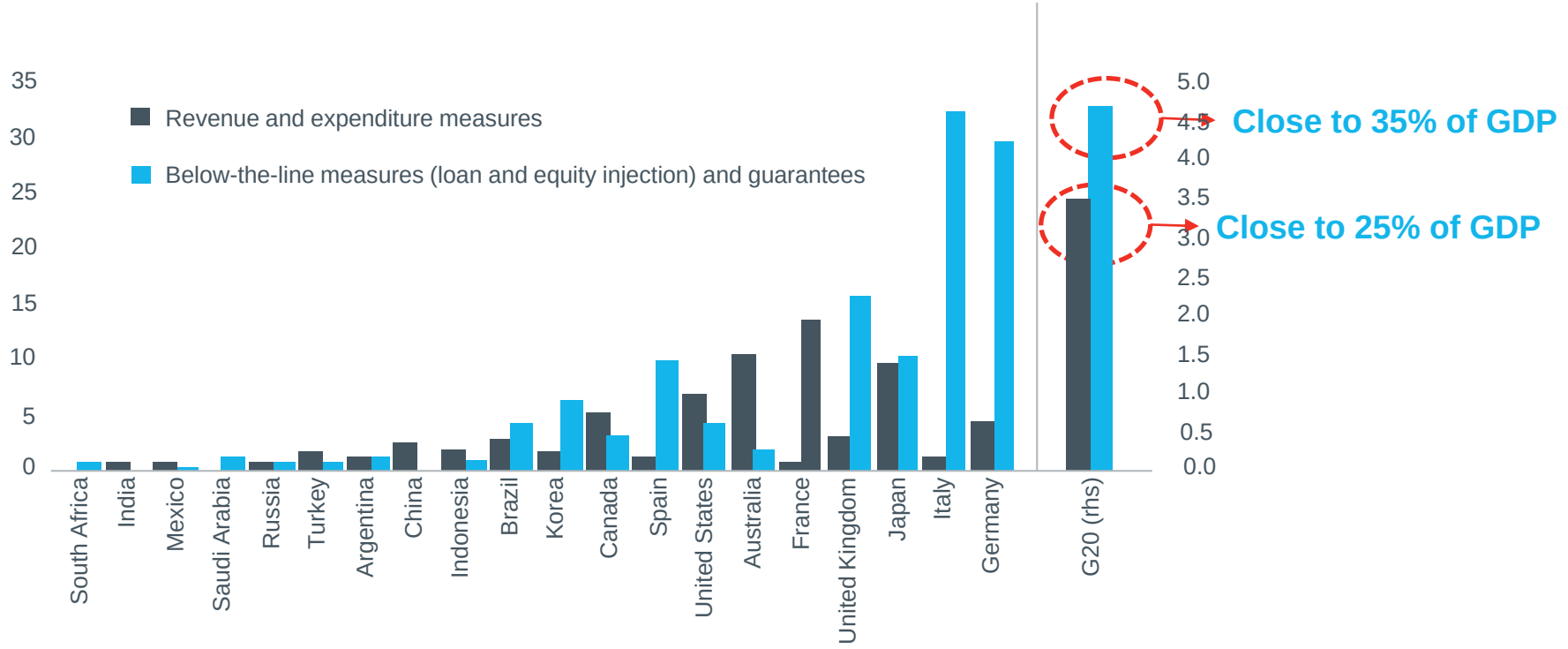


Fiscal Policy Response to COVID-19 for G-20 Countries as % of GDP

IMF Analysis as of April 8, 2020

Emergency lifelines

So far, countries around the world have used about $8 trillion to fight the pandemic, with G20 countries taking the led. (Announced fiscal measures in G20 economies, % of GDP)



Sources: National authorities; and IMF staff estimates as of April 8, 2020.
Note: G20 = Group of twenty. G20 aggregates are calculated using PPP-adjusted GDP weights

Source: https://blogs.imf.org/2020/04/15/fiscal-policies-to-contain-the-damage-from-covid-19/?utm_medium=email&utm_source=govdelivery#post/0

U.S. Real GDP (Annualized) Growth Estimates for 2020
Before & After Enactment of the U.S. Fiscal Stimulus Package (CARES Act)

Moody's Analytics' Analysis as of March 31, 2020

Projected Real GDP Growth

Period	Prior to CARES Act (%)	After CARES Act (%)	Net Impact of 2020 CARES Act (%)
Q2 2020	-29.60	-18.33	+11.27
Q3 2020	8.66	10.95	+2.29
Q4 2020	6.69	2.38	-4.31
Q1 2021	8.94	2.60	-6.34
Full Year 2020	**-4.83**	**-2.17**	**+2.65**
Full Year 2021	**4.91**	**2.68**	**-2.23**

Source: Moody's Analytics

S&P 500 Earnings Consensus Estimates – Before and After Coronavirus

Analysis as of April 9, 2020

Forecast Date	31 December 2019	9 April 2020	Difference
S&P 500 Index	**9.2%**	**-8.5%**	**-17.7%**
Energy	21.2	-88.5	-109.7
Financials	37.0	-21.0	-58.0
Industrials	14.9	-20.0	-34.9
Consumer Discretionary	11.9	-16.6	-28.5
Materials	13.0	-9.4	-22.4
Communication Services	11.5	1.5	-10.0
Real Estate	6.6	1.4	-5.2
Consumer Staples	5.7	2.5	-3.2
Utilities	5.7	3.0	-2.7
Healthcare	8.7	3.6	-5.1
Information Technology	9.0	5.2	-3.8

Source: FactSet

STOXX Europe 600 Earnings Consensus Estimates – Post-Coronavirus

Analysis as of April 14, 2020

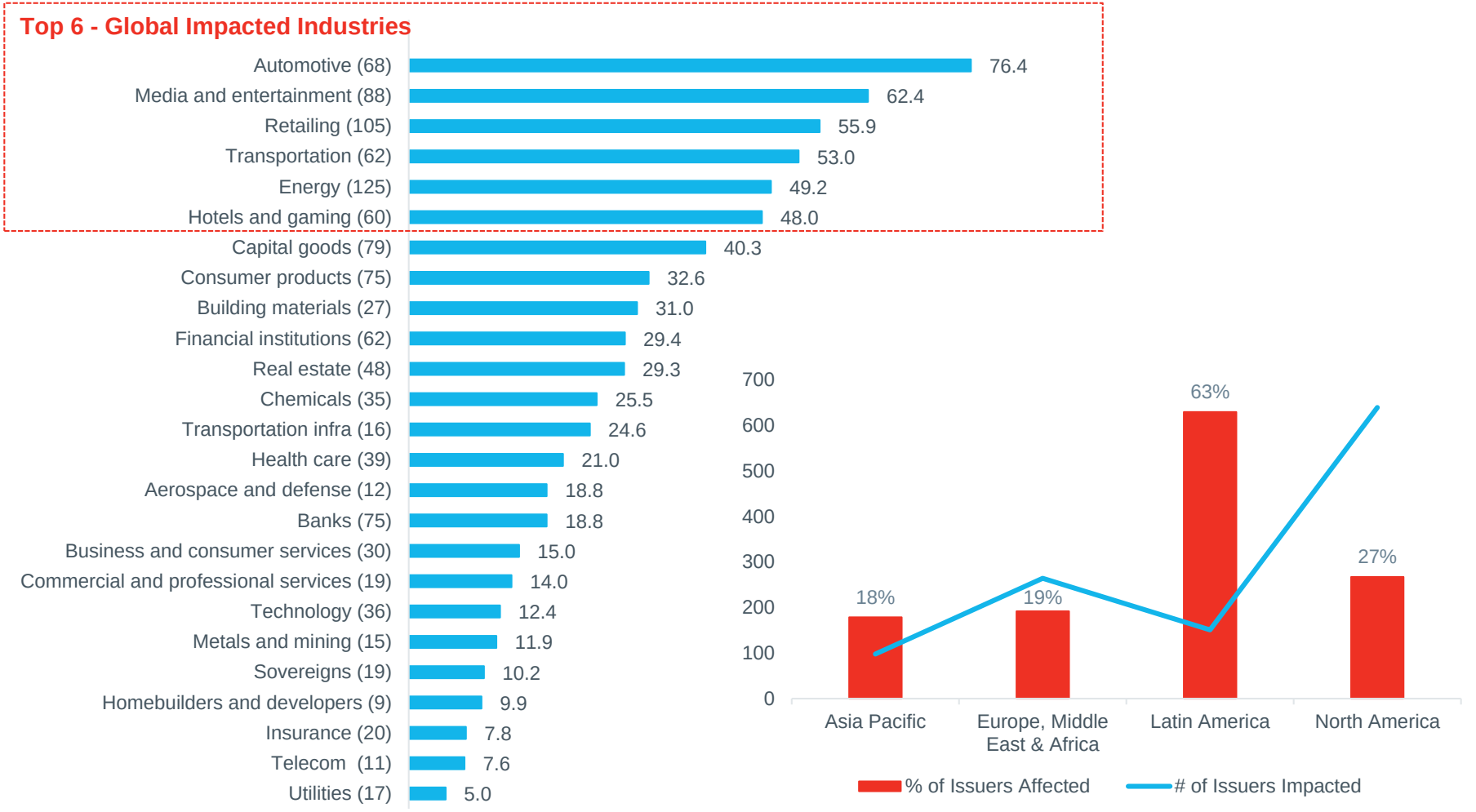
Forecast Date	9 April 2020
STOXX Europe 600	**-13.2%**
Energy	-49.7
Consumer Discretionary (Cyclicals)	-21.9
Industrials	-20.4
Financials	-14.7
Basic Materials	-11.4
Technology	-3.8
Consumer Staples (Non-Cyclicals)	-2.6
Healthcare	3.0
Telecommunications Services	4.2
Utilities	10.1

Source: Refinitiv I/B/E/S

S&P Global Ratings

Rating Actions due to COVID-19 and Oil Price Collapse

Percent (%) of Global Issuers Affected by Industry and Region as of April 10, 2020



* Source: S&P Global Ratings, “COVID-19: Coronavirus- And Oil Price-Related Public Rating Actions On Corporations, Sovereigns, And Project Finance To Date”, April 13, 2020.

Financial Market Performance

MSCI Developed, Emerging, and Frontier Markets

As of March 31, 2010 Year-to-date (YTD) (in USD)

Most Impacted: **RED** bold.

Least Impacted: **BLUE** Bold

Developed Markets

Australia	-33.2%
Austria	**-42.9%**
Belgium	-32.5%
Canada	-27.4%
Denmark	**-7.7%**
Finland	-18.9%
France	-27.5%
Germany	-27.0%
Hong Kong	-17.3%
Ireland	-25.5%
Israel	-18.0%
Italy	-29.2%
Japan	-16.6%
Netherlands	-20.6%
New Zealand	-16.3%
Norway	-33.3%
Portugal	-13.1%
Singapore	-28.2%
Spain	-29.7%
Sweden	-21.4%
Switzerland	-11.1%
United Kingdom	-28.8%
United States	-19.6%
Average	-23.7%
Median	-25.5%

Emerging Markets

Argentina	-39.3%
Brazil	**-50.2%**
Chile	-33.4%
China	**-10.2%**
Colombia	-49.7%
Czech Republic	-38.5%
Egypt	-27.1%
Greece	-45.1%
Hungary	-39.0%
India	-31.1%
Indonesia	-39.4%
Korea	-22.4%
Malaysia	-19.2%
Mexico	-35.4%
Pakistan	-39.6%
Peru	-35.8%
Philippines	-32.0%
Poland	-36.5%
Qatar	-17.3%
Russia	-36.3%
Saudi Arabia	-23.1%
South Africa	-40.3%
Taiwan	-19.0%
Thailand	-33.7%
Turkey	-30.0%
United Arab Emirates	-27.1%
Average	-34.6%
Median	-35.8%

Frontier Markets

Bahrain	-22.2%
Bangladesh	-17.9%
Croatia	-18.5%
Estonia	-31.1%
Jordan	-9.9%
Kazakhstan	-23.6%
Kenya	-24.8%
Kuwait	-26.8%
Lebanon	**0.1%**
Lithuania	-22.9%
Mauritius	**-37.9%**
Morocco	-26.0%
Nigeria	-33.0%
Oman	-11.1%
Romania	-30.8%
Serbia	-27.5%
Slovenia	-22.7%
Sri Lanka	-34.5%
Tunisia	-6.4%
Vietnam	-31.0%
Average	-22.9%
Median	-24.2%

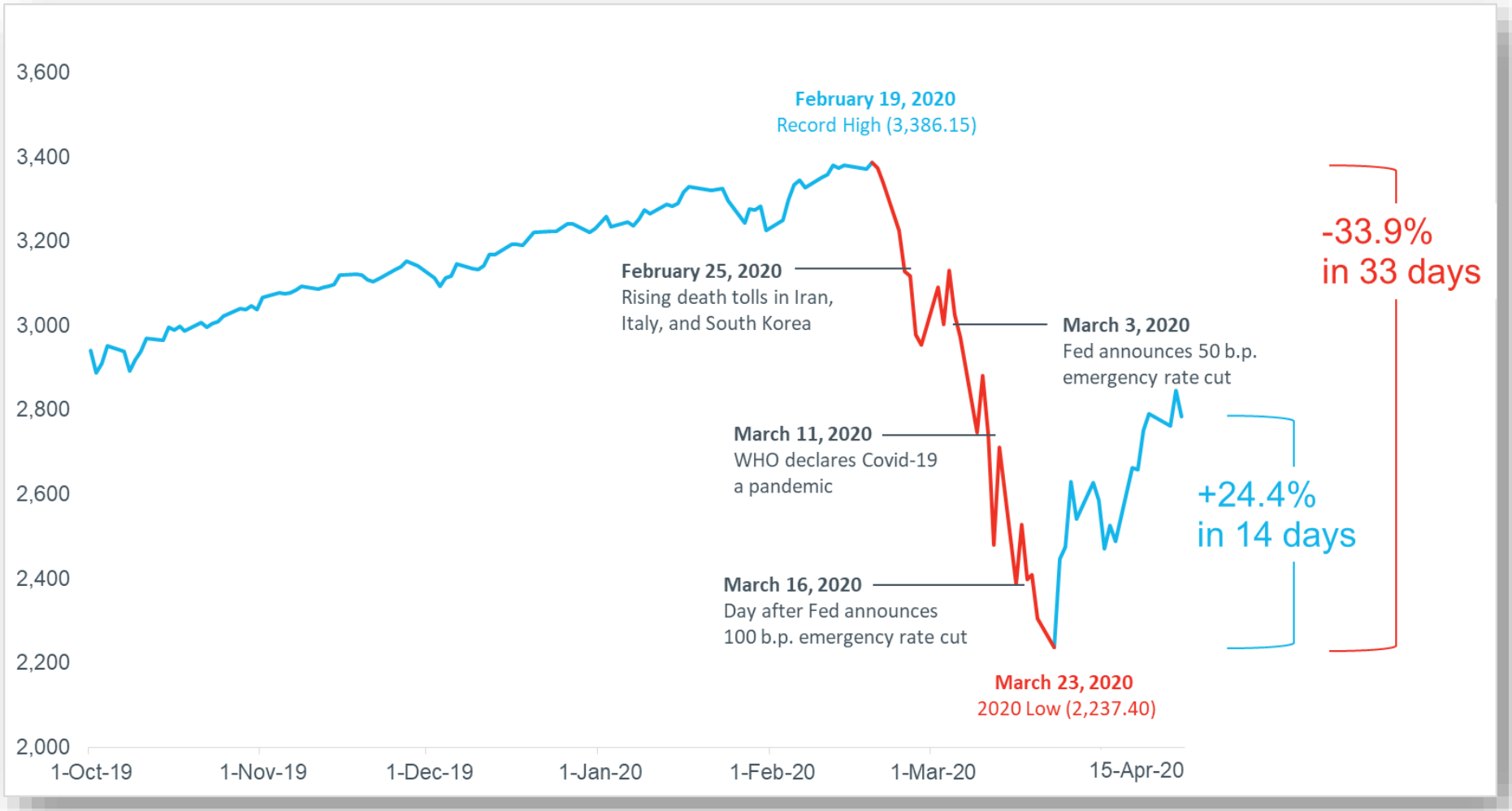
Equity Markets Around the World

Through April 15, 2020

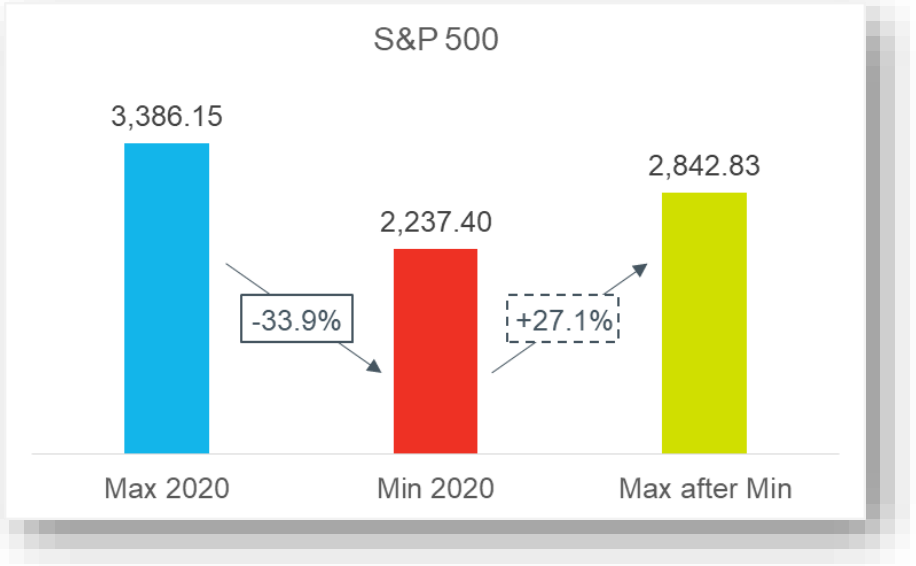
Country	Index	High in 2020	Date	Low 2020	Date	Decline from 2020 High	April 15, 2020	Increase from 2020 Low	2020 YTD
USA	S&P 500	3,386.15	19-Feb-20	2,237.40	23-Mar-20	**-33.9%**	2,783.36	**24.4%**	-13.8%
USA	Dow Jones Industrial Average	29,551.42	12-Feb-20	18,591.93	23-Mar-20	**-37.1%**	23,504.35	**26.4%**	-17.6%
USA	NASDAQ Composite	9,817.18	19-Feb-20	6,860.67	23-Mar-20	**-30.1%**	8,393.18	**22.3%**	-6.5%
Canada	S&P/TSX Composite index	17,944.10	20-Feb-20	11,228.50	23-Mar-20	**-37.4%**	13,958.60	**24.3%**	-18.2%
Mexico	IPC MEXICO	45,902.68	20-Jan-20	32,964.22	23-Mar-20	**-28.2%**	33,855.24	**2.7%**	-22.2%
Europe	STOXX 600	433.90	19-Feb-20	279.66	18-Mar-20	**-35.5%**	323.06	**15.5%**	-22.3%
UK	FTSE 100	7,674.60	17-Jan-20	4,993.90	23-Mar-20	**-34.9%**	5,597.88	**12.1%**	-25.8%
Germany	DAX	13,789.00	19-Feb-20	8,441.71	18-Mar-20	**-38.8%**	10,279.76	**21.8%**	-22.4%
Russia	MOEX Russia Index	3,219.92	20-Jan-20	2,112.64	18-Mar-20	**-34.4%**	2,498.94	**18.3%**	-18.0%
India	S&P BSE SENSEX	41,952.63	14-Jan-20	25,981.24	23-Mar-20	**-38.1%**	30,379.81	**16.9%**	-26.4%
Hong Kong	HANG SENG INDEX	29,056.42	17-Jan-20	21,696.13	23-Mar-20	**-25.3%**	24,145.34	**11.3%**	-14.3%
Shanghai	SSE Composite Index	3,115.57	13-Jan-20	2,660.17	23-Mar-20	**-14.6%**	2,811.17	**5.7%**	-7.8%
Japan	TOPIX	1,744.16	20-Jan-20	1,236.34	16-Mar-20	**-29.1%**	1,434.07	**16.0%**	-16.7%
Australia	All Ordinaries	7,255.20	20-Feb-20	4,564.10	23-Mar-20	**-37.1%**	5,455.50	**19.5%**	-19.8%

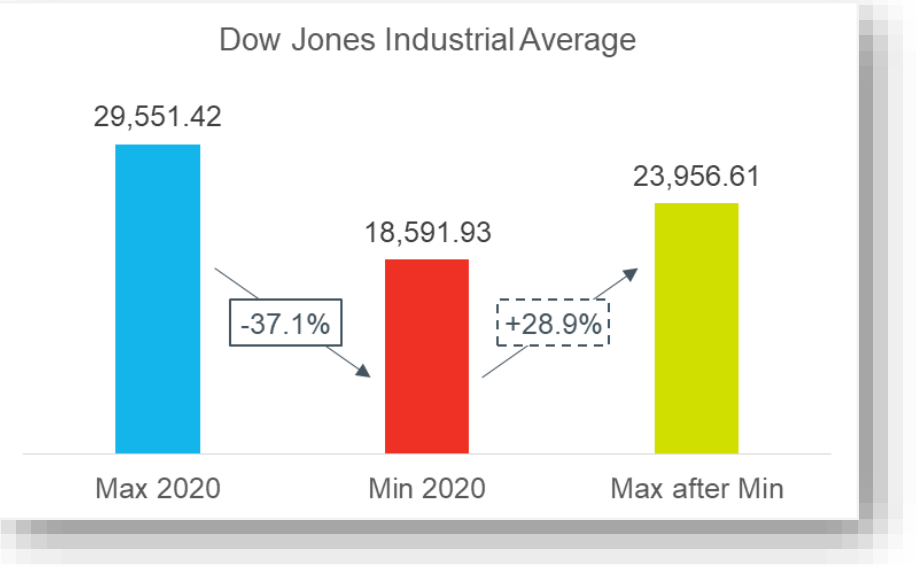
S&P 500 Index

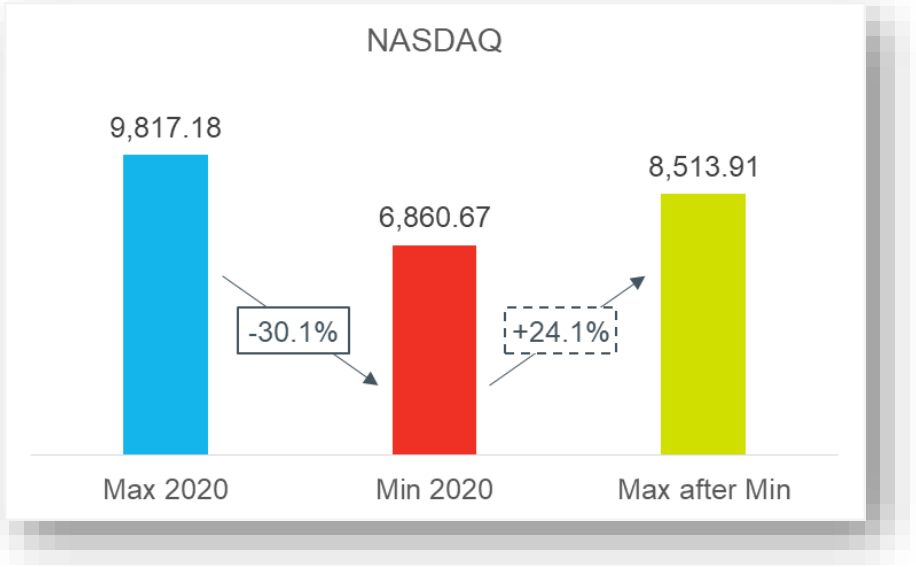
October 1, 2019 – April 15, 2020

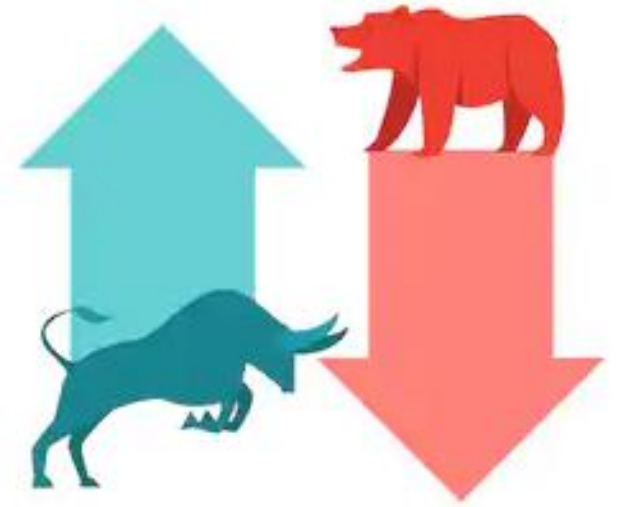


Is the U.S. Now in a Bull Market?









U.S. Market Crashes, Using S&P 500 Price Index as the Benchmark

1929 Crash

Start Date of the Decline	16-Sep-29
S&P 500	31.86
End date of the Decline	1-Jun-32
S&P 500	4.40
Decline	**-86.2%**
Recovery Date	22-Sep-54
S&P 500	32.00
Years to Recover	**25.02**

1987 Crash

Start Date of the Decline	25-Aug-87
S&P 500	336.77
End date of the Decline	19-Oct-87
S&P 500	224.84
Decline	**-33.2%**
Recovery Date	26-Jul-89
S&P 500	338.05
Years to Recover	**1.92**

Dotcom Crash

Start Date of the Decline	24-Mar-00
S&P 500	1,527.46
End date of the Decline	9-Oct-02
S&P 500	776.76
Decline	**-49.1%**
Recovery Date	30-May-07
S&P 500	1,530.23
Years to Recover	**7.18**

2008 Crash

Start Date of the Decline	9-Oct-07
S&P 500	1,565.15
End date of the Decline	9-Mar-09
S&P 500	676.53
Decline	**-56.8%**
Recovery Date	28-Mar-13
S&P 500	1,569.19
Years to Recover	**5.47**

Covid-19 Crash

Start Date of the Decline	19-Feb-20
S&P 500	3,386.15
End date of the Decline	23-Mar-20
S&P 500	2,237.40
Decline	**-33.9%**
Recovery Date	?
S&P 500	?
Years to Recover	**?**

U.S. Market Crashes, Using S&P 500 Price Index as the Benchmark
Length of Decline and Average Years to Recover

Length of Decline and Average Years to Recover

Decline	0 to 6 months	7 to 12 months	13 to 18 months	19 to 24 months	25 to 30 months	31 to 36 months
> -80% and <= -90%	-	-	-	21.19	21.72	24.47
> -70% and <= -80%	-	4.70	5.48	15.54	21.04	19.73
> -60% and <= -70%	-	4.03	4.66	-	-	-
> -50% and <= -60%	0.71	2.75	4.90	5.48	5.38	-
> -40% and <= -50%	0.78	3.22	4.14	7.01	5.62	4.67
> -30% and <= -40%	1.13	1.69	2.48	2.62	3.33	3.86
> -20% and <= -30%	0.89	1.50	1.67	2.11	2.22	3.76
> -10% and <= -20%	0.56	1.04	1.56	2.12	2.37	2.80
> 0% and <= -10%	0.17	0.79	1.35	1.72	2.32	2.76

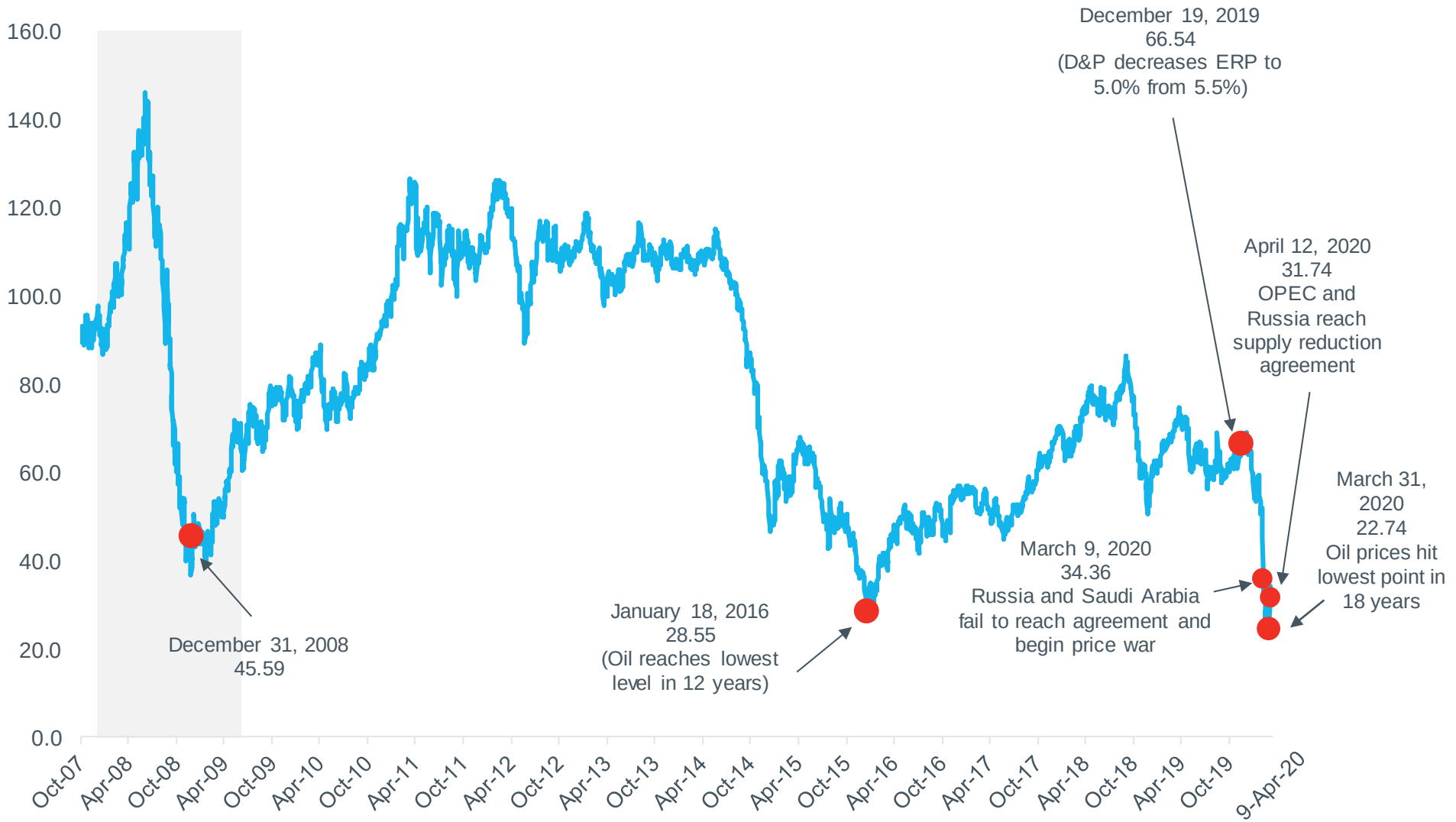
Counts

Decline	0 to 6 months	7 to 12 months	13 to 18 months	19 to 24 months	25 to 30 months	31 to 36 months
> -80% and <= -90%	-	-	-	10	93	107
> -70% and <= -80%	-	9	110	115	32	17
> -60% and <= -70%	-	76	15	-	-	-
> -50% and <= -60%	12	91	103	127	102	-
> -40% and <= -50%	87	109	118	123	182	213
> -30% and <= -40%	112	99	59	30	90	168
> -20% and <= -30%	370	346	293	202	10	52
> -10% and <= -20%	889	1,068	725	461	280	31
> 0% and <= -10%	6,076	604	572	399	195	171
Total	7,546	2,402	1,995	1,467	984	759

Analysis performed over the time horizon December 31, 1927 through April 14, 2020 (daily).

Brent Crude Oil Prices (U.S. Dollars per barrel)

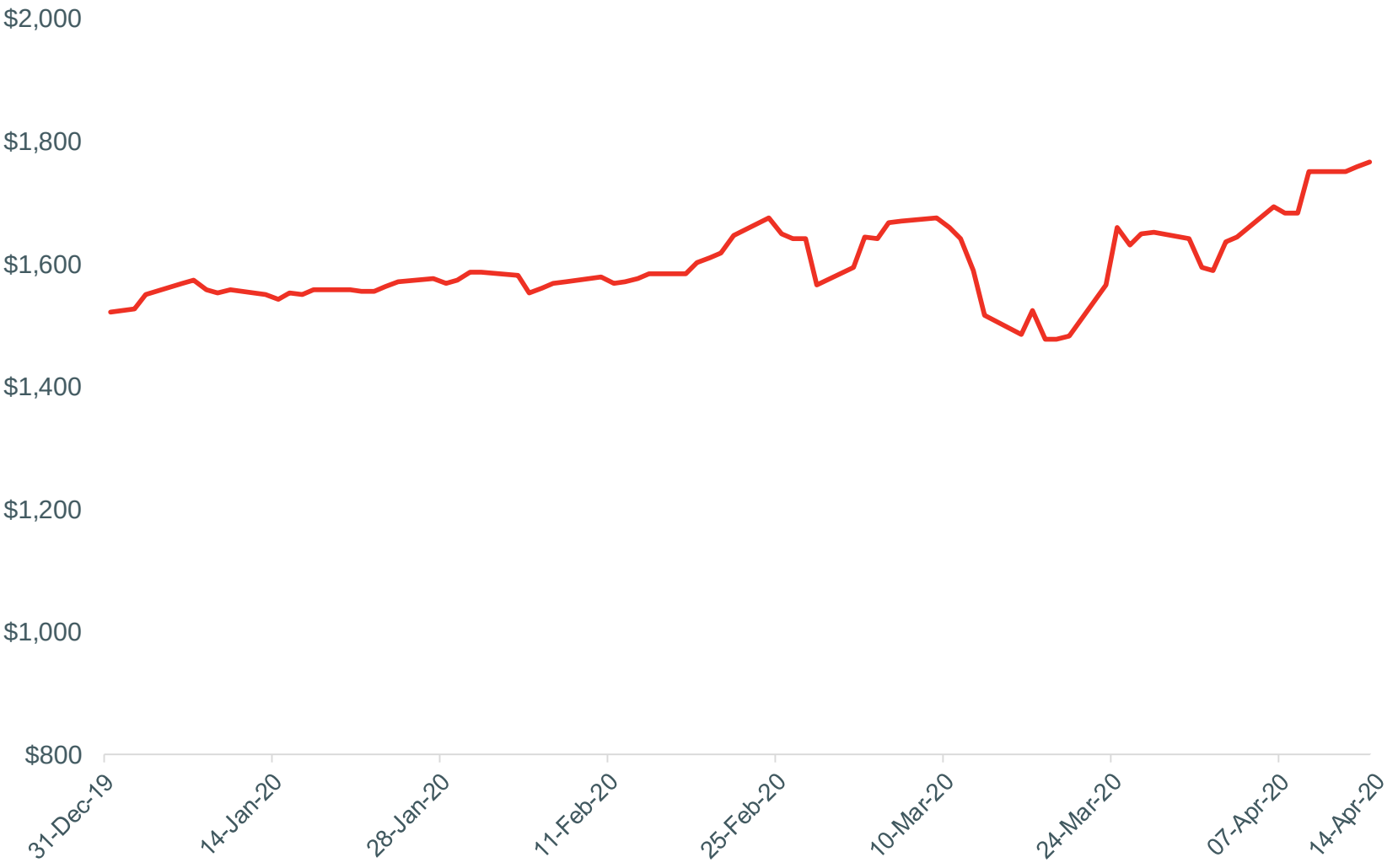
October 31, 2007 – April 14, 2020



Source: Bloomberg

Gold Prices (U.S. Dollars per troy ounce)

December 31, 2019 – April 14, 2020

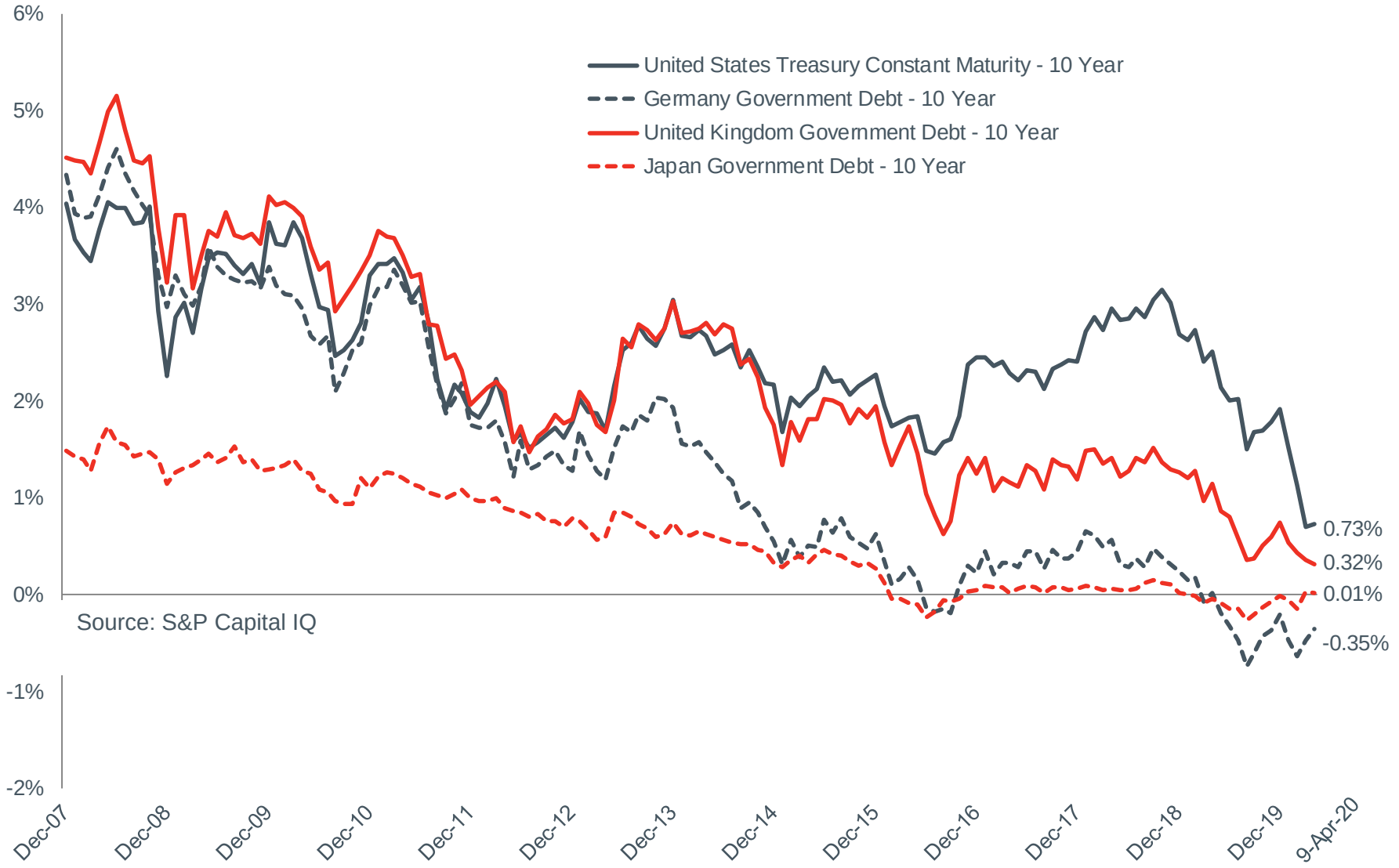


Source: S&P *Capital IQ*.

Risk-free Rate Analysis

10-year Yields for U.S., Germany, U.K., Japan

December 31, 2007 – April 9, 2020



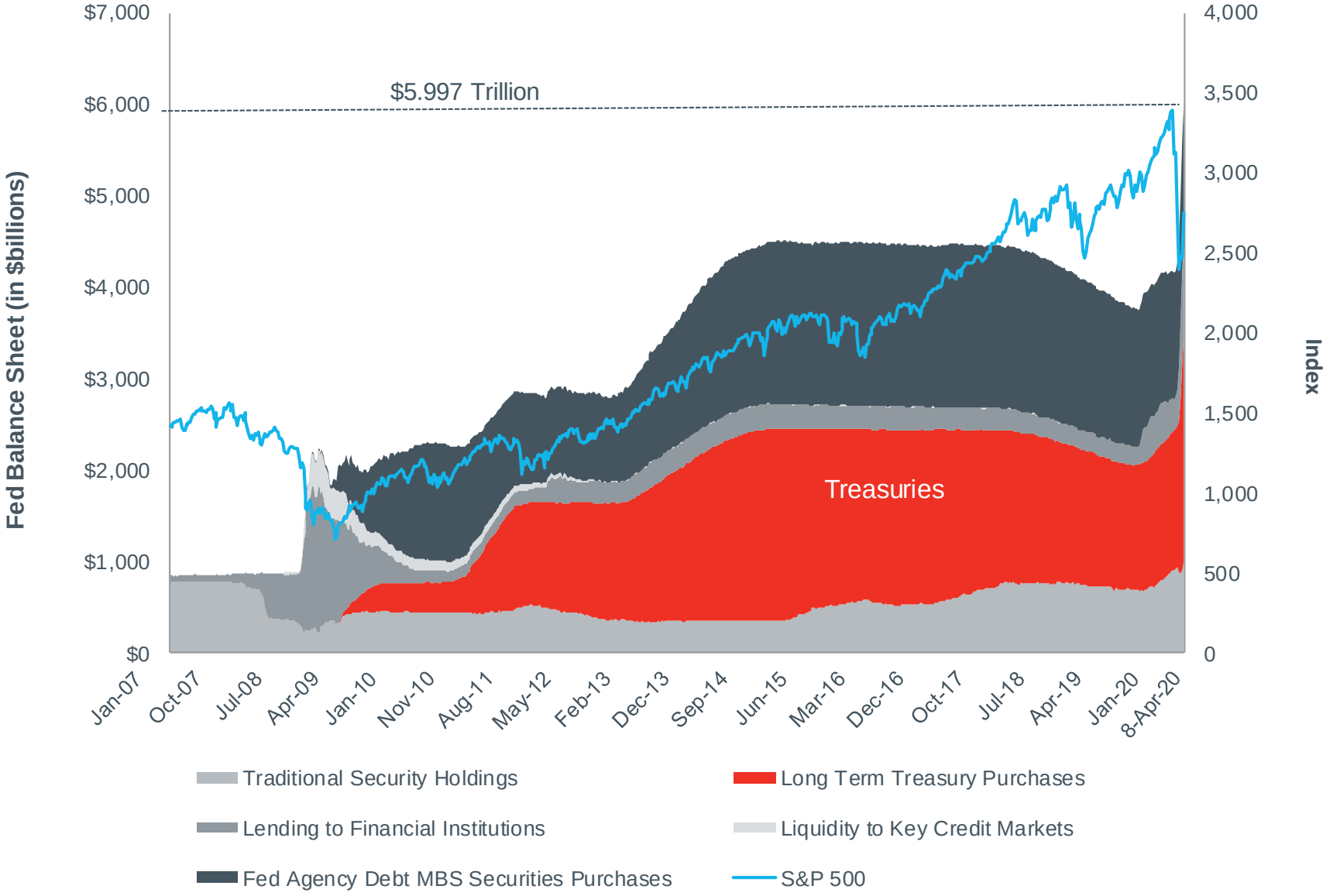
Federal Reserve (Fed) – A Selection of Monetary Policy Measures

As of April 10, 2020

Date	Amount Up To	Highlighted Actions & Announcements
3-Mar-20		Policy Rate (Target Fed Funds Rate) cut by 50 b.p. to a target range of 1% to 1.25%
15-Mar-20		Policy Rate (Target Fed Funds Rate) cut by 100 b.p. to a target range of 0% to 0.25%
15-Mar-20	$700 billion	• New program: $500 billion in U.S. Treasuries and $200 billion in Mortgage-Backed Securities (MBS) • Establishment of U.S. dollar liquidity swap line with other major central banks
17-Mar-20	$1.0 trillion	• Commercial Paper Funding Facility (CPFF) created • Primary Dealer Credit Facility (PDCF) created
18-Mar-20		• Money Market Mutual Fund Liquidity Facility (MMLF) created
19-Mar-20		• Establishment of U.S. dollar liquidity swap line with additional central banks
23-Mar-20	As needed	• Purchase of U.S. Treasuries and Agency bonds in "amounts needed“ • Three new facilities: Up to $600 million 1. Primary Market Corporate Credit Facility (PMCCF): support credit to large employers for new bonds and loans; and 2. Secondary Market Corporate Credit Facility (SMCCF) to provide liquidity for outstanding corporate bonds 3. Term Asset-Backed Securities Loan Facility (TALF): enable issuance of asset-backed securities (ABS) by student, car and credit-card loans, and loans guaranteed through Small Business Administration • Expand scope of CPFF and MMLF
9-Apr-20	$2.3 trillion	New $2.3 trillion loan program to support the economy: • Paycheck Protection Program Liquidity Facility to extend credit to PPP financial institutions • Main Street Lending Program: Up to $600 billion • Expand size and scope of PMCCF, SMCCF, and TALF: Up to $850 billion • Municipal Liquidity Facility: Up to $500 billion

Federal Reserve Balance Sheet

January 1, 2007 – April 8, 2020

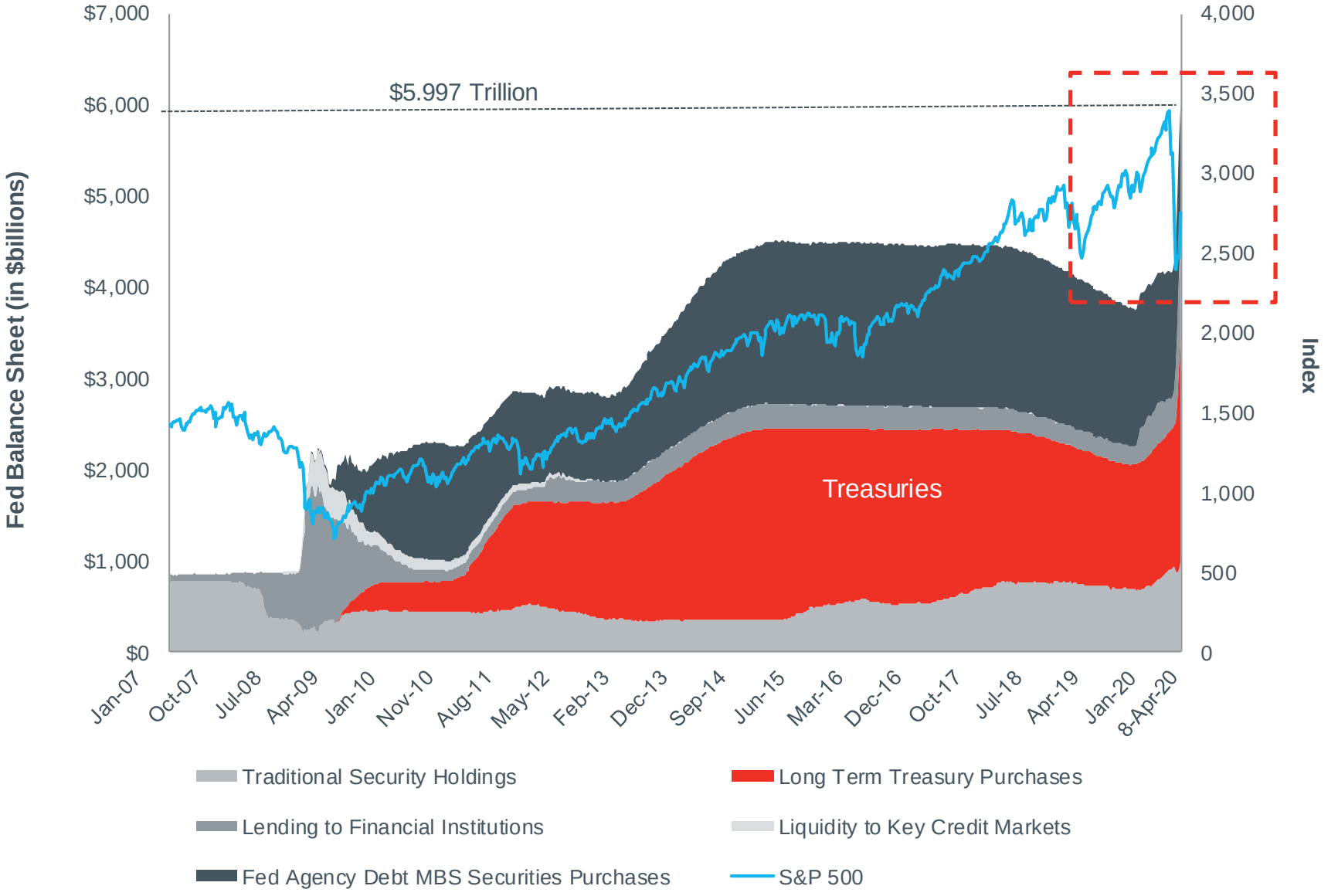


Source: Federal Reserve Bank of Cleveland

Federal Reserve Balance Sheet

January 1, 2007 – April 8, 2020

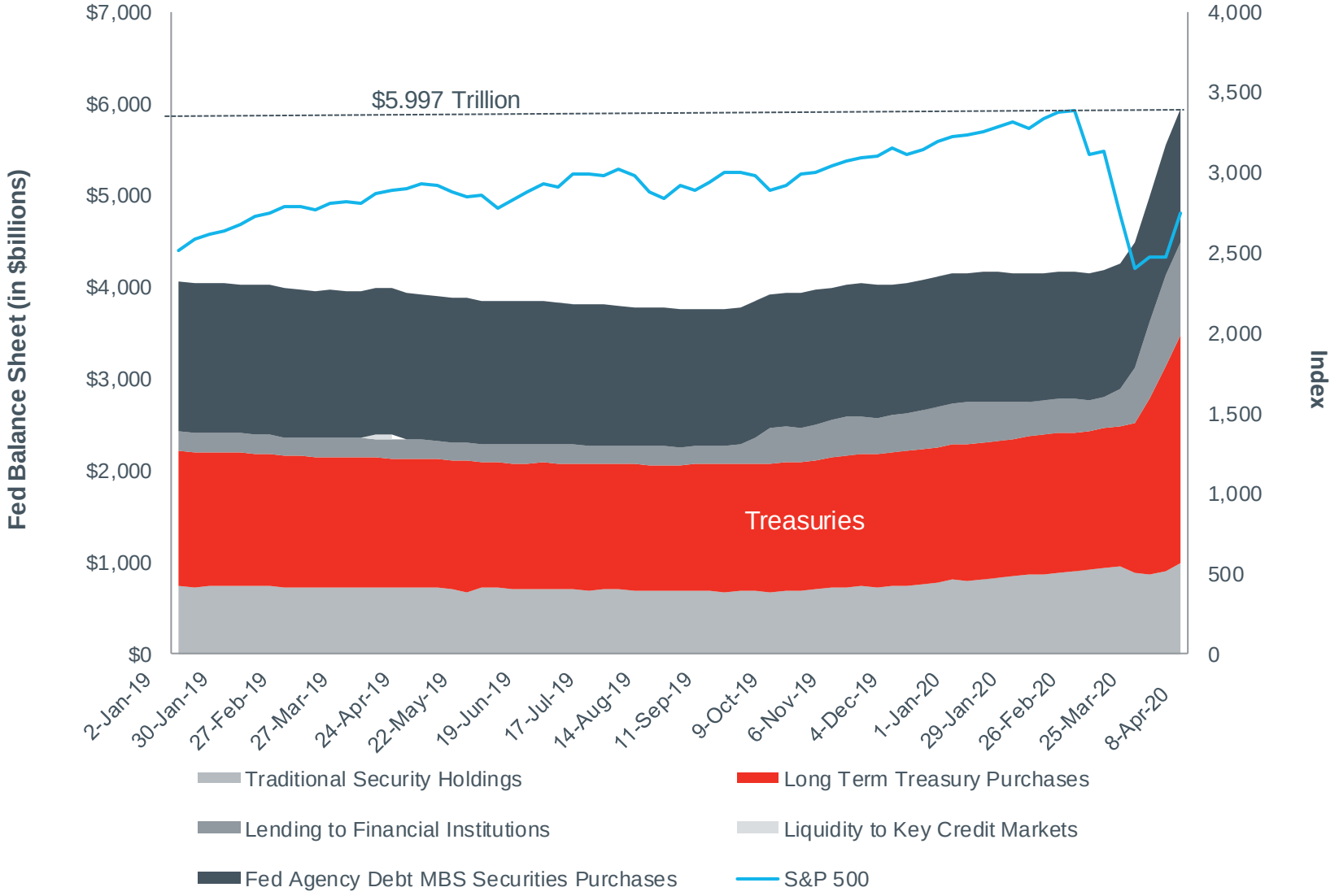
Let's take a closer look!



Source: Federal Reserve Bank of Cleveland

Federal Reserve Balance Sheet (a closer look)

January 2, 2019 – April 8, 2020



Source: Federal Reserve Bank of Cleveland

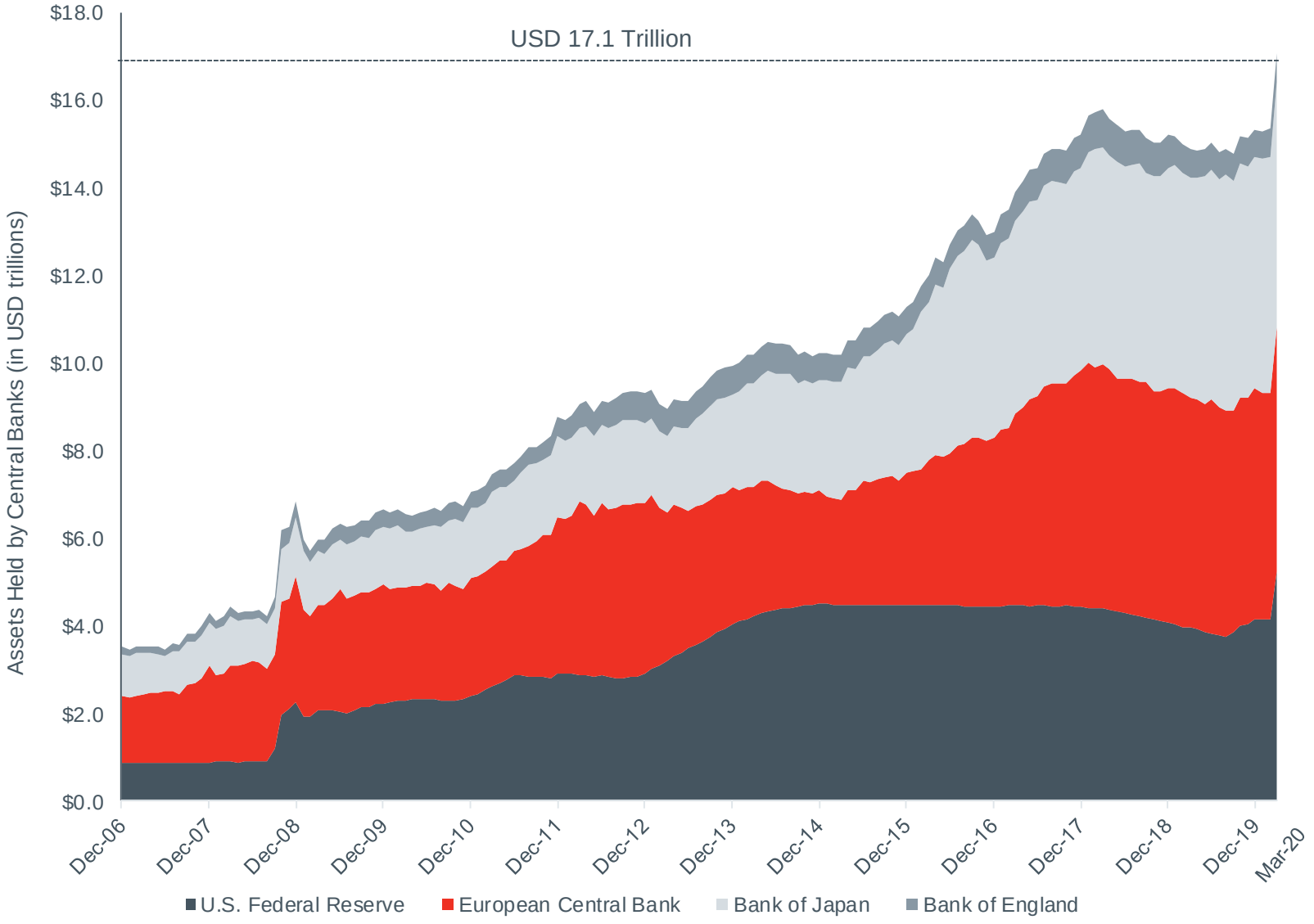
European Central Bank (ECB) – Summary of Actions

As of April 10, 2020

Date	Amount Up To	Highlighted Actions & Announcements
12-Mar-20	€120 billion	• Expanded existing asset purchase program (APP) by €120 billion ($130 billion) • Additional auctions and more favorable terms on existing targeted longer-term refinancing operations (TLTRO-III) between June 2020 and June 2021
18-Mar-20	€750 billion	• New Pandemic Emergency Purchase Program (PEPP): €750 billion ($830 billion) • Purchases conducted until the end of 2020 • Include all assets in existing the APP • Greek government bonds granted waver • Scope increase under existing corporate sector purchase program (CSPP) to include non-financial commercial paper
20-Mar-20		• Coordinated actions with other major central banks to enhance U.S. dollar liquidity
7-Apr-20		• ECB adopts an unprecedented set of collateral measures to mitigate the tightening of financial conditions across the euro area

Combined Central Banks' Balance Sheet: Fed, ECB, BOE, BOJ

December 1, 2006 – March 31, 2020



Source: Federal Reserve Bank of St. Louis Economic Research and the Bank of England.

The Risk-free Rate (R_f) – Spot Rate or "Normalized" Rate?

During periods in which risk-free rates appear to be abnormally low due to flights to quality or massive monetary policy interventions (i.e. QE or quantitative easing)

=> Duff & Phelps recommends normalizing the risk-free rate

Abnormally Low Rf

Use Normalized Risk-free Rate

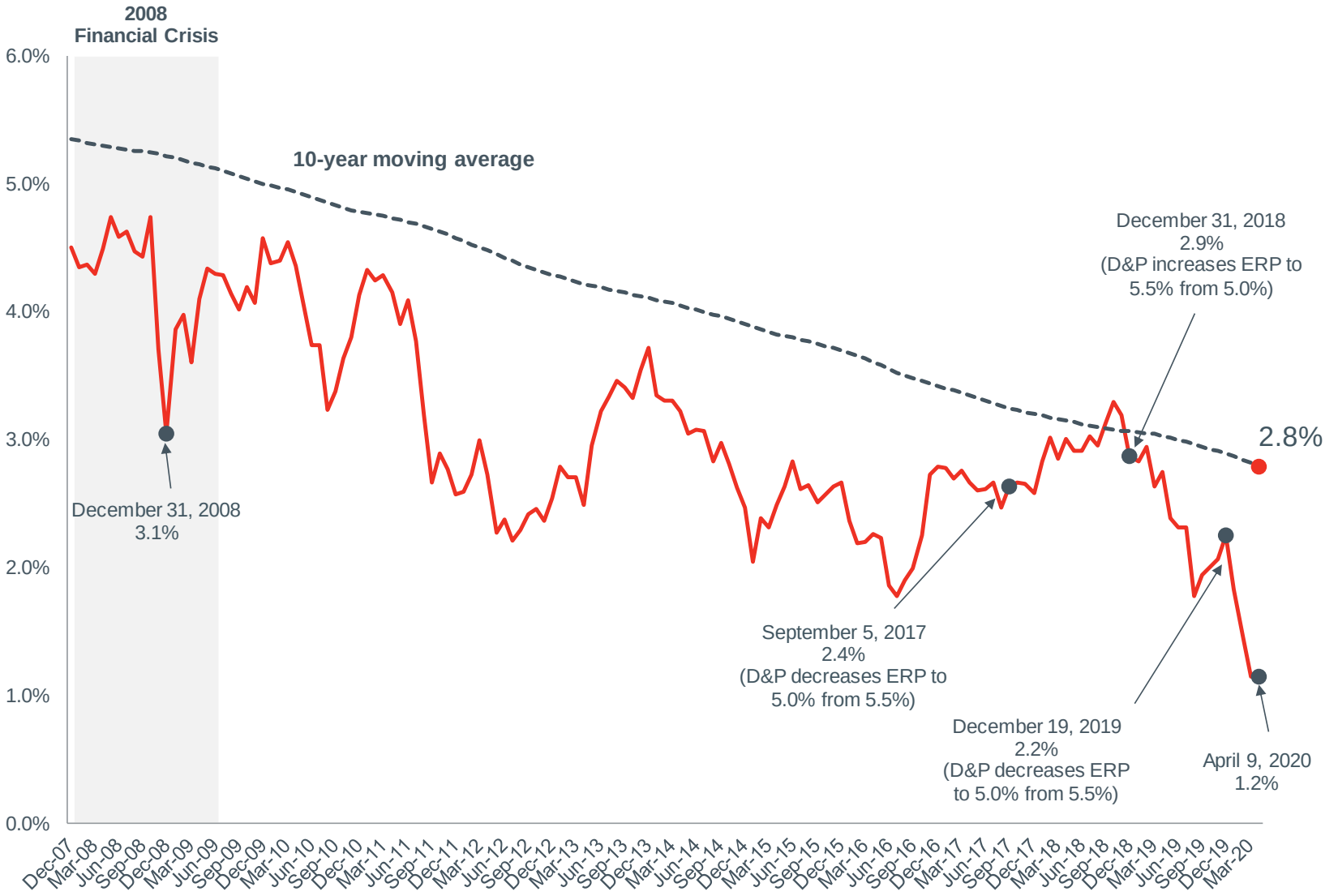
The Risk-free Rate (R_f) – Spot Rate or "Normalized" Rate?

Normalization can be accomplished in a number of ways, including:

- Simple averaging
- Various "buildup" methods

U.S. 20-year Treasury Yield, including Trailing Average

December 31, 2007 – April 9, 2020



Source: 20-year U.S. government bond series. Board of Governors of the Federal Reserve System.

Fisher Equation

Conceptually, the risk-free rate can be (loosely) illustrated as the return on the following two components: *

* Technically, an Inflation Risk Premium should also be added, but it can be positive or negative, with some academic estimates at close to 0%

United States

Several academic studies have suggested the long-term real risk-free rate to be somewhere in the range of 0.0% to 2.0% based on the study of inflation swap rates, yields on long-term U.S. Treasury Inflation-Protected Securities (TIPS), OLG, DGSE and other econometric models *

* In academic literature, this is also sometimes called the natural rate of interest, the neutral rate, or the equilibrium rate

Risk-Free Rate Normalization – Long-term Expected Inflation

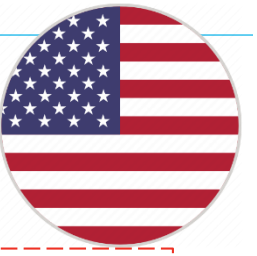
Estimates as of March 23, 2020

Source	Estimate (%)
Livingston Survey (Federal Reserve Bank of Philadelphia)	2.2
Survey of Professional Forecasters	2.2
Blue Chip Financial Forecasts	2.1
Blue Chip Economic Indicators	2.2
Consensus Economics	2.2
Cleveland Federal Reserve	1.4
Arouba Term Structure of Inflation Expectations	2.2
University of Michigan Survey 5-10 Year Ahead Inflation Expectations	2.3
Range of Expected Inflation Forecasts	**1.4% – 2.3%**

Sources: "Survey of Professional Forecasters: First Quarter 2020", Federal Reserve Bank of Philadelphia (February 14, 2020); "The Livingston Survey: December 2019", Federal Reserve Bank of Philadelphia (December 13, 2019); "Consensus Forecasts Global Outlook 2021–2029", Consensus Economics Inc. (October 2019); "Consensus Forecasts – A Digest of International Economic Forecasts", Consensus Economics Inc. (December 2019); Blue Chip Economic Indicators (March 10, 2020), Blue Chip Financial Forecasts (December 1, 2019 and March 1, 2020); University of Michigan Survey (March 2020), Federal Reserve Bank of Philadelphia, Arouba Term Structure (February 2020), Cleveland Federal Reserve (March 1, 2020), S&P Capital IQ™ database.

Risk-Free Rate Normalization – By Buildup

U.S. Example as of March 23, 2020



0.0%	Long-term Real Rate	2.0%
+		+
1.4%	Long-term Inflation Forecasts	2.3%
=		=
1.4%	Long-term Normalized Risk-Free Rate	4.3%

(Midpoint = 2.9%)

=> 10-Year Trailing Average on 20-Year U.S. Treasury Yield = 2.8%

Concluded Normalized Rf = 3.0%

Equity Risk Premium

The Duff & Phelps Recommended ERP is a Two-Step Process

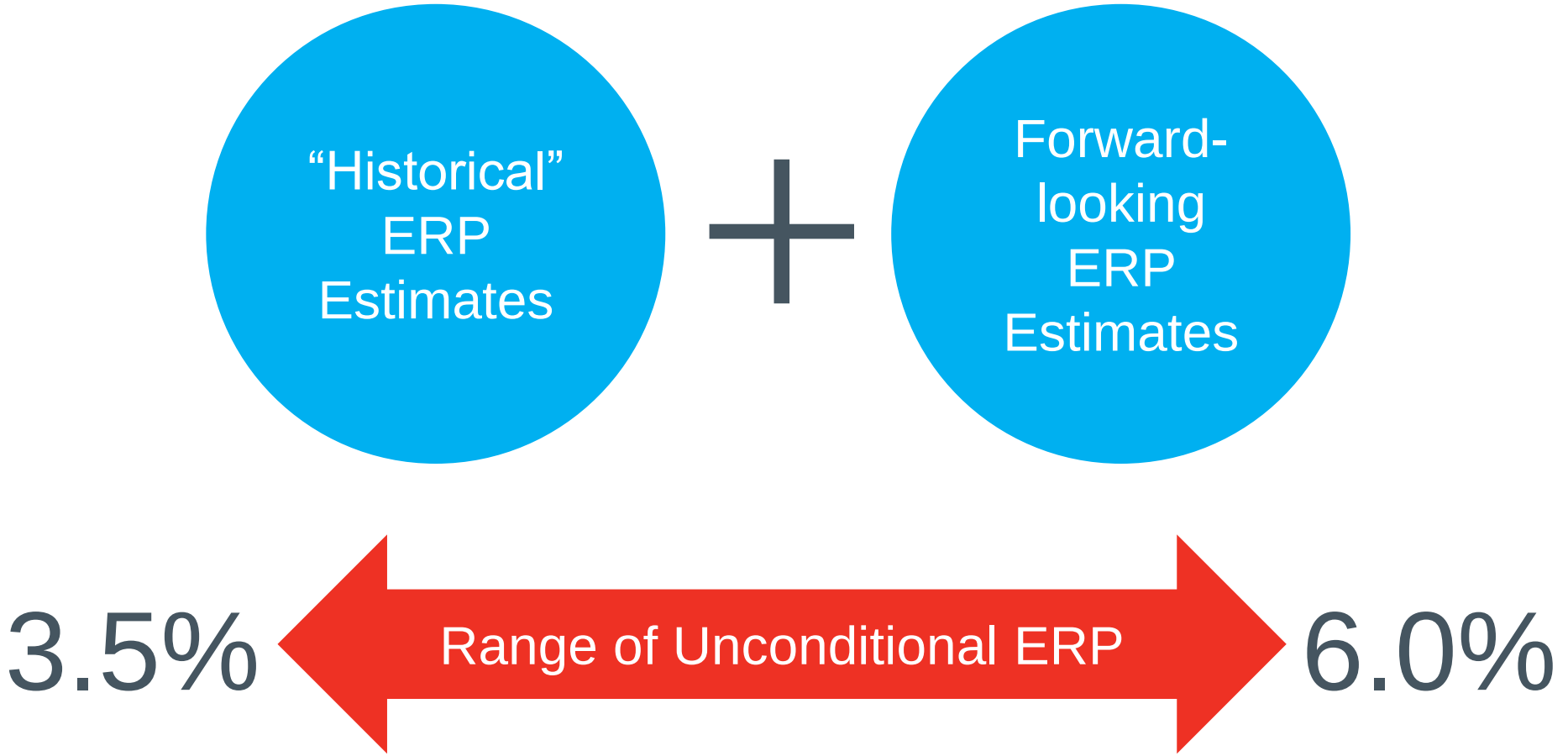
Step 1: What is a reasonable range of unconditional ERP that can be expected over an entire business cycle?

"What is the range?"

Step 2: Research has shown that ERP is cyclical during the business cycle. We use the term conditional ERP to mean the ERP that reflects current market conditions.

"Where are we in the range?"

Duff & Phelps Considers Multiple Models to Estimate U.S. ERP



Duff & Phelps Recommended U.S. Equity Risk Premium (ERP)

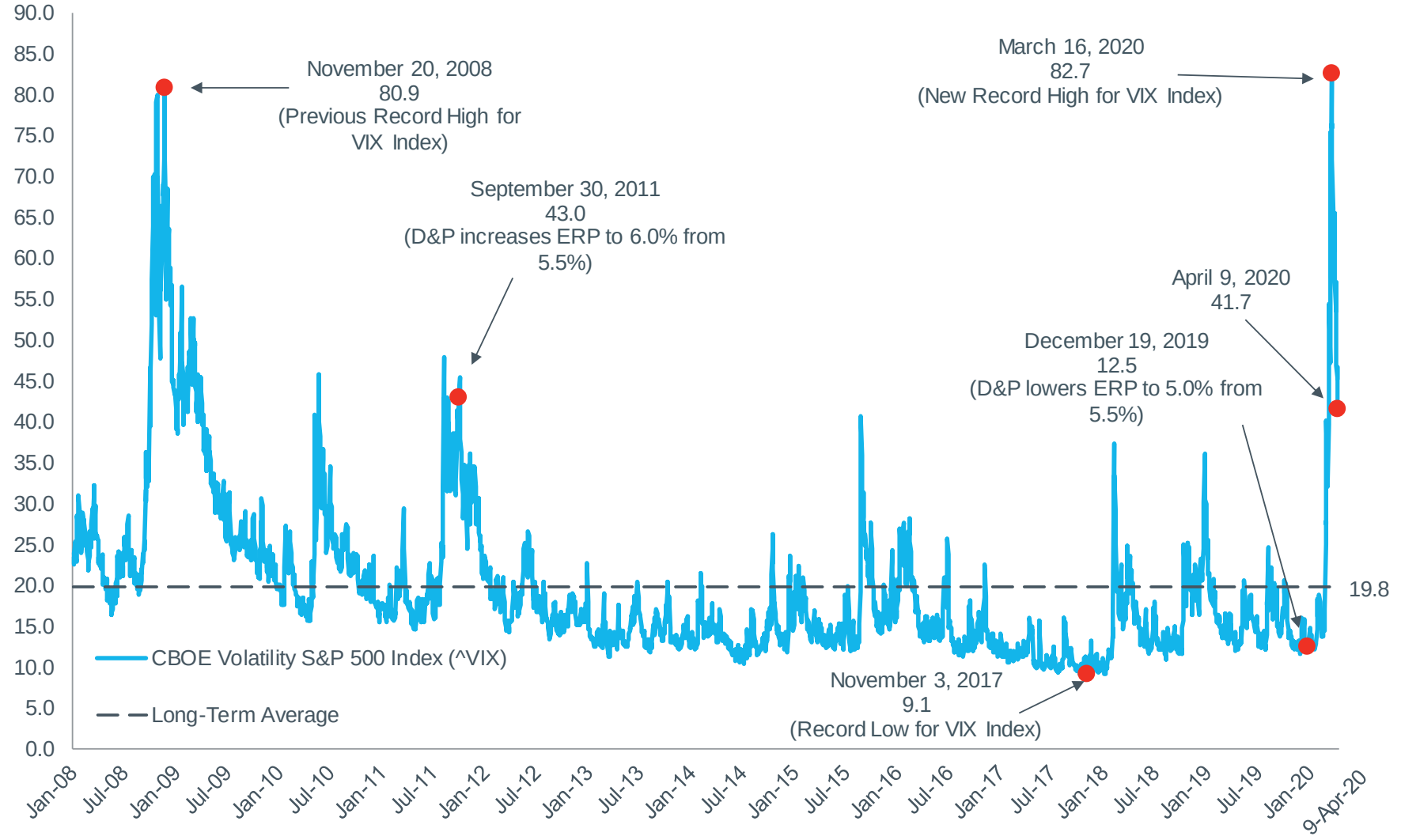
For discount rates developed as of:
March 25, 2020 (and thereafter)

Summary Table of Factors

Factor	Change	Effect on ERP
U.S. Equity Markets	↓	↑
Implied Equity Volatility	↑	↑
Corporate Debt Spreads	↑	↑
EPU and Equity Uncertainty	↑	↑
GDP Growth and GDP Growth Forecasts	↓	↑
Unemployment Environment	↓	↑
Consumer Sentiment	↓	↑
Business Confidence	↓	↑
Sovereign Credit Ratings	↔	↔
Default Spread Model	↑	↑
Damodaran Implied ERP Model	↑	↑

Chicago Board Options Exchange (CBOE) "VIX" Index

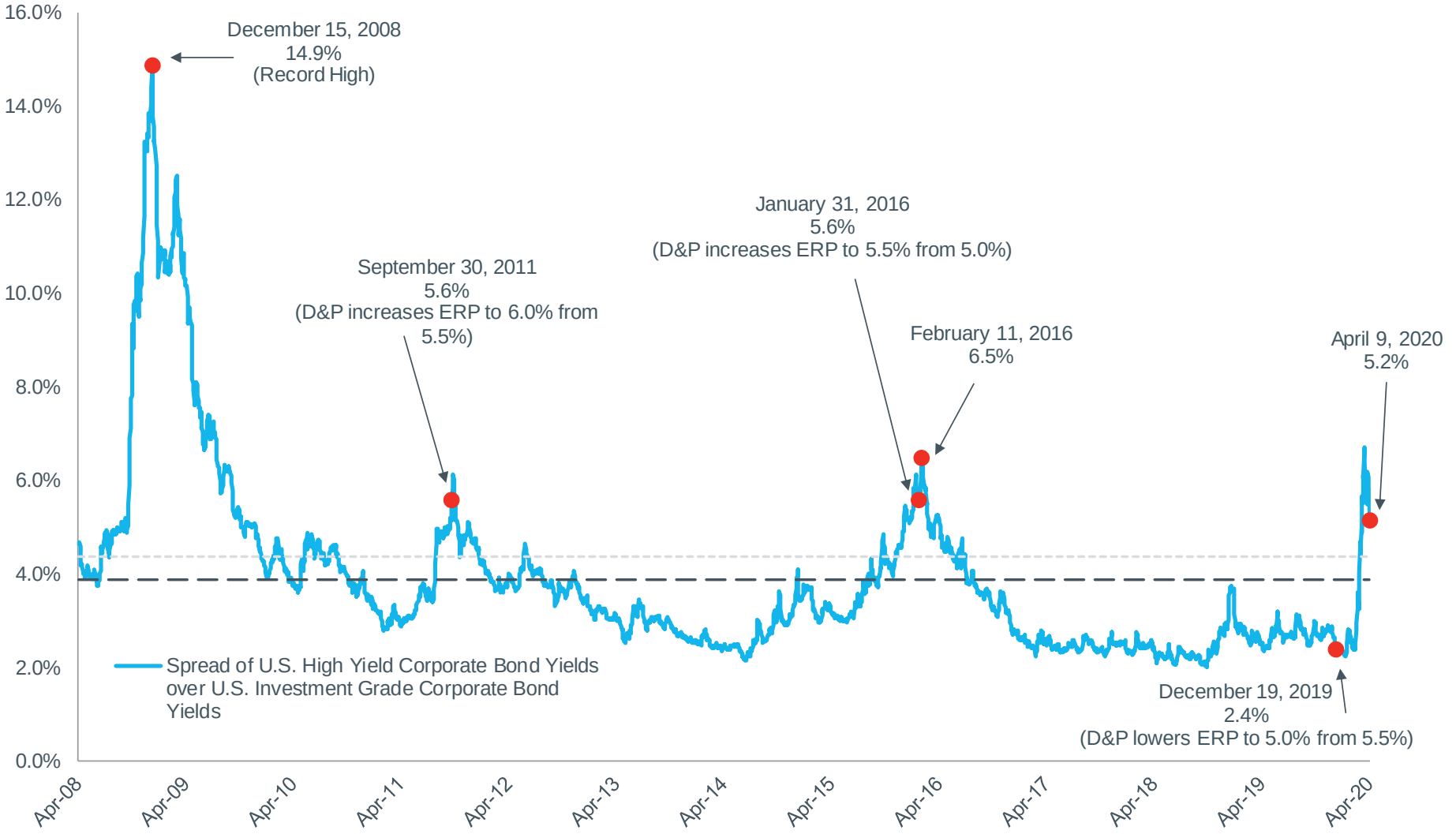
January 2, 2008 – April 9, 2020



Source: S&P *Capital IQ*.

Spread of U.S. High Yield Corporate Bond Yields Over U.S. Investment Grade Corporate Bond Yields

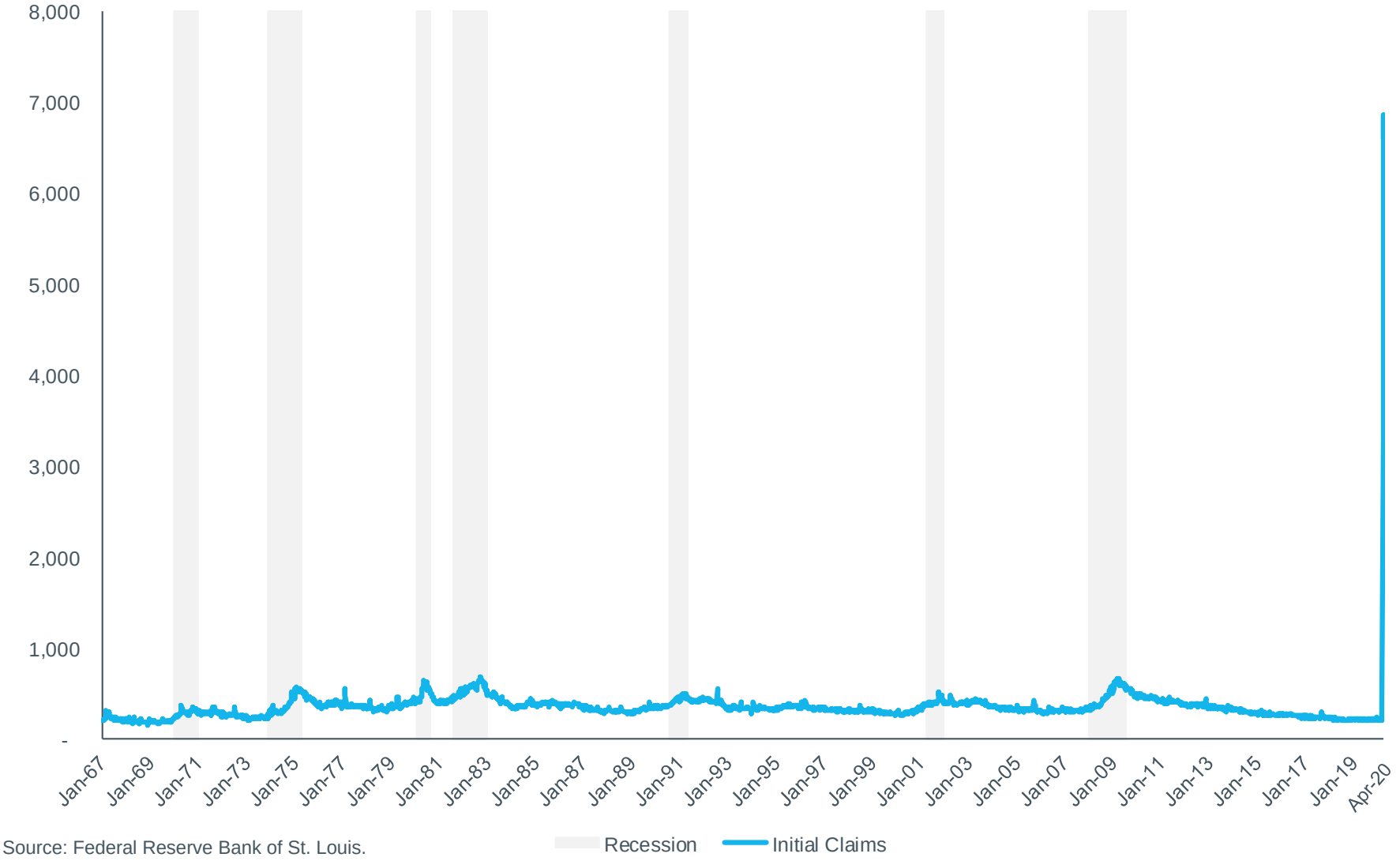
April 9, 2008 – April 9, 2020



Source: S&P *Capital IQ*.

Initial Jobless Claims – Seasonally Adjusted (in Thousands)
(Recessionary periods shaded in gray)

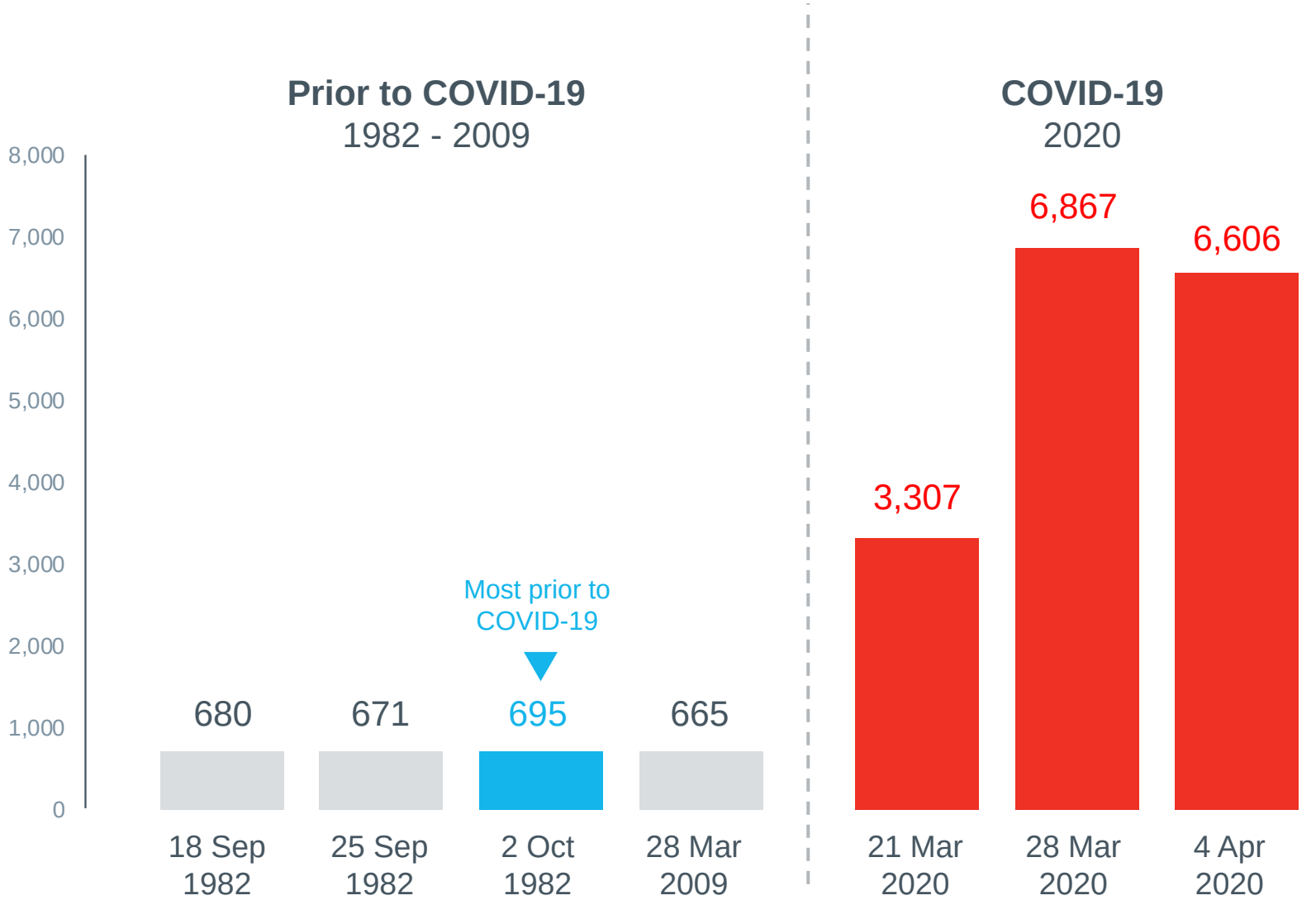
January 7, 1967 – April 4, 2020



Source: Federal Reserve Bank of St. Louis.

Weekly Initial Jobless Claims (Seasonally Adjusted), Over Time in Thousands

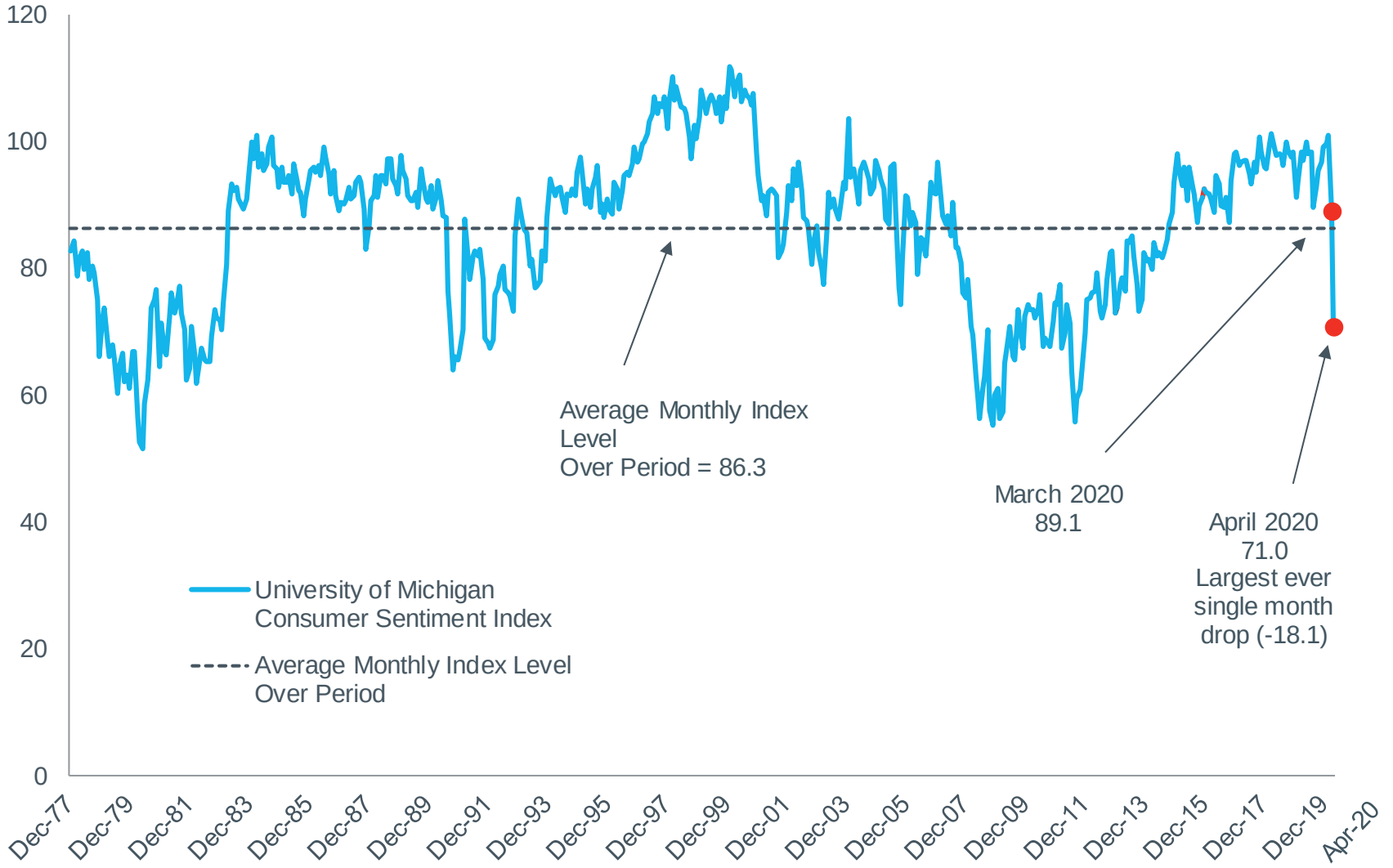
January 7, 1967 – April 4, 2020



Source: Federal Reserve Bank of St. Louis.

University of Michigan Consumer Sentiment

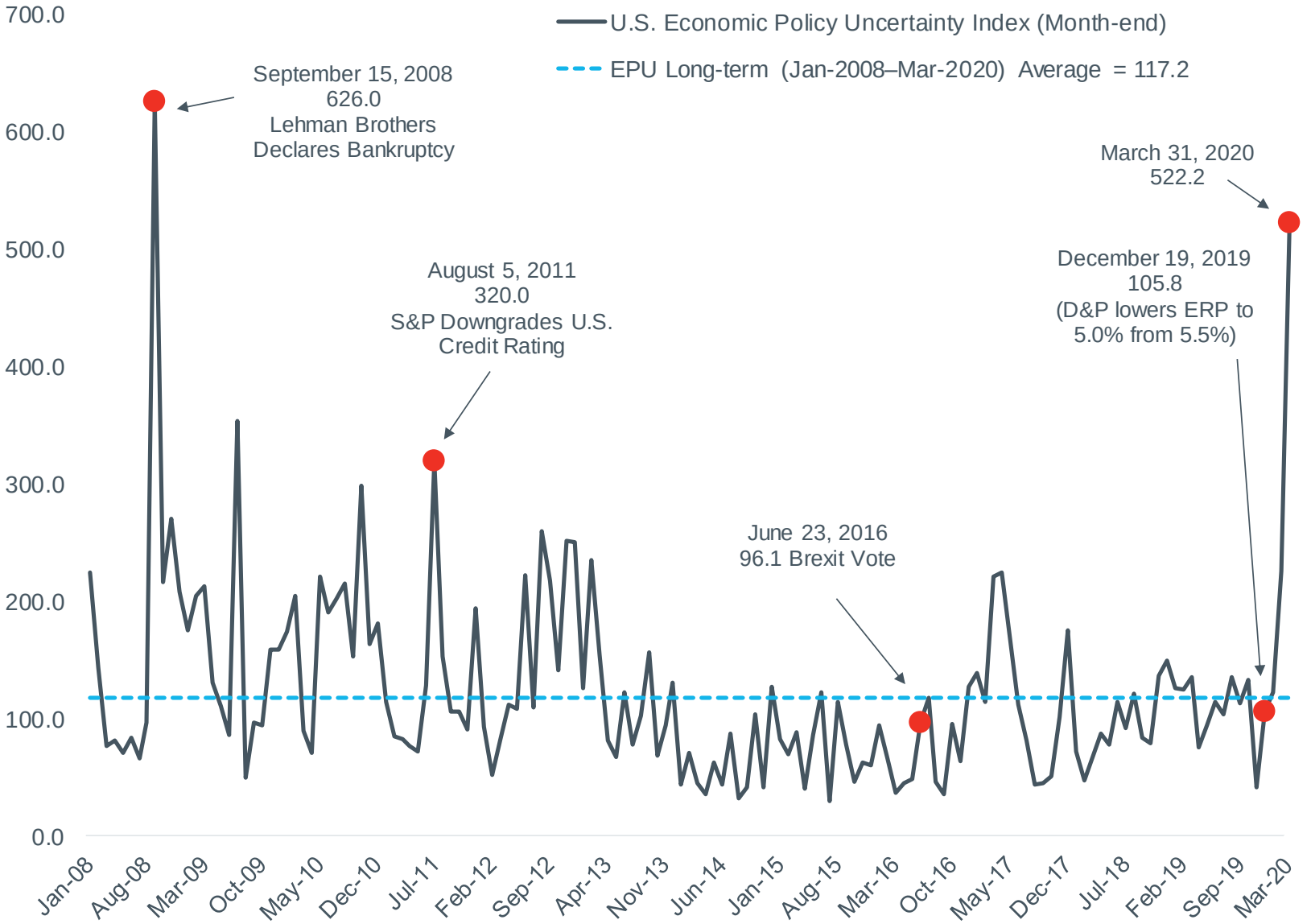
December 1978 – April 2020



Source: University of Michigan.

U.S. Monthly Economic Policy Uncertainty Index

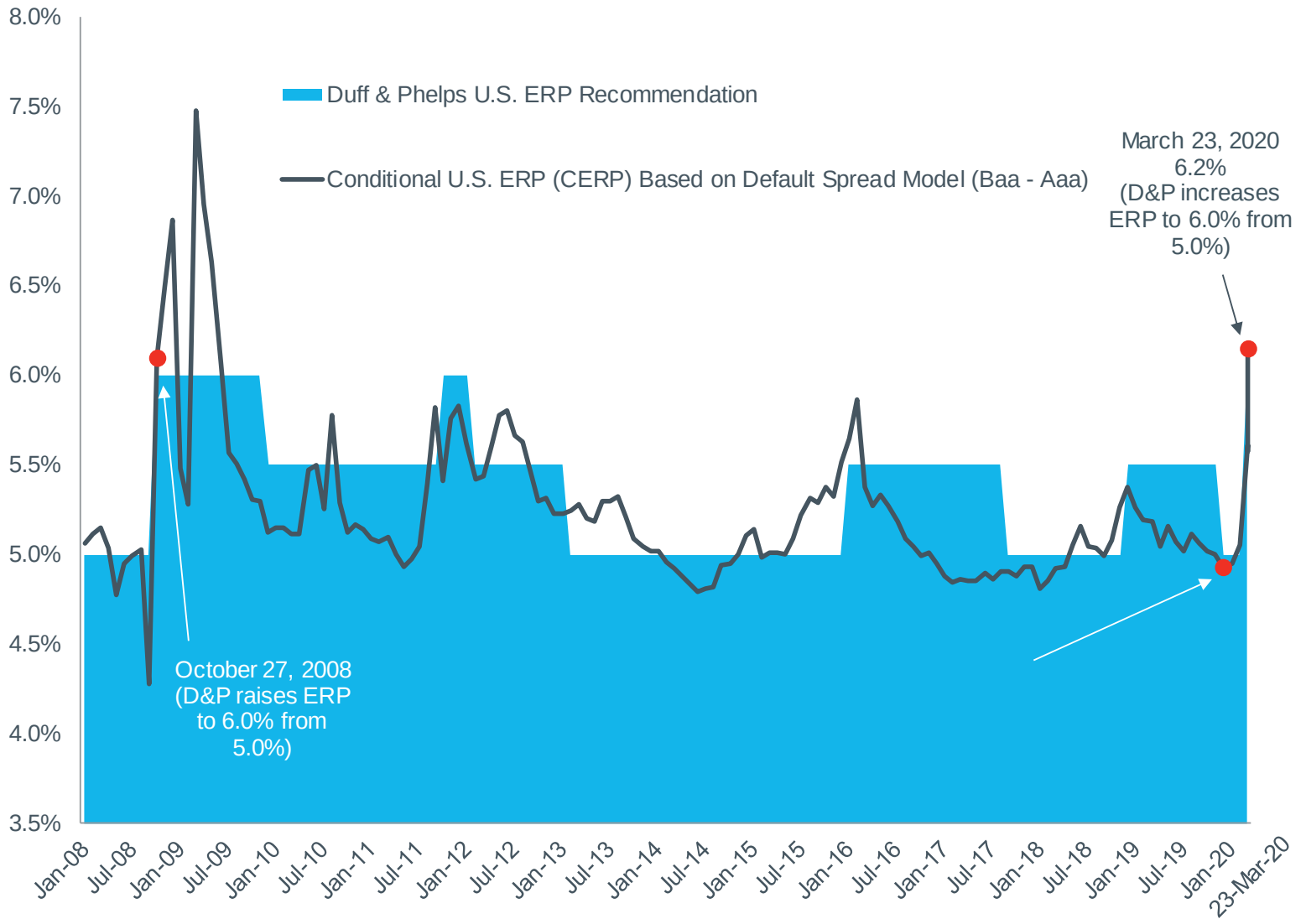
January 1, 2008 – March 31, 2020



Source: Economic Policy Uncertainty

Default Spread Model

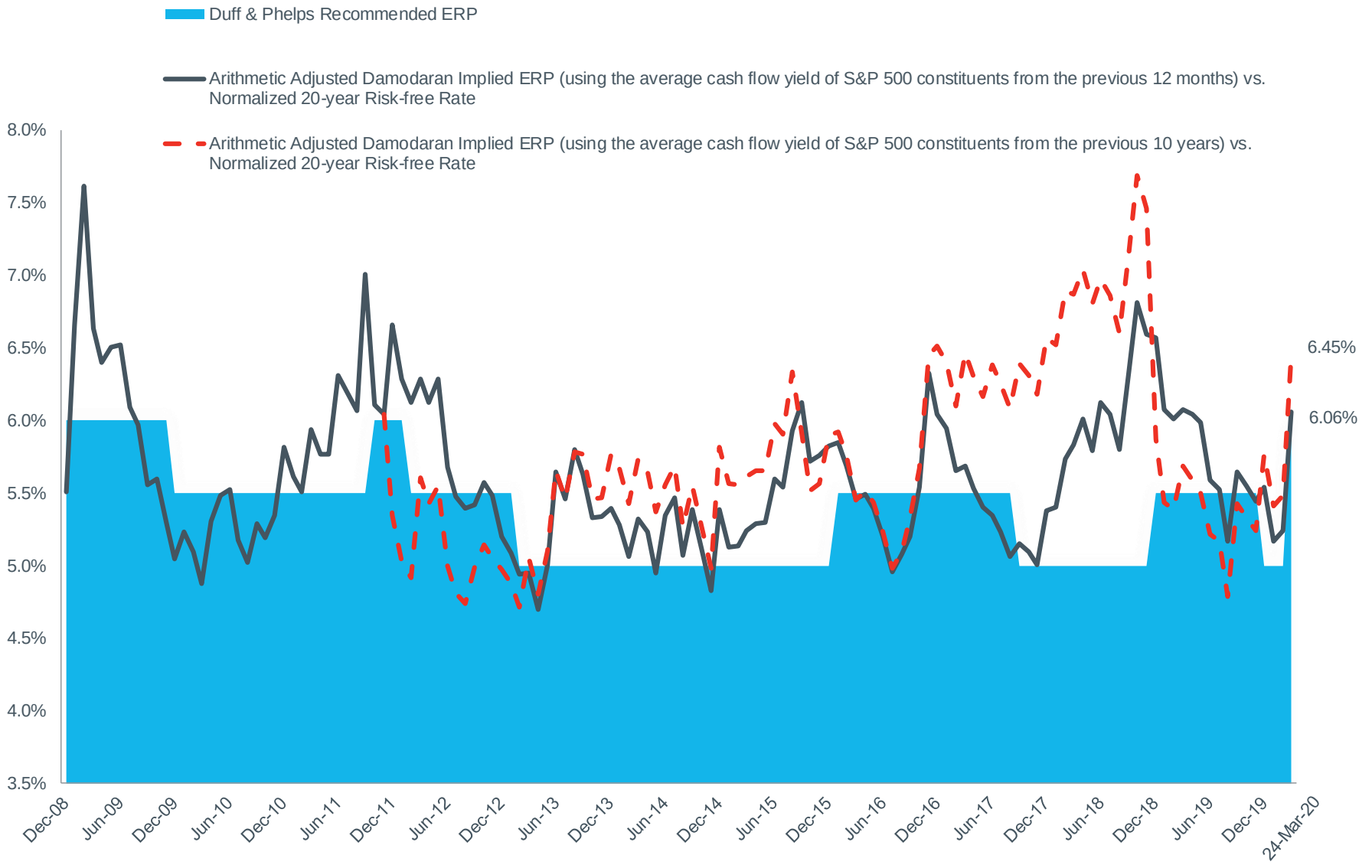
January 2008 – March 23, 2020



Source of Underlying Data: Bloomberg Barclays US Corp Baa Long Yld USD (Yield) and Bloomberg Barclays US Corp Aaa Long Yld USD (Yield). Morningstar *Direct*.

Damodaran Implied ERP vs Duff & Phelps Recommended ERP

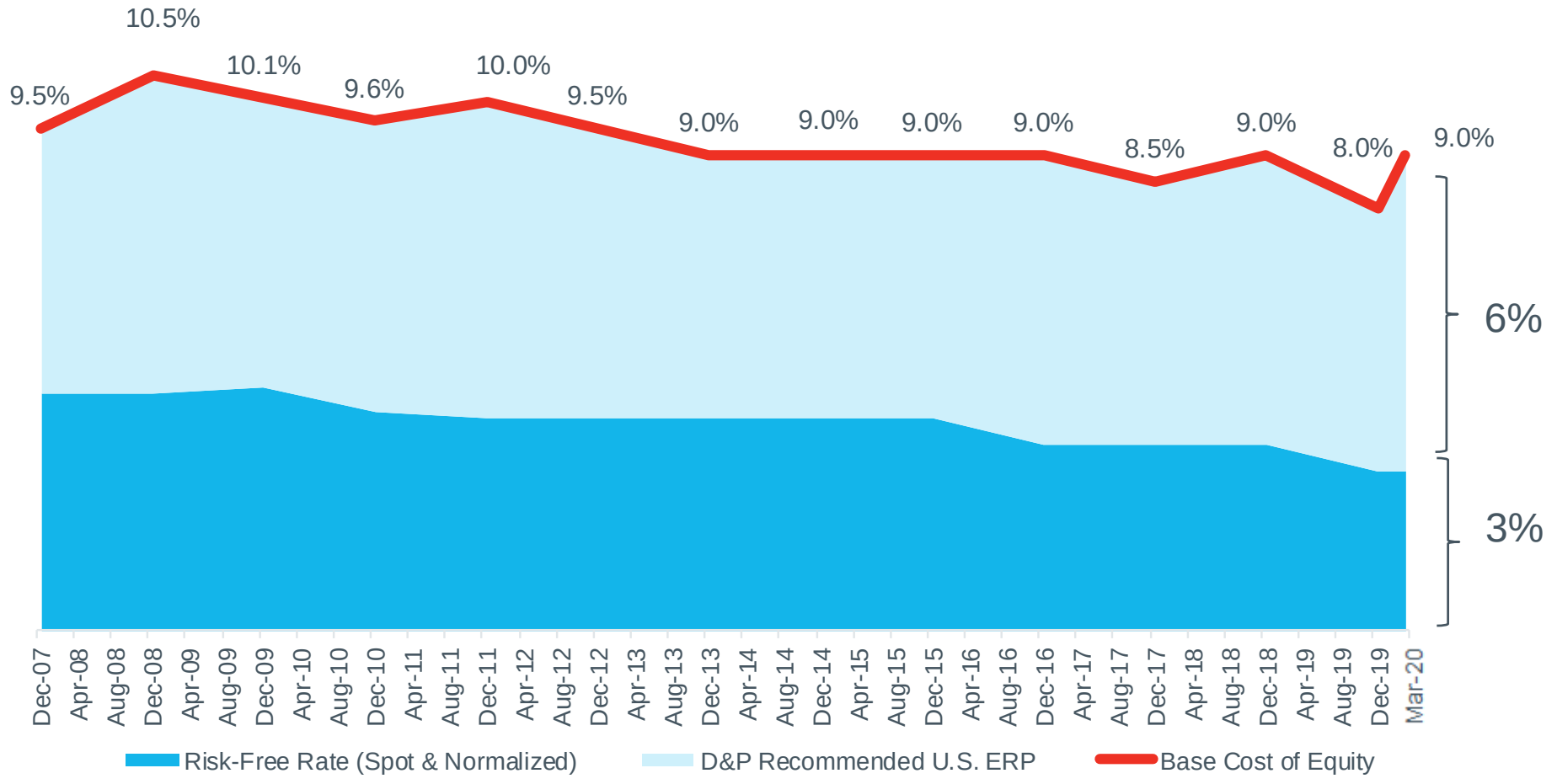
December 31, 2008 – March 24, 2020



Source: Aswath Damodaran. http://pages.stern.nyu.edu/~adamodar/

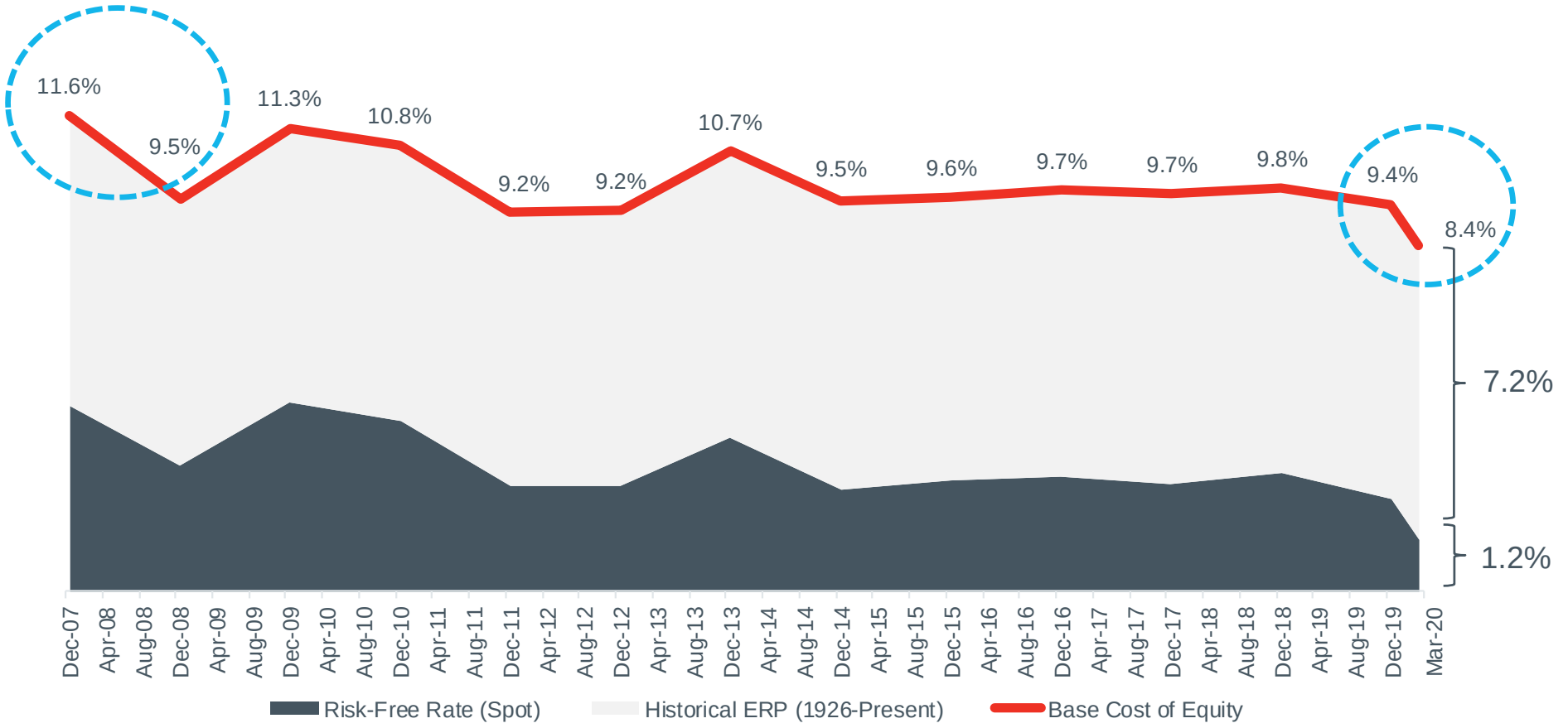
Duff & Phelps U.S. Recommended ERP and Corresponding Risk-free Rates

January 2008 – Present



Spot 20-year U.S. Government Yield in Conjunction with Unadjusted “Historical” Equity Risk Premium*

2007 – March 25, 2020



*The Historical Equity Risk Premium is defined as the ERP over the years 1926–Present as of the date of the analysis. For example The Historical Equity Risk Premium for December 2018 spans the years 1926–2018 while the Historical ERP for 2019 spans the years 1926–2019.

Inferred ERP:
Using the D&P U.S. Recommended ERP against a Spot Risk-Free Rate
As of March 25, 2020

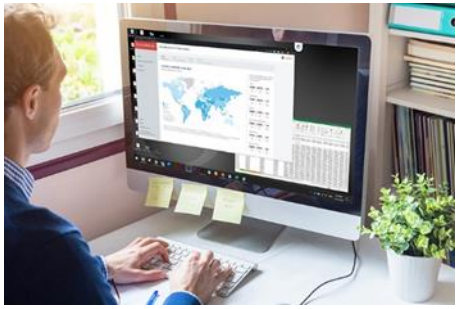
Duff & Phelps U.S. Recommended ERP		Normalized Risk Free Rate		Spot 20-Year U.S. Treasury Yield		Inferred U.S. ERP
6.0%	+	3.0%	–	1.23%	=	7.77%

Country Risk

Estimating the Cost of Capital from Empirical Data

Cost of Capital Navigator: International Cost of Capital Module

(Previously the *Valuation Handbook – International Guide to Cost of Capital*)



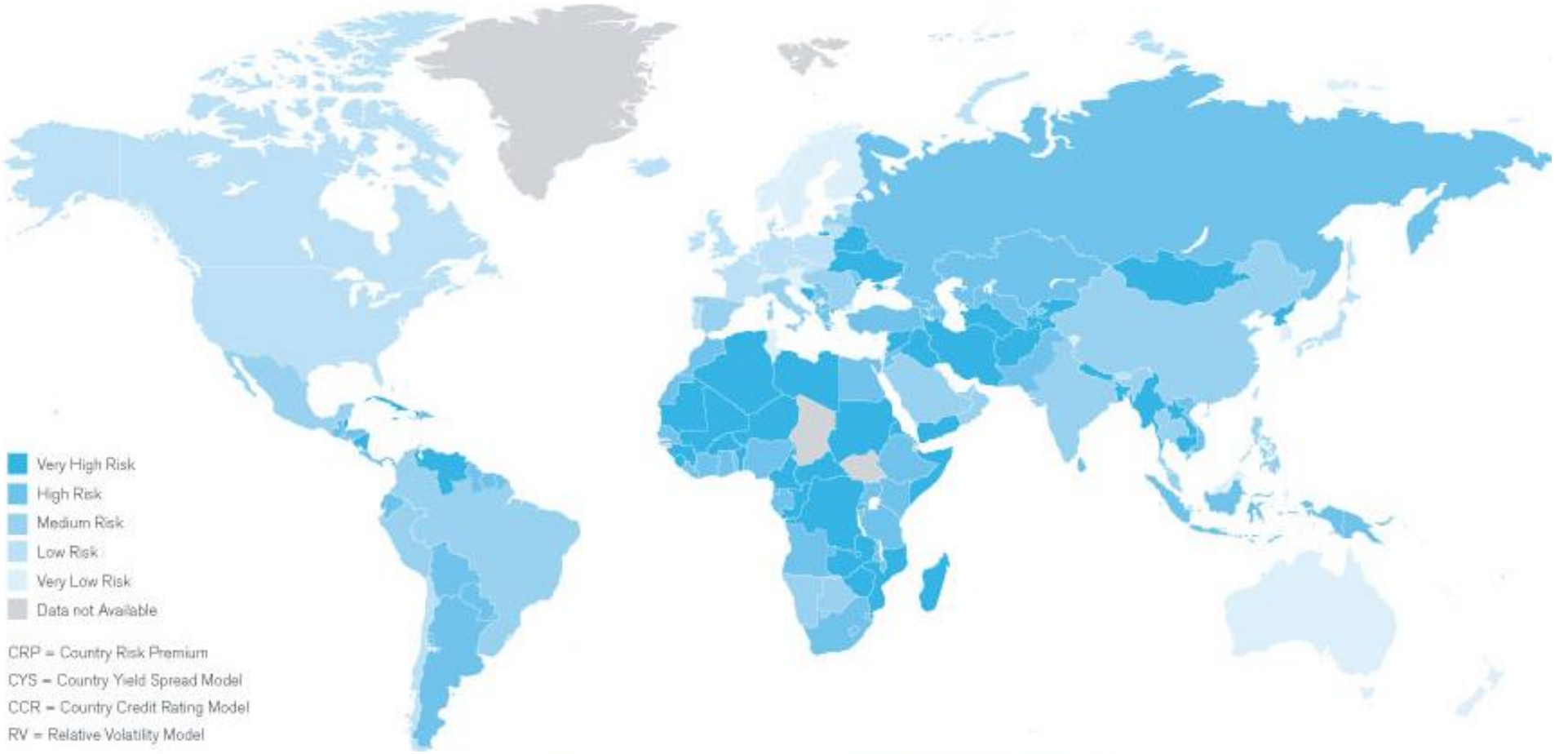
Country-level data

Available Models:

- **Country Yield Spread Model** – Country Risk Premia (CRPs)
- **Country Credit Rating Model** – Country Risk Premia (CRPs)
- **Relative Volatility Model** – Relative Volatility (RV) Factors

Global Country Risk Map

Data as of December 31, 2019



*Ranking of risk based on each country's Euromoney Country Risk (ECR) score, as published by Euromoney. For more information, visit: https://www.euromoney.com/country-risk.

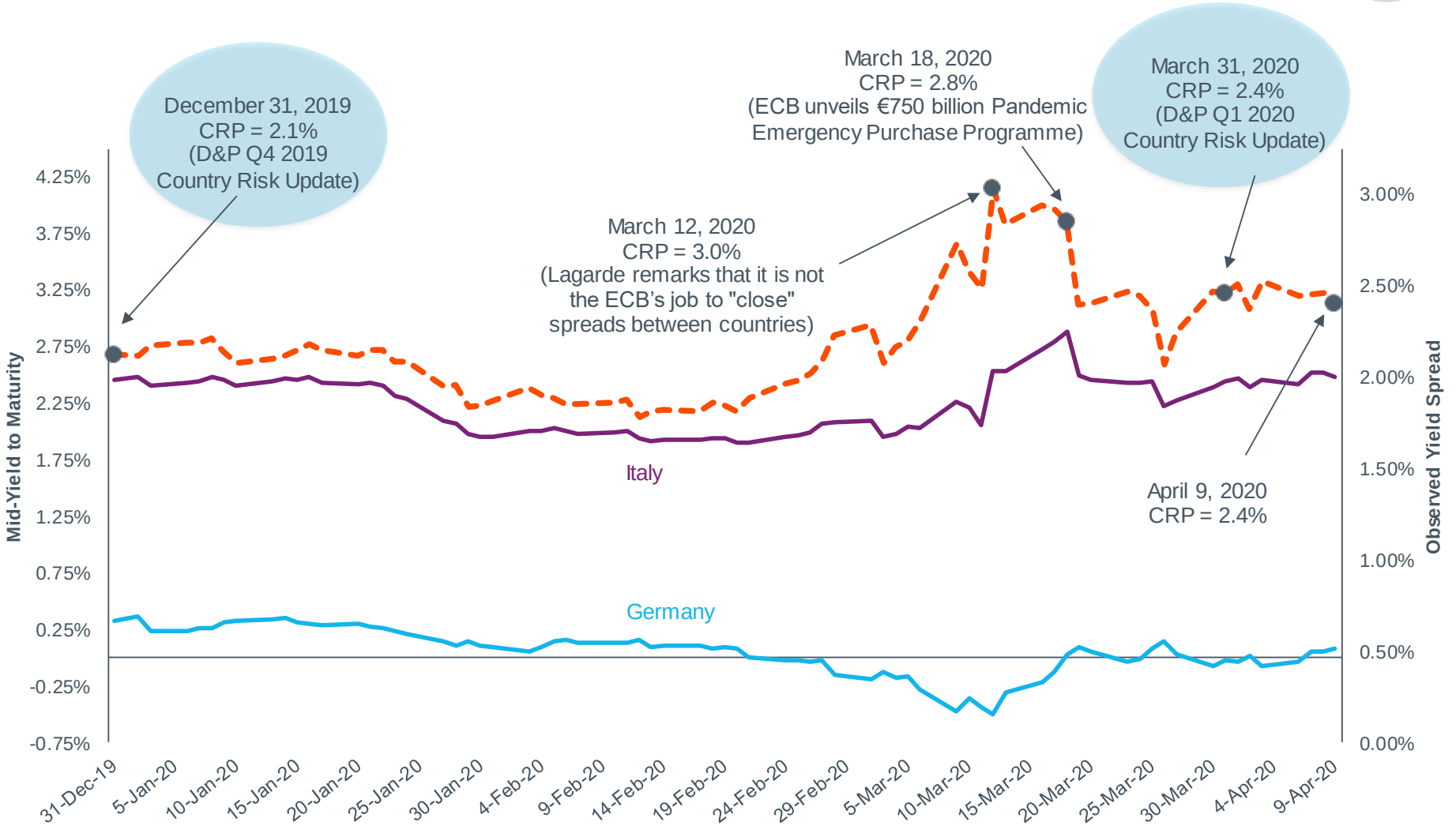
To the extent a country does not have an ECR score, but has a sovereign credit rating issued by one of the main rating agencies (Standard & Poor's, Moody's, Fitch), a similar methodology to ECR's is used to assign the risk level.

Country risk premia and relative volatility factors based on data extracted from the three international cost of capital models currently supported in the Cost of Capital Navigator's International module.

https://dpcostofcapital.com/international-cost-of-capital

Country Yield Spread Model – Italy Observed Yield Spreads in Euros

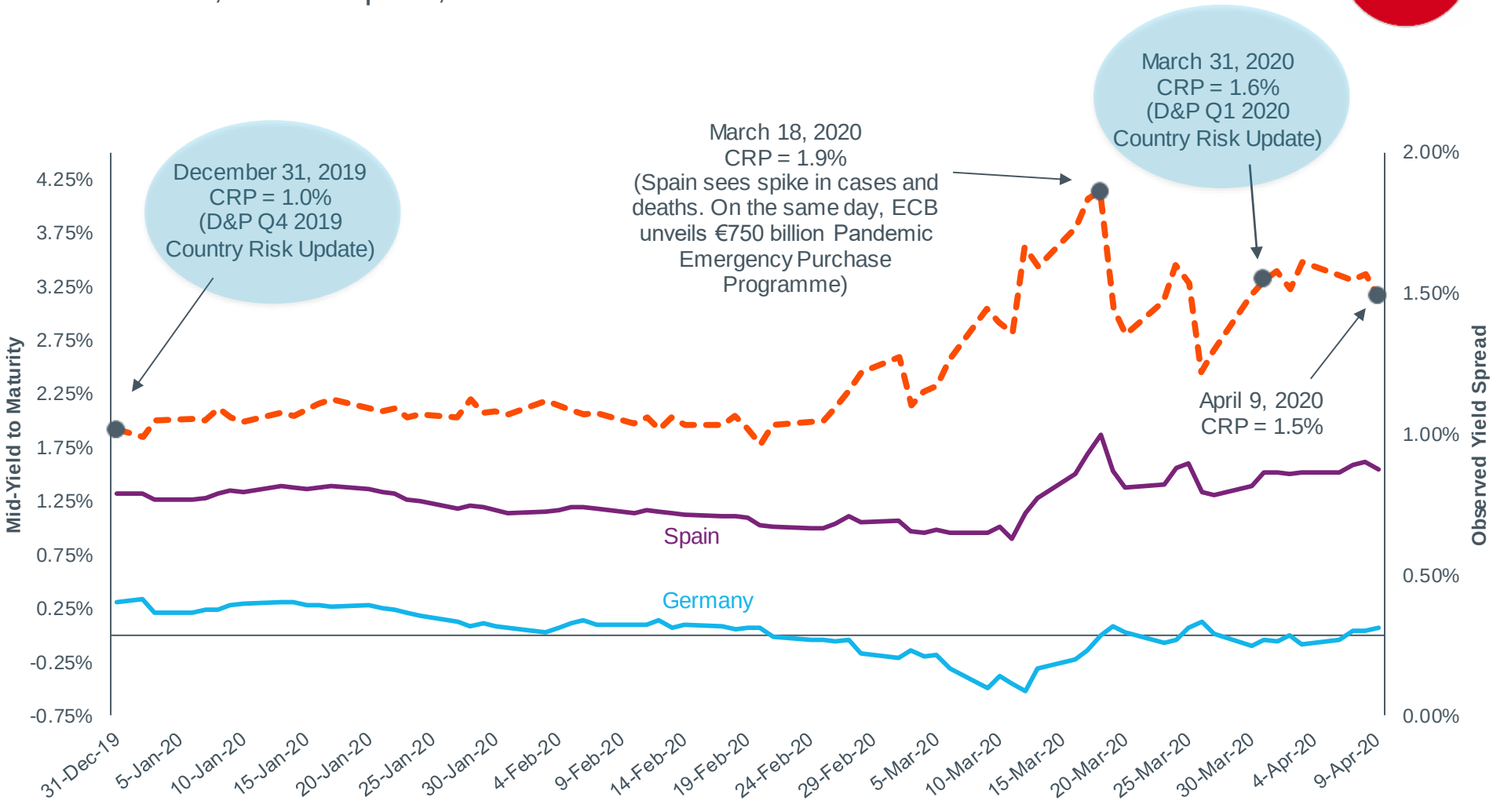
December 31, 2019 – April 9, 2020



Source: Bloomberg, Duff & Phelps Analysis

Country Yield Spread Model – Spain Observed Yield Spreads in Euros

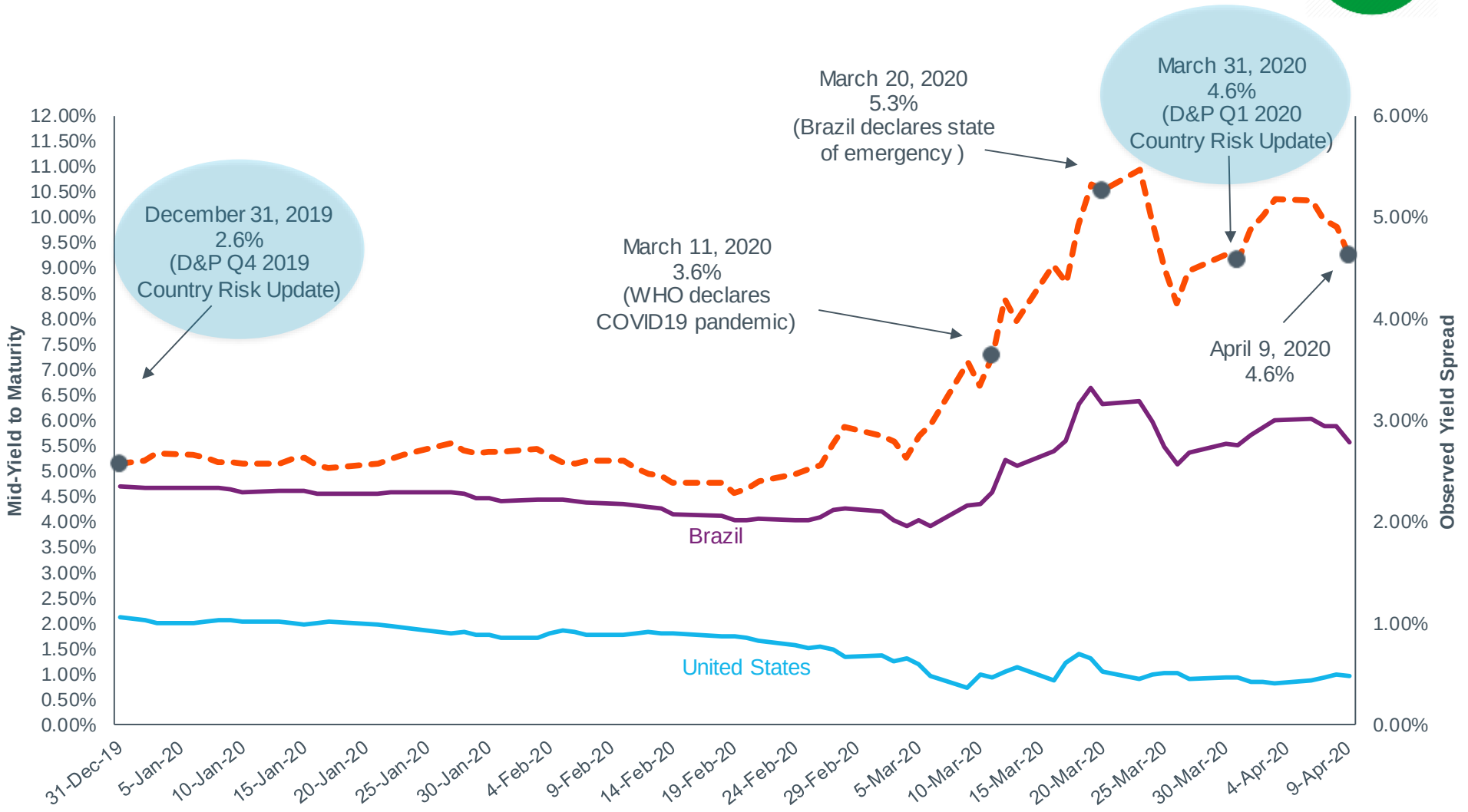
December 31, 2019 – April 9, 2020



Source: Bloomberg, Duff & Phelps Analysis

Country Yield Spread Model – Brazil Observed Yield Spreads in USD

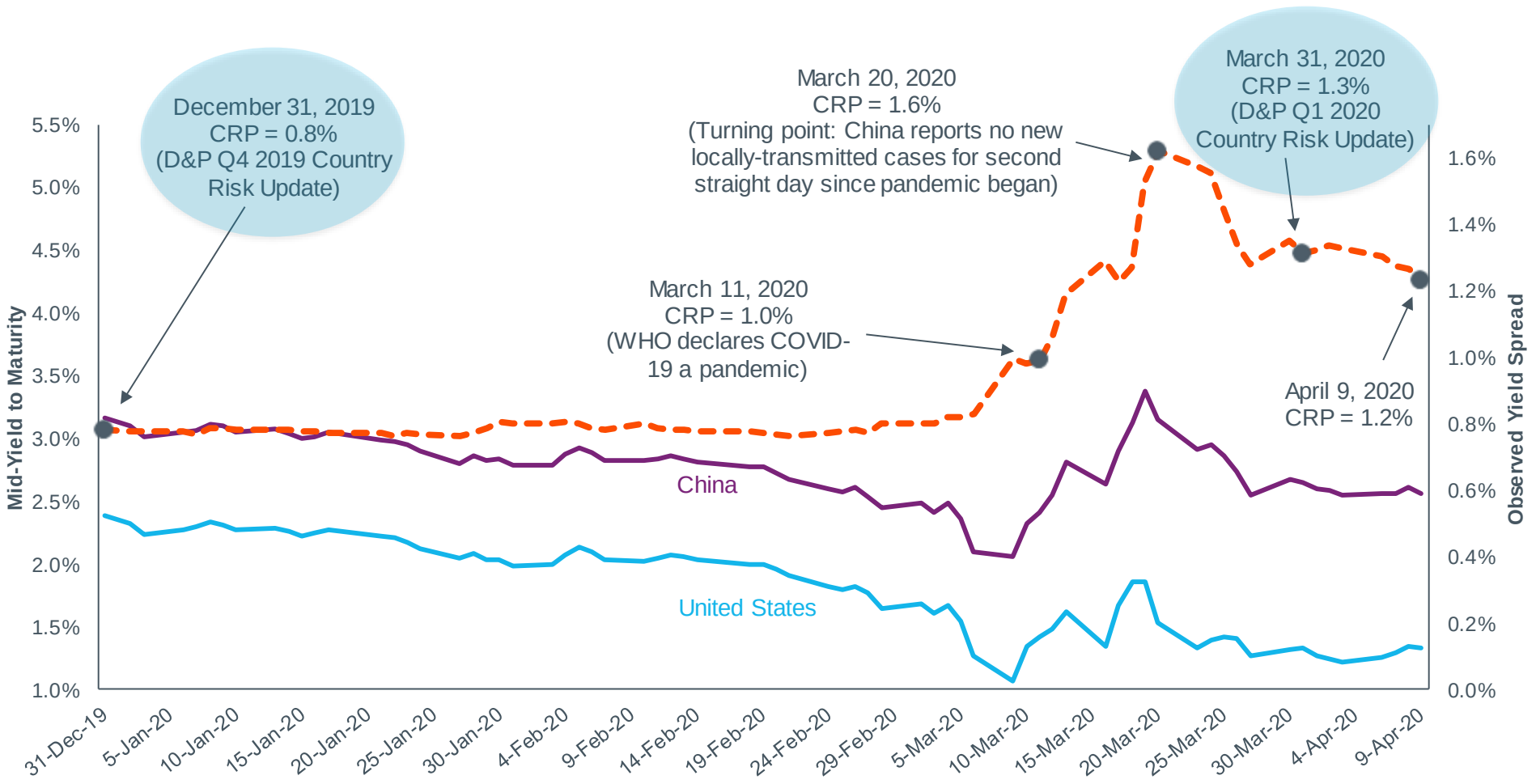
December 31, 2019 – April 9, 2020



Source: Bloomberg, Duff & Phelps Analysis

Country Yield Spread Model – China Observed Yield Spreads in USD

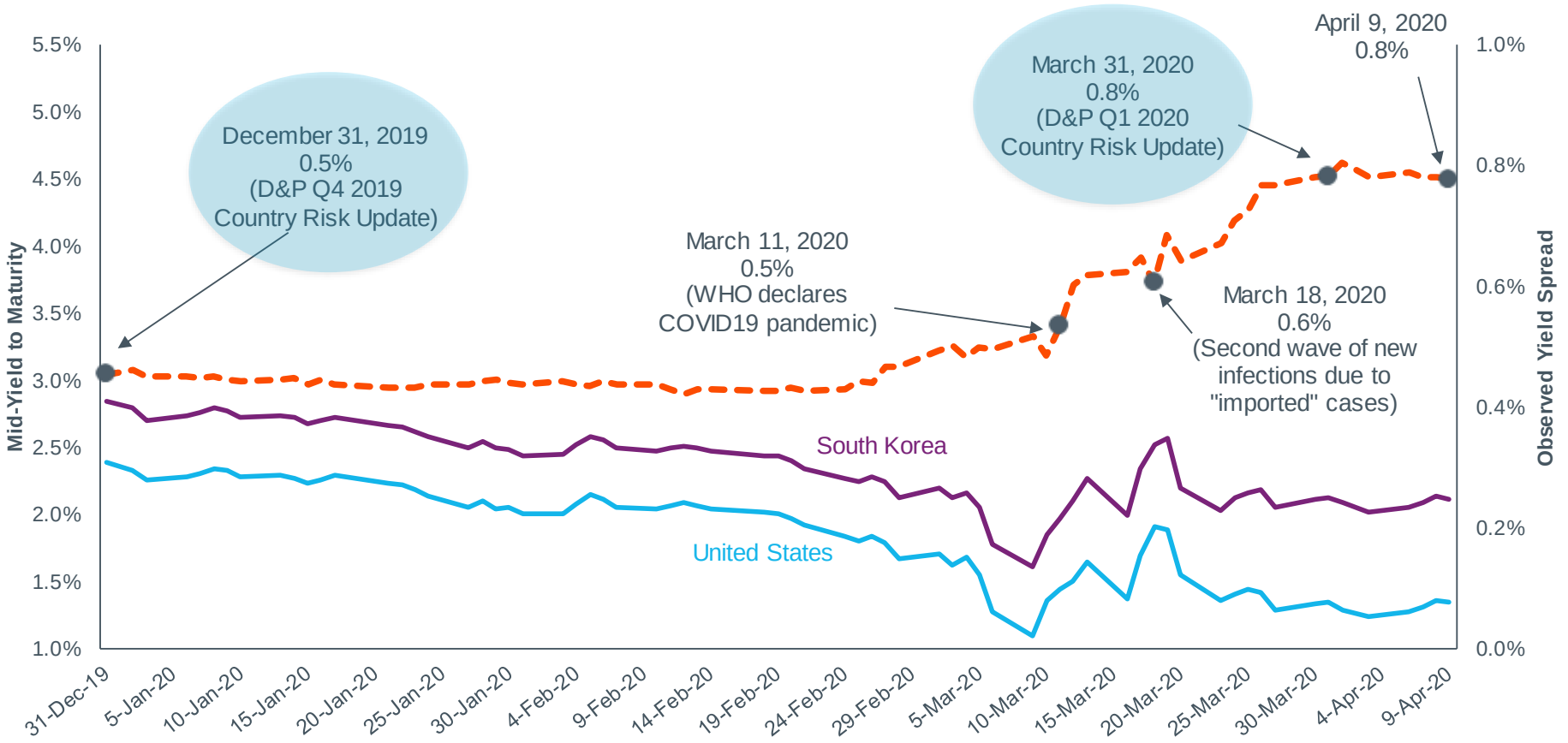
December 31, 2019 – April 9, 2020



Source: Bloomberg, Duff & Phelps Analysis

Country Yield Spread Model – South Korea Observed Yield Spreads in USD

December 31, 2019 – March 31, 2020

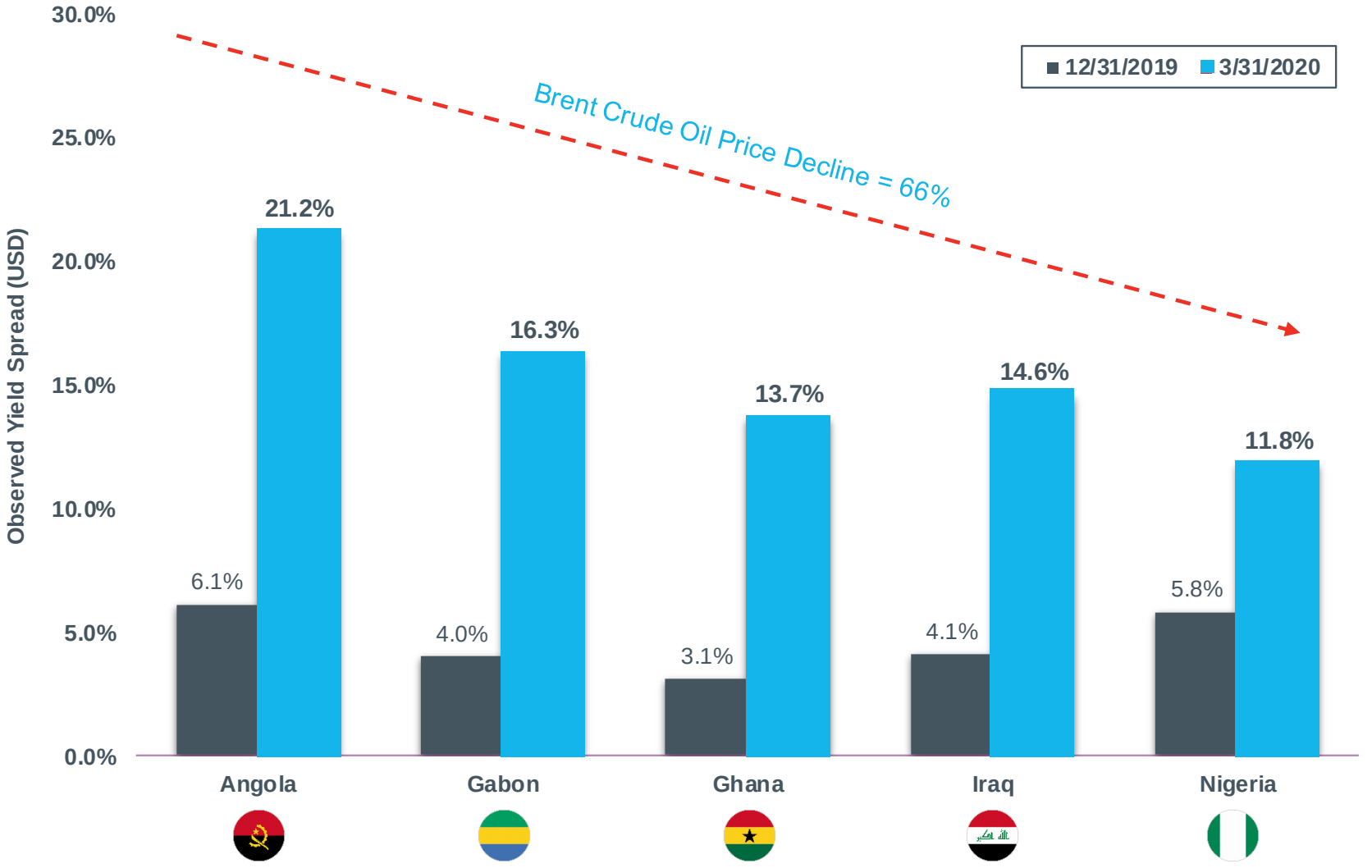


Source: Bloomberg, Duff & Phelps Analysis

Country Yield Spread Model – U.S. Dollar Observed Yield Spreads

Selection of Oil Revenue Dependent Countries

Comparison between December 31, 2019 and March 31, 2020

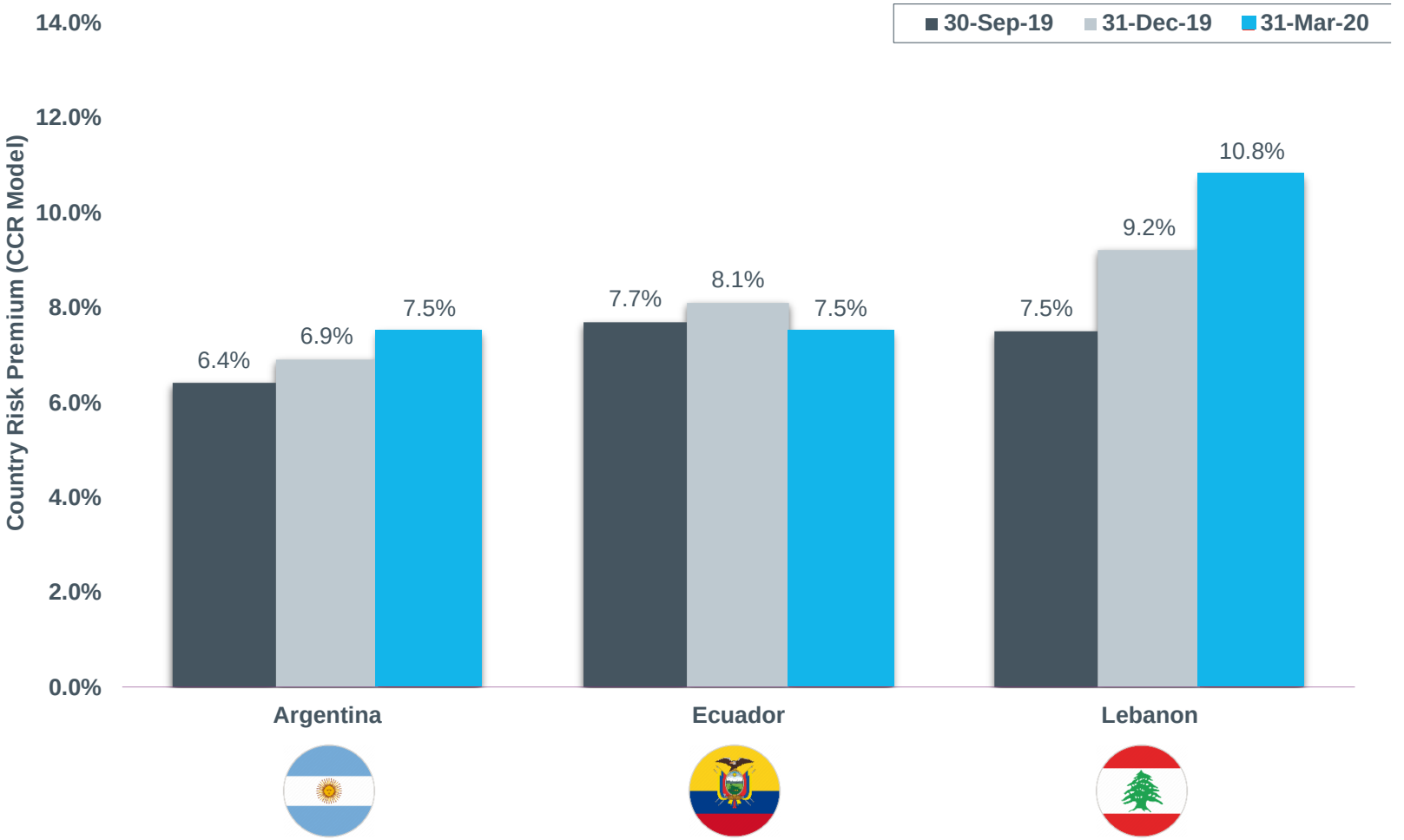


Source: Bloomberg, Duff & Phelps Cost of Capital Navigator - International Module

Country Risk Premium (CRP) Over Time – Germany Investor Perspective (in EUR)

Country Credit Rating Model

Comparison between September 30, 2019, December 31, 2019, and March 31, 2020



Source: Duff & Phelps Cost of Capital Navigator – International Cost of Capital Module

Other Cost of Capital Inputs

Other Cost of Capital Inputs

Selected Tips

Cost of Capital Input	Post Coronavirus Considerations
(Asset) Beta – Unlevered	• Significant equity market declines can lead to greater debt % in the capital structure • May significantly distort the calculated unlevered betas. Hamada unlevering formula may exacerbate the issue. • Consider using other unlevering methods (e.g. Harris-Pringle) in the current environment
Pre-Tax Cost of Debt	• Don't automatically assume BBB rating for industry peers. • Subsidized or below-market interest rate loans should not be used in WACC calculation. Instead, discreetly model the associated benefits and add those to the value of the firm.
Capital Structure	• Corporate finance theory tells us to use market value weights for debt component • Don't automatically assume debt book value = market value • Review Fair Value footnotes in annual & interim financials • Consider averages instead of point-in-time capital structure

Takeaways of today's presentation

- COVID-19 profoundly changed key value drivers:
  - Existing Cash Flows
  - Projected Growth in Cash Flows
  - Discount Rates

- Need to adjust cash flow projections for information known as of the valuation date:
  - Use multiple sources of data, particularly when there is a heighted level of uncertainty
  - Scenario Analyses will likely be a better way to capture some of that uncertainty.
  - Discount rates cannot solve all the issues

- Interest rates of safe-haven countries are likely to stay low for a long-time due to Central Banks actions

- Equity Risk Premium is cyclical. Historical measures are countercyclical and used without further adjustments may lead to the wrong conclusion:
  - Post-coronavirus Base Cost of Equity should not be lower than prior to the outbreak

- Country Risk changes over time to reflect current economic and market conditions

- Other cost of capital inputs may be distorted

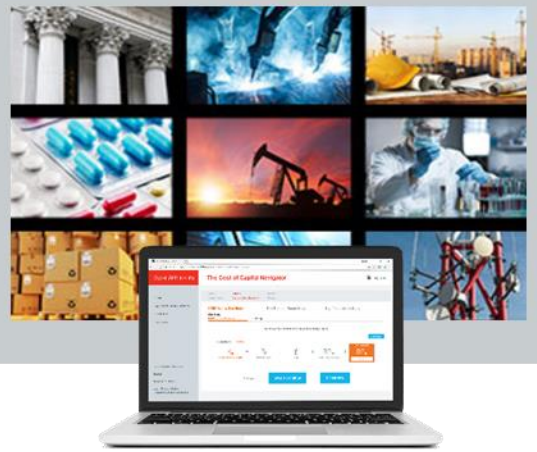
Cost of Capital Navigator

An online platform that guides you through the process of estimating cost of capital, a key component of any valuation analysis. You can subscribe to three cost of capital modules, each offering three annual subscription levels: Basic, Pro and Enterprise.

U.S. Cost of Capital

- Size Premia and Risk Premia
- Risk-free Rates
- U.S. Equity Risk Premia (ERPs)
- Betas

U.S. Industry Benchmarking



- Cost of equity, cost of debt and WACC estimates
- Performance statistics
- Valuation multiples
- Levered and unlevered betas

International Cost of Capital

- Country risk premia (CRPs) for over 175 countries
- Relative volatility (RV) factors for over 70 countries
- Global equity risk premia
- Global risk-free rates

Learn More: dpcostofcapital.com

Upcoming COVID-19 Webcasts from Duff & Phelps

April 21, 2020

Impact of COVID-19 on Goodwill Impairment – Perspectives from U.S. GAAP and IFRS

https://www.duffandphelps.com/insights/events/2020/webcast-impact-covid-19-on-goodwill-impairment

April 22, 2020

Cyber Deep Dive: COVID-19 and Other Threats to the Healthcare Sector

https://www.kroll.com/en/insights/events/2020/covid-19-and-other-threats-healthcare-sector

April 23, 2020

COVID-19 and OPEC Price War-Implications for Oil and Gas Markets, Prices, and Companies

https://www.kroll.com/en/insights/events/2020/covid-19-and-other-threats-healthcare-sector

April 23, 2020

COVID-19 Transfer Pricing Webcast: IP Valuation, Benchmarking and Tax Administration Implications

https://www.kroll.com/en/insights/events/2020/covid-19-and-other-threats-healthcare-sector

Learn More: dpcostofcapital.com

DUFF & PHELPS

Thank You!

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Appendix

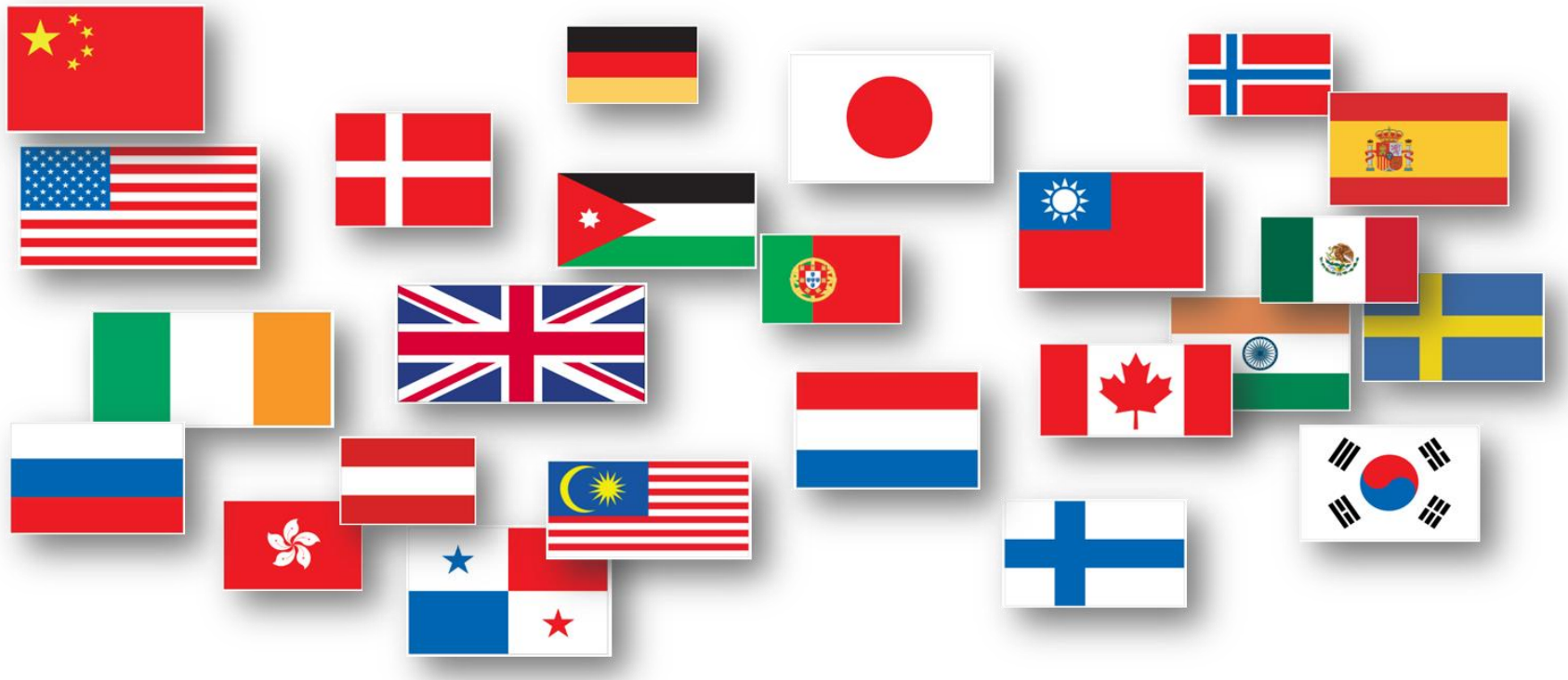
Duff & Phelps Recommended Equity Risk Premium (ERP) and Corresponding Risk-Free Rates

Date	Risk-free Rate (R_f)	R_f (%)	Duff & Phelps Recommended ERP (%)	What Changed
Current Guidance:				
March 25, 2020 – UNTIL FURTHER NOTICE	Normalized 20-year U.S. Treasury yield	3.00	6.00	ERP
December 19, 2019 – March 24, 2020	Normalized 20-year U.S. Treasury yield	3.00	5.00	*ERP*
September 30, 2019 – December 18, 2019	Normalized 20-year U.S. Treasury yield	3.00	5.50	R_f
December 31, 2018 – September 29, 2019	Normalized 20-year U.S. Treasury yield	3.50	5.50	*ERP*
September 5, 2017 – December 30, 2018	Normalized 20-year U.S. Treasury yield	3.50	5.00	*ERP*
November 15, 2016 – September 4, 2017	Normalized 20-year U.S. Treasury yield	3.50	5.50	R_f
January 31, 2016 – November 14, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
December 31, 2015	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2014	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.00	
February 28, 2013 – January 30, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.00	ERP
December 31, 2012	Normalized 20-year U.S. Treasury yield	4.00	5.50	
January 15, 2012 – February 27, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
December 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	6.00	
September 30, 2011 – January 14, 2012	Normalized 20-year U.S. Treasury yield	4.00	6.00	ERP
July 1 2011 – September 29, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
June 1, 2011 – June 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
May 1, 2011 – May 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2010 – April 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
June 1, 2010 – November 30, 2010	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2009	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2009 – May 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	ERP
June 1, 2009 – November 30, 2009	Spot 20-year U.S. Treasury yield	Spot	6.00	R_f
December 31, 2008	Normalized 20-year U.S. Treasury yield	4.50	6.00	

**Normalized in this context means that in months where the risk-free rate is deemed to be abnormally (i.e., unsustainably) low, a proxy for a longer-term sustainable risk-free rate is used.*

Table is available at: www.duffandphelps.com/insights/publications/cost-of-capital

Are country risks real?



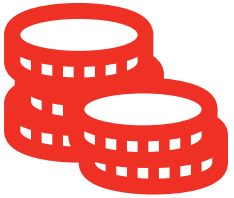
I know how to value a company in the United States, but this one is in Country X, a developing economy

…what should I use for a discount rate?

Risks typically associated with international investment

These risks may include:

Political



Financial

Economic

Each of these risks is a problem for the discount rate only to the extent that it is non-diversifiable from the perspective of the investor, which is often the case.

Which International Cost of Equity Model Should I Use?

In choosing a model, the goal is to balance several objectives:

Acceptance and use: The model has a degree of acceptance, and the model is actually used by valuation analysts.

Data Availability: Quality data is available for consistent and objective application of the model.

Simplicity: The model's underlying concepts are understandable, and can be explained in plain language.

Which International Cost of Equity Model Should I Use?

When selecting a model (or models), it is important to remember:

There is no consensus among academics and practitioners as to the best model to use in estimating the cost of equity capital in a global environment, particularly with regards to companies operating in emerging economies.

There are several common approaches to incorporating country factors into a cost of equity capital estimate.

None are perfect.