Carla S. Nunes, CFA, ABV

Managing Director

Carla S. Nunes is a Managing Director in the Office of Professional Practice of Kroll (previously Duff & Phelps). She has over 25 years of experience. In that role, Carla provides firm-wide technical guidance on a variety of valuation, financial reporting and tax issues. She also co-authors Kroll's annual U.S. and European Goodwill Impairment Studies. In addition, Carla is the Global Leader of Kroll'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 Kroll's 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 Kroll's predecessor firms, PricewaterhouseCoopers, Standard & Poor's, and Duff & Phelps.

- Carla has conducted numerous business and asset valuations for a variety of purposes, including purchase price allocations, goodwill impairment testing, M&A, corporate tax restructuring and debt analysis. She has been involved in multiple valuation assignments for a wide range of industries, including pharma & biotech, healthcare, vitamin retail, specialty chemicals, industrial manufacturing and gaming & hospitality. Carla has substantial experience with cross-border valuations, working with multinational corporations to address complex tax, international cost of capital and foreign exchange issues.

- Carla is one of Kroll's experts addressing valuation issues related to cost of capital. She is a co-author of the "Valuation Handbook" series and is a co-creator of the Kroll Cost of Capital Navigator. Carla is a frequent speaker in webinars and conferences on the topics of cost of capital, goodwill impairment and valuation in general.

- Carla is a Practitioner Director in the Board of the Financial Management Association (FMA) International and a member of the Education Committee of the International Institute of Business Valuers (iiBV). She was a Fellow of the defunct Kroll Institute.

- Carla received her M.B.A. in finance from the University of Rochester's Simon School, an honors degree is busines administration from Lisbon's School of Economics and Management (ISEG Lisbon) and completed coursework for a Masters of Taxation from Villanova University School of Law. Additionally, she holds a Chartered Financial Analyst (CFA) designation, an Accredited in Business Valuation (ABV) credential, and has passed the exam and fulfilled all the requirements for the Certified in Entity and Intangibles Valuations (CEIV) credential (now-discontinued).

KROLL

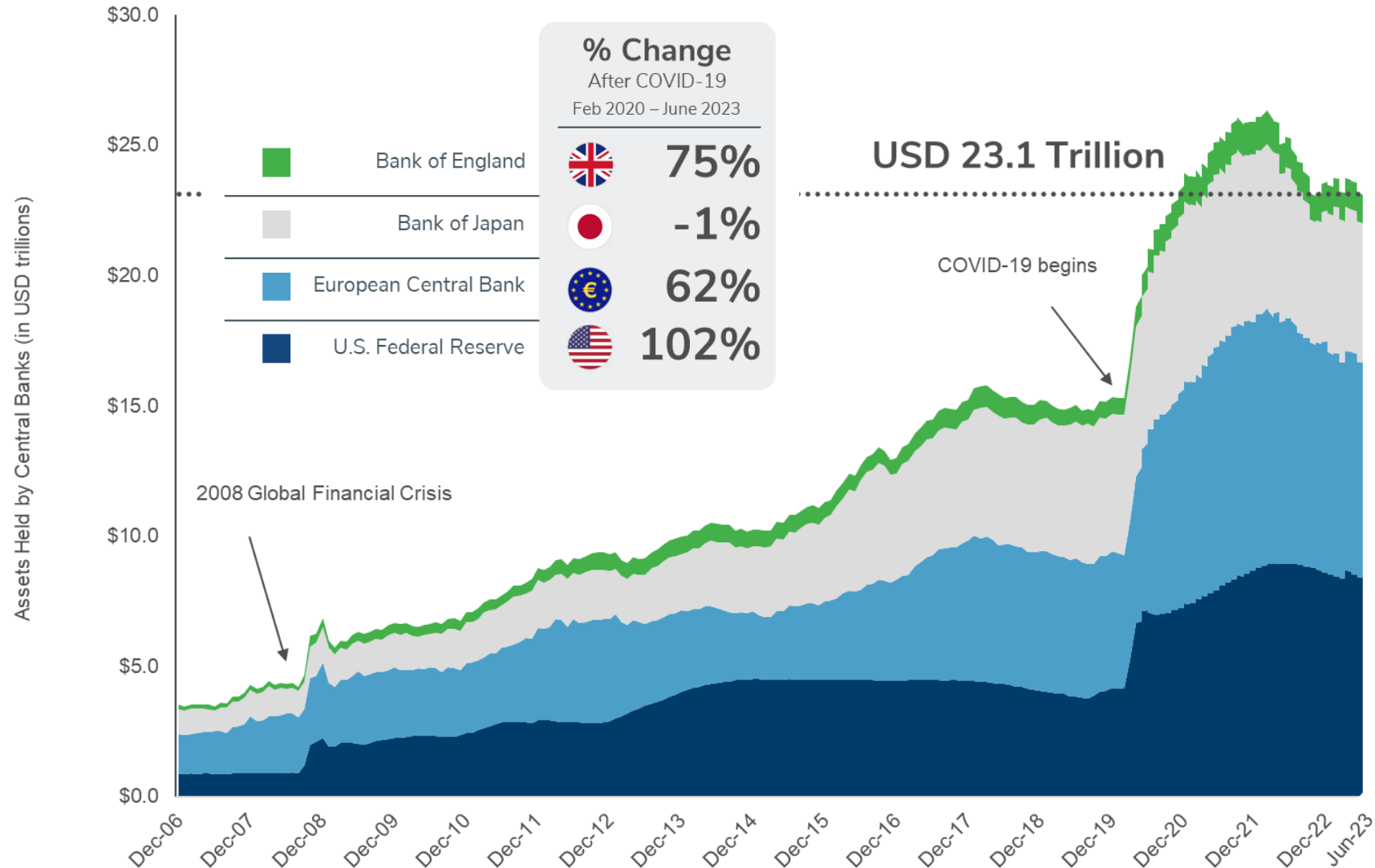# Table of Contents

KROLL

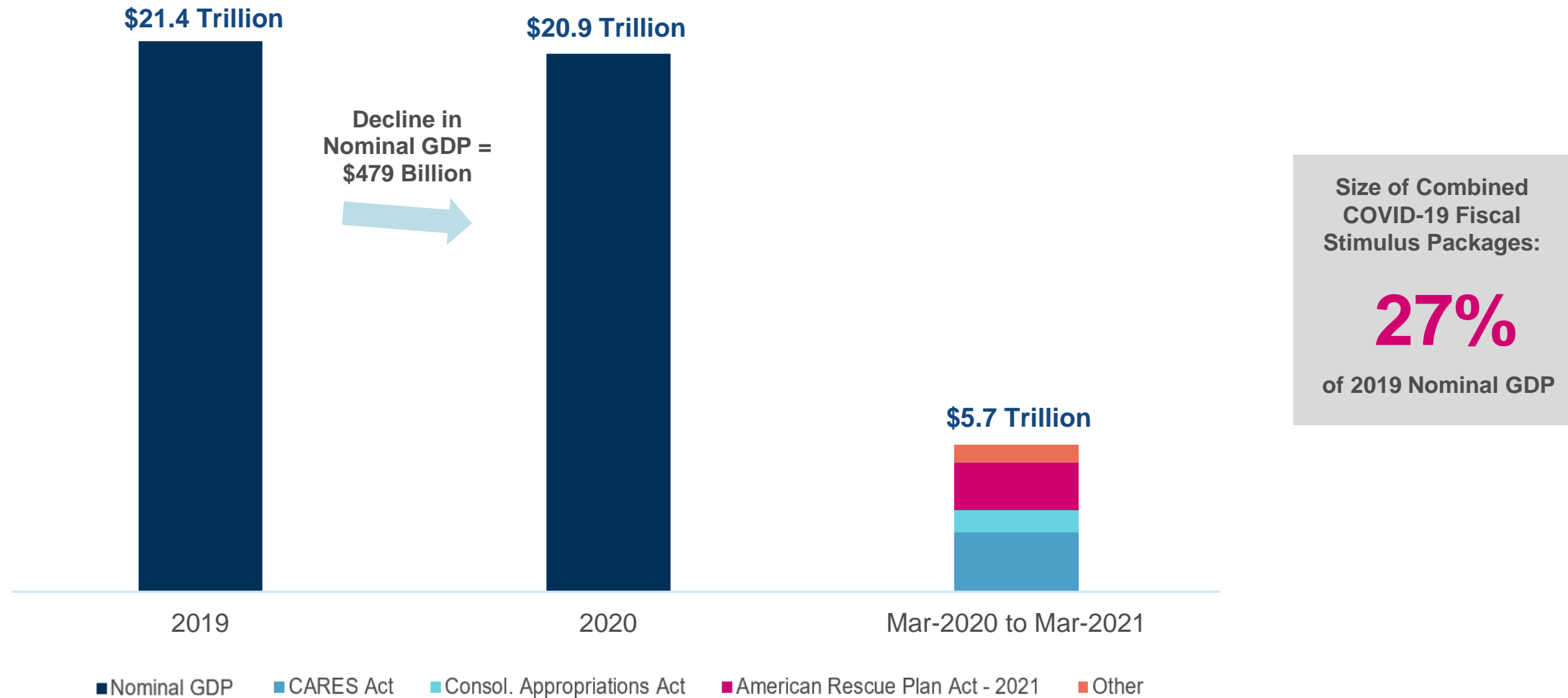# Current Economic Conditions

KROLL

Combined Major Central Banks Balance Sheets: Fed, ECB, BOJ, BOE

February 2020 – Mid-June 2023

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

KROLL 5

U.S. Fiscal Policy Response to COVID-19 as a Proportion of Nominal GDP

$21.4 Trillion

$20.9 Trillion

Decline in Nominal GDP = $479 Billion

$5.7 Trillion

Size of Combined COVID-19 Fiscal Stimulus Packages:

27%

of 2019 Nominal GDP

2019

2020

Mar-2020 to Mar-2021

■ Nominal GDP ■ CARES Act ■ Consol. Appropriations Act ■ American Rescue Plan Act - 2021 ■ Other
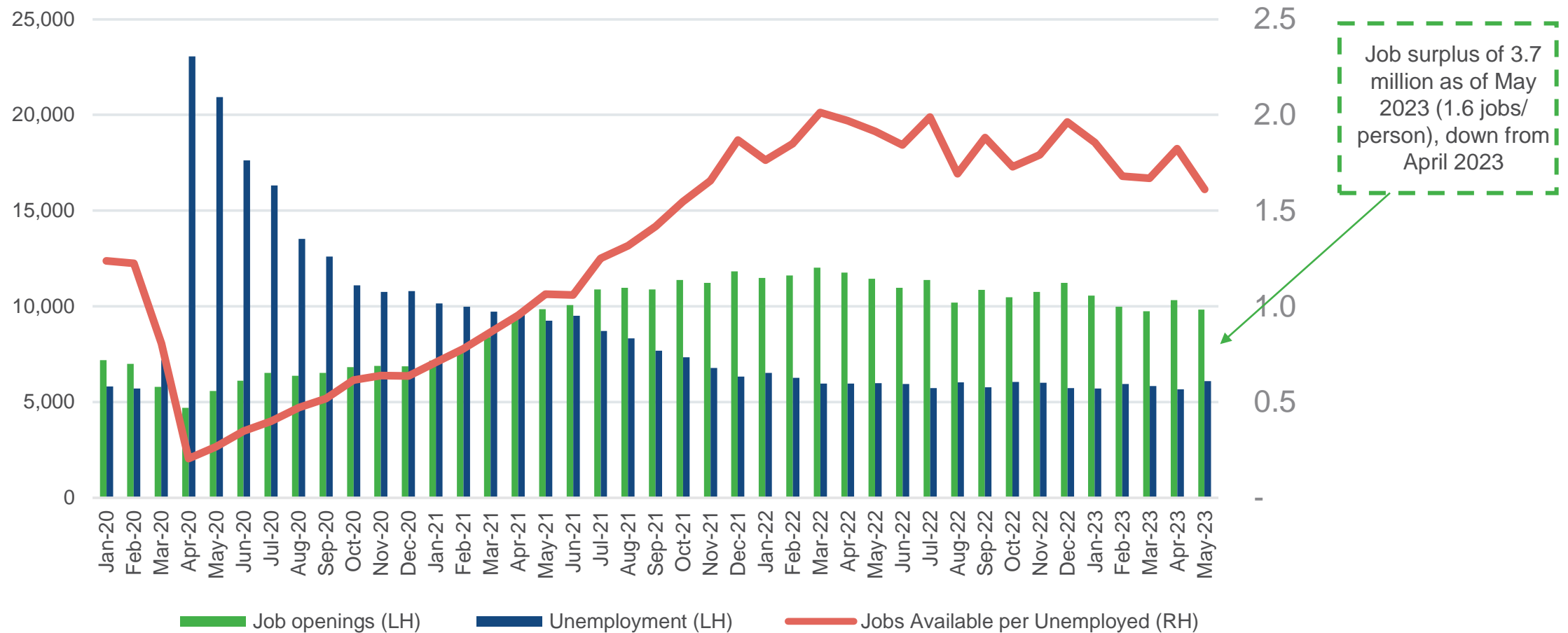
U.S. Unemployment Rate Drops to 3.6% in June 2023, And Still Low by Historical Standards

January 2019 – June 2023

Covid Peak: 14.7%

Pre-Covid (Feb-2020): 3.5%
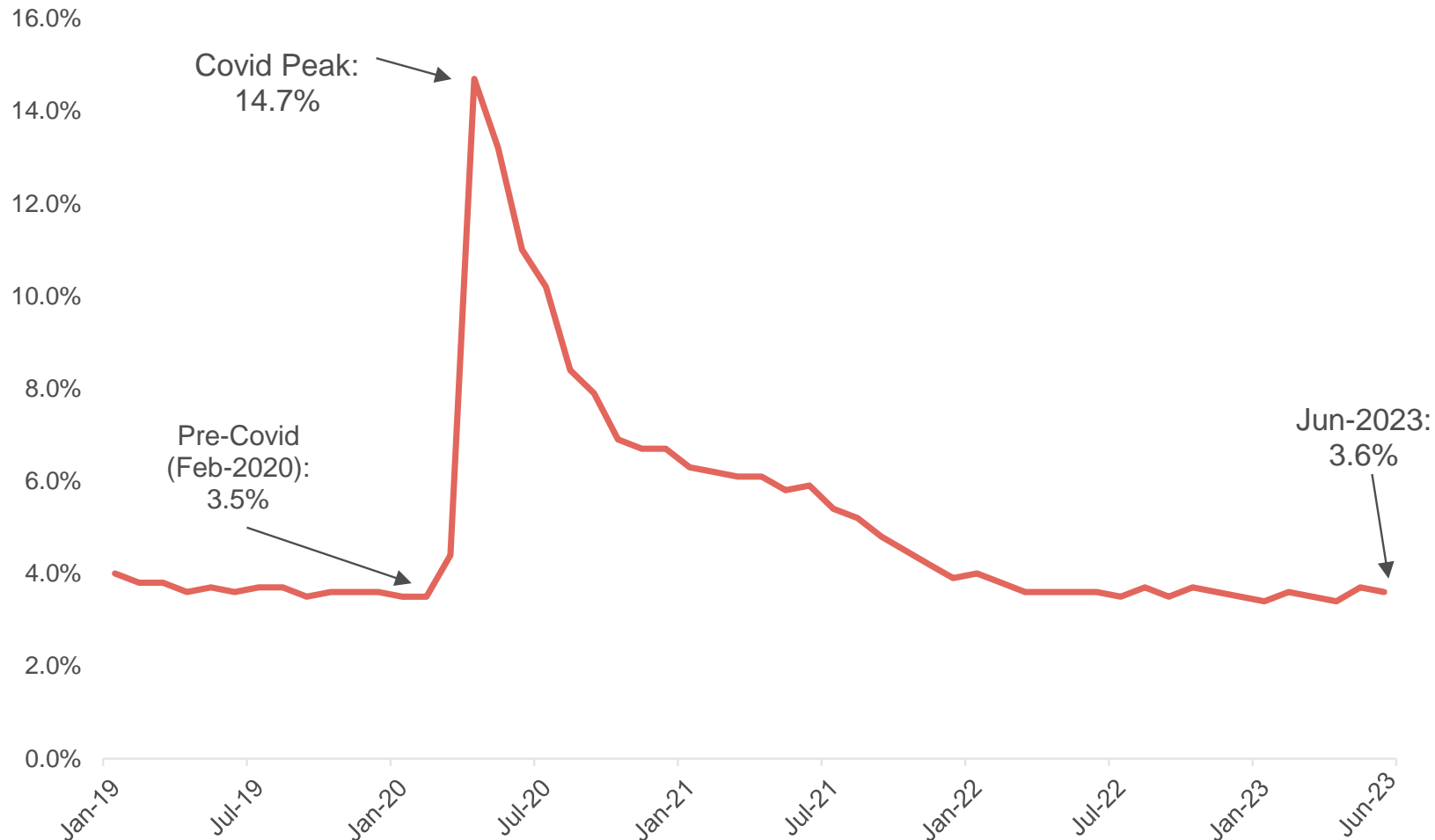
Jun-2023: 3.6%

Source: U.S. Bureau of Labor Statistics, Seasonally Adjusted series

KROLL 8

12-Month Percentage Change (%) in Consumer Price Inflation (CPI) Index (YOY)

	Cycle High	Jun 2023	Comments
United States	Jun-22: 9.1%	3.0%	Smallest 12-month increase since March 2021.
Canada	Jun-22: 8.1%	2.8%	Decreased from 3.4% in May 2023. This is the smallest increase since June 2021.
United Kingdom	Oct-22: 11.1%	7.9%	Down from 8.7% in April and May 2023. October 2022 was the highest rate in over 40 years.
Germany*	Oct-22 and Nov-22: 8.8%	6.4%	Up from 6.1% in May 2023. First increase since January 2023, as food continues to drive inflation.
Eurozone	Oct-22: 10.6%	5.5%	Down from 6.1% in May 2023. Food, alcohol and tobacco are driving inflation.

KROLL

12-Month Percentage Change, CPI vs. Core Inflation (%)

November 1981 – June 2023

Source: U.S. Bureau of Labor Statistics, Non-Seasonally Adjusted series

Long-Term Implied (Break-Even) Inflation

December 2001 – June 2023

19-Mar-2020

0.50%

Legend:
- Implied Inflation (20 year U.S.Treasury - 20 year U.S. TIPS)
- AVERAGE: Implied 20-Year Inflation July 2004–June 2023 (2.2%)
- Implied Inflation (10 year U.S.Treasury - 10 year U.S. TIPS)
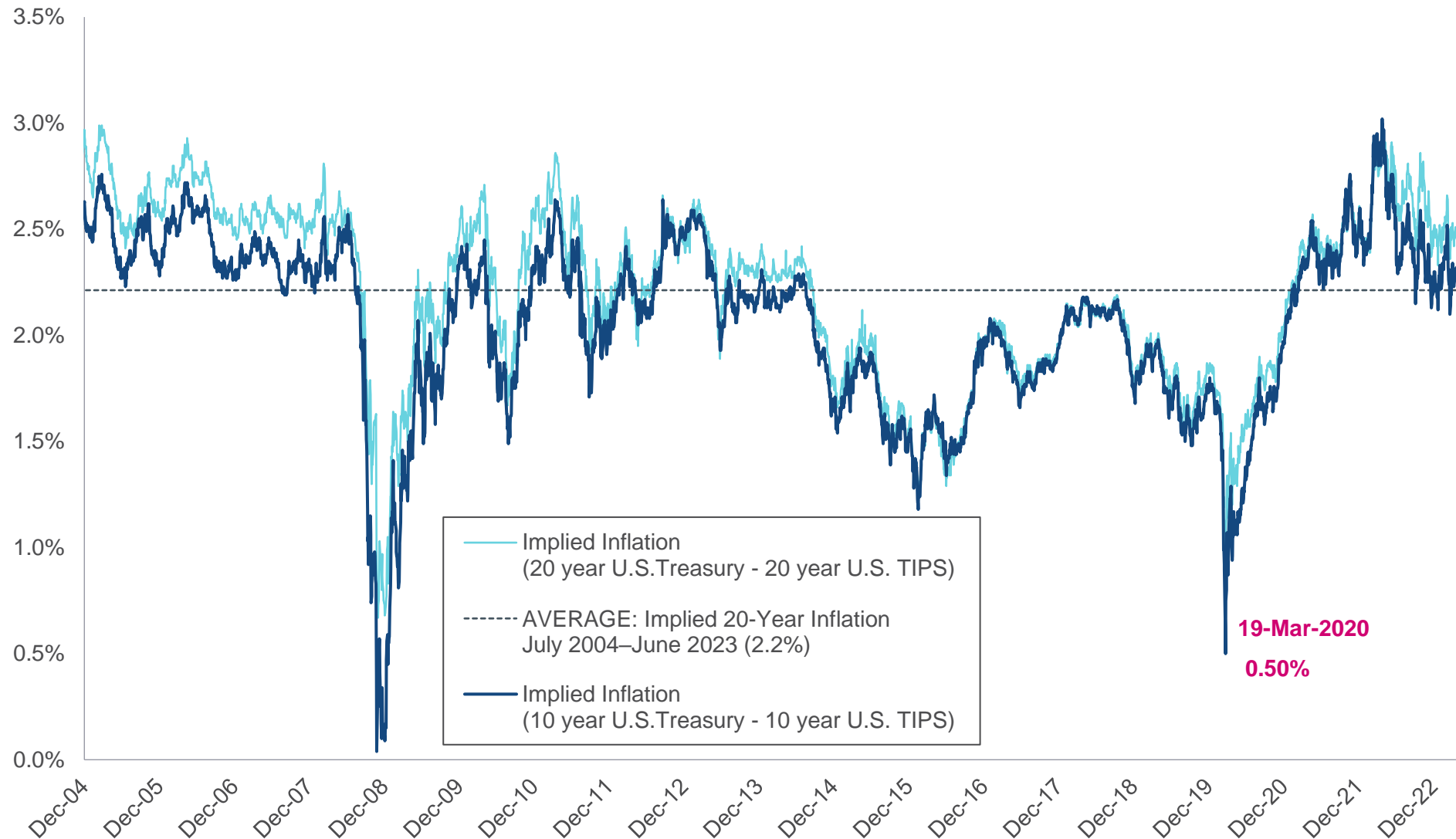
Source: FRED

5-Year Forward (Break-Even) Inflation

December 2001 – June 2023
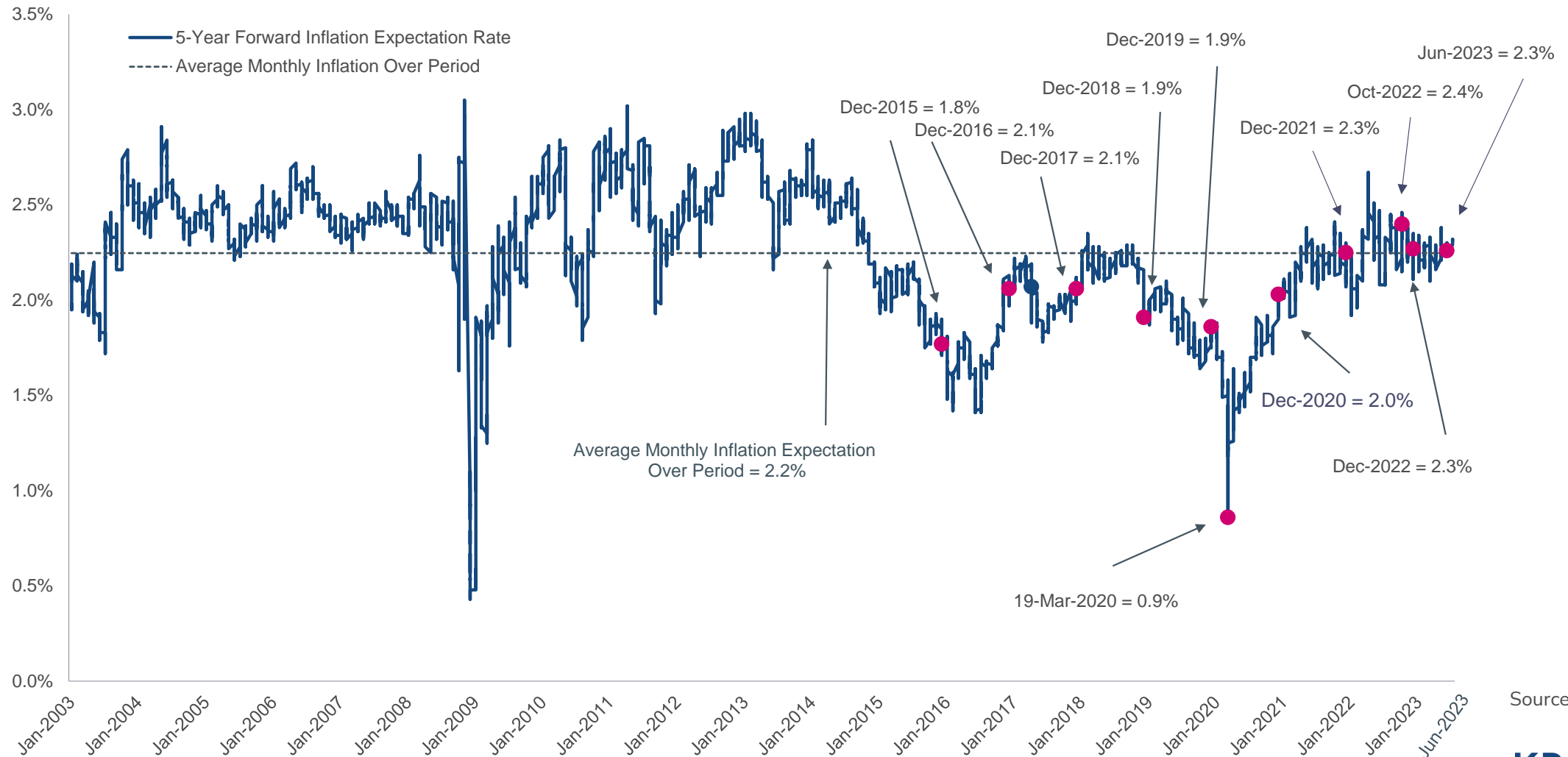
Source: FRED

Long-Term Inflation Expectations

Estimates as of June 2023 (approximately)

SOURCES	Long-Term Average (%)
Aruoba Term Structure of Inflation Expectations	2.2
Blue Chip Economic Indicators	2.3
Blue Chip Financial Forecasts	2.3
Consensus Economics	2.5
Federal Reserve Bank of Cleveland	1.7
IHS Markit (S&P Global Market Intelligence)	2.4
Oxford Economics	2.4
Livingston Survey (Federal Reserve Bank of Philadelphia)	2.4
Survey of Professional Forecasters (Federal Reserve Bank of Philadelphia)	2.4
University of Michigan Survey 5-10 Year Ahead Inflation Expectations	3.0
Range of Inflation Estimates	**1.7% – 3.0%**

Median

2.4%

Projected Economic Growth

KROLL

Real GDP Growth – Source 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. World Bank

4. Blue Chip Economic Indicators

5. Consensus Economics

6. Economist Intelligence Unit (EIU)

7. Fitch Ratings

8. IHS Markit (now part of S&P Global Market Intelligence)

9. Moody's Analytics

10. Oxford Economics

11. Standard & Poor's

* Not all sources are available for all countries/regions.

Real GDP Growth (%) Estimates by Region: World

Data as of June 15, 2023

Year	Value
2020	-3.2
2021	6.0
2022	3.1
2023	2.2
2024	2.4
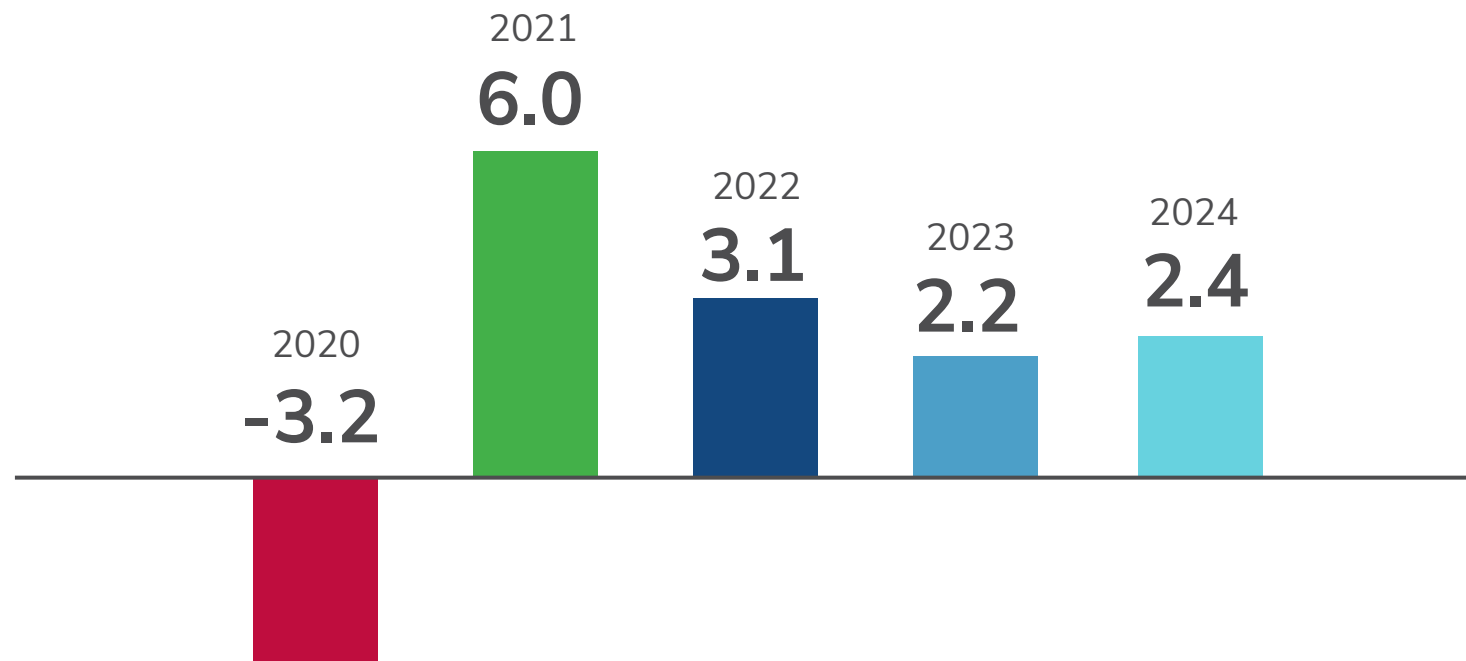
Real GDP Growth (%) Estimates by Region: United States

Data as of June 15, 2023
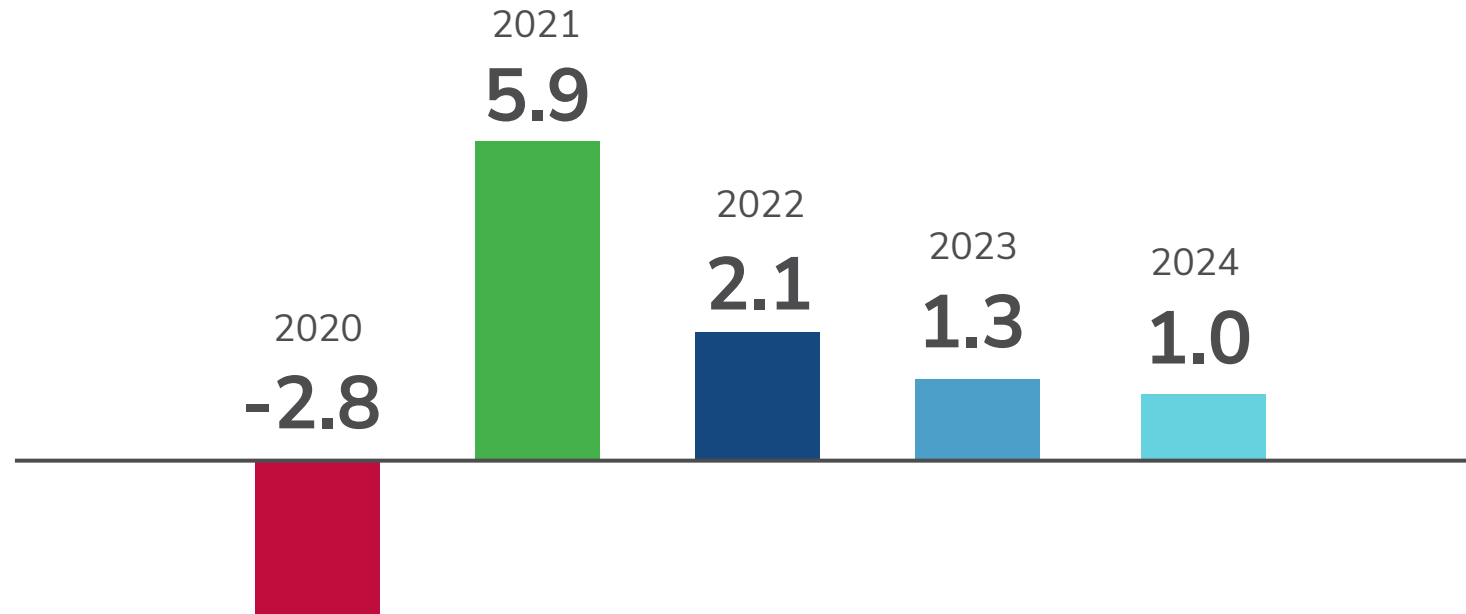
Real GDP Growth (%) Estimates by Region: China

Data as of June 15, 2023

2021
8.4

2023
5.5

2024
4.9

2020
2.2

2022
3.0
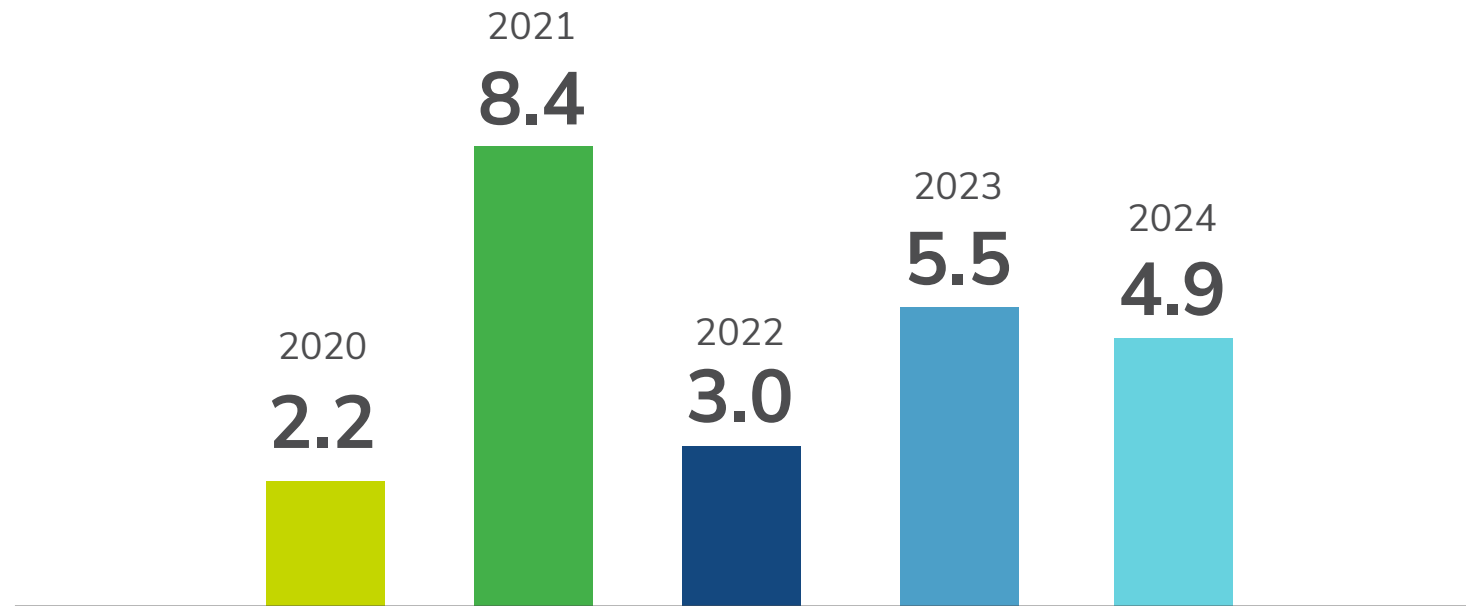
Long-Term Projected Real GDP Growth (%)

Estimates as of June 2023 (approximately)

SOURCE	Long-Term Average (%)
Blue Chip Economic Indicators	1.7
Blue Chip Financial Forecasts	1.8
Consensus Economics	1.7
IHS Markit (S&P Global Market Intelligence)	1.7
Livingston Survey	1.9
Oxford Economics	1.5
Survey of Professional Forecasters	1.8
	1.5% – 1.9%
Median ▶	**1.7%**

g = Long-Term Growth Rate (Nominal)

Estimates as of June 2023 (approximately)

Long-Term Growth Rate is calculated using the following formula:

Long-Term Growth Rate (Median) **=** (1 + Long-Term Real GDP Forecast) **×** (1 + Long-Term Inflation Forecast) **− 1**

4.1% = (1 + 1.7%)   (1 + 2.4%) − 1

Risk-free Rate Analysis

10-Year Yields for U.S., U.K., Germany, Japan, and Canada

December 31, 2007 – June 30, 2023

Legend:
- United States Treasury Constant Maturity - 10 Year
- United Kingdom Government Debt - 10 Year
- Canada Government Debt - 10 Year
- Germany Government Debt - 10 Year
- Japan Government Debt - 10 Year

End values: 4.32%, 3.81%, 3.26%, 2.40%, 0.43%

X-axis: Dec-07, Dec-08, Dec-09, Dec-10, Dec-11, Dec-12, Dec-13, Dec-14, Dec-15, Dec-16, Dec-17, Dec-18, Dec-19, Dec-20, Dec-21, Dec-22, Jun-23

Y-axis: -1%, 0%, 1%, 2%, 3%, 4%, 5%, 6%
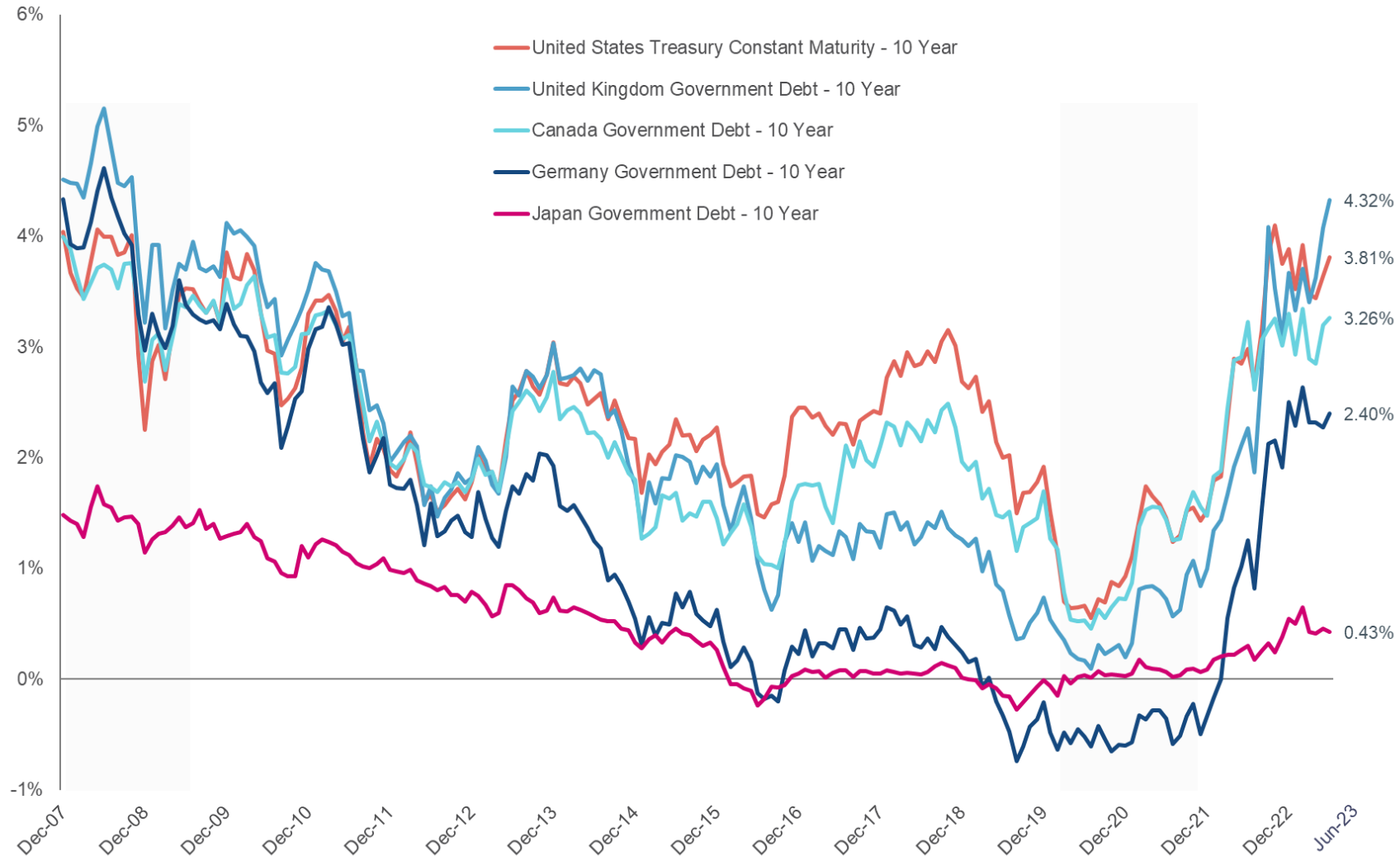
Source: S&P Capital IQ

Fed Funds Target Range (Dec 2008 – June 2023)

Date the Federal Open Market Committee (FOMC) Announced the Change to the Fed Funds Target Rate
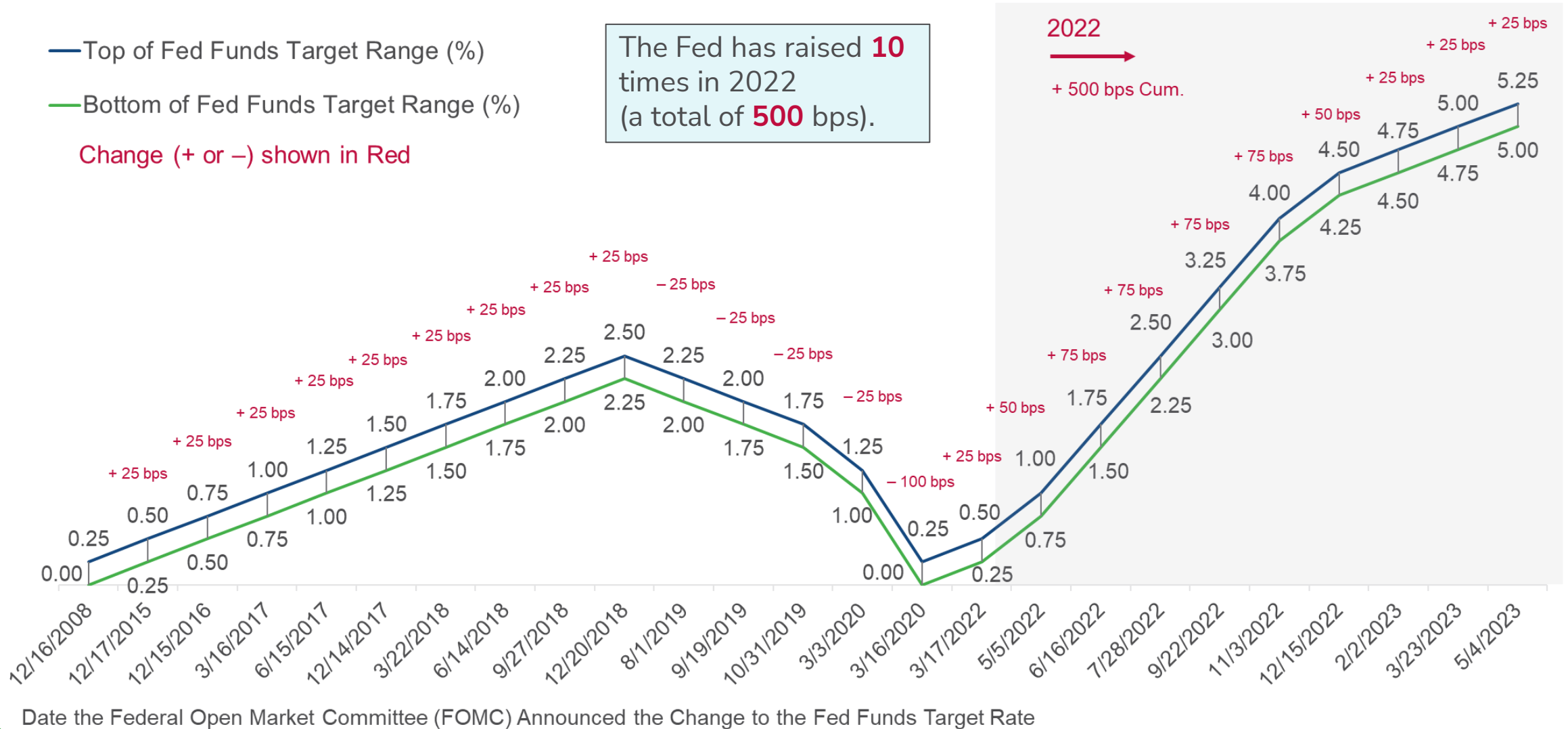
U.S. Central Bank (Fed) Balance Sheet

December 1, 2019 – June 30, 2023

$8.364 Trillion

Legend:
- Traditional Security Holdings
- Long Term Treasury Purchases
- Lending to Financial Institutions
- Liquidity to Key Credit Markets
- Fed Agency Debt MBS Securities Purchases

Chart labels: Mortgages, Treasuries

Y-axis: Fed Balance Sheet (in $billions) — $0 to $10,000

X-axis: Dec-19 through Jun-23
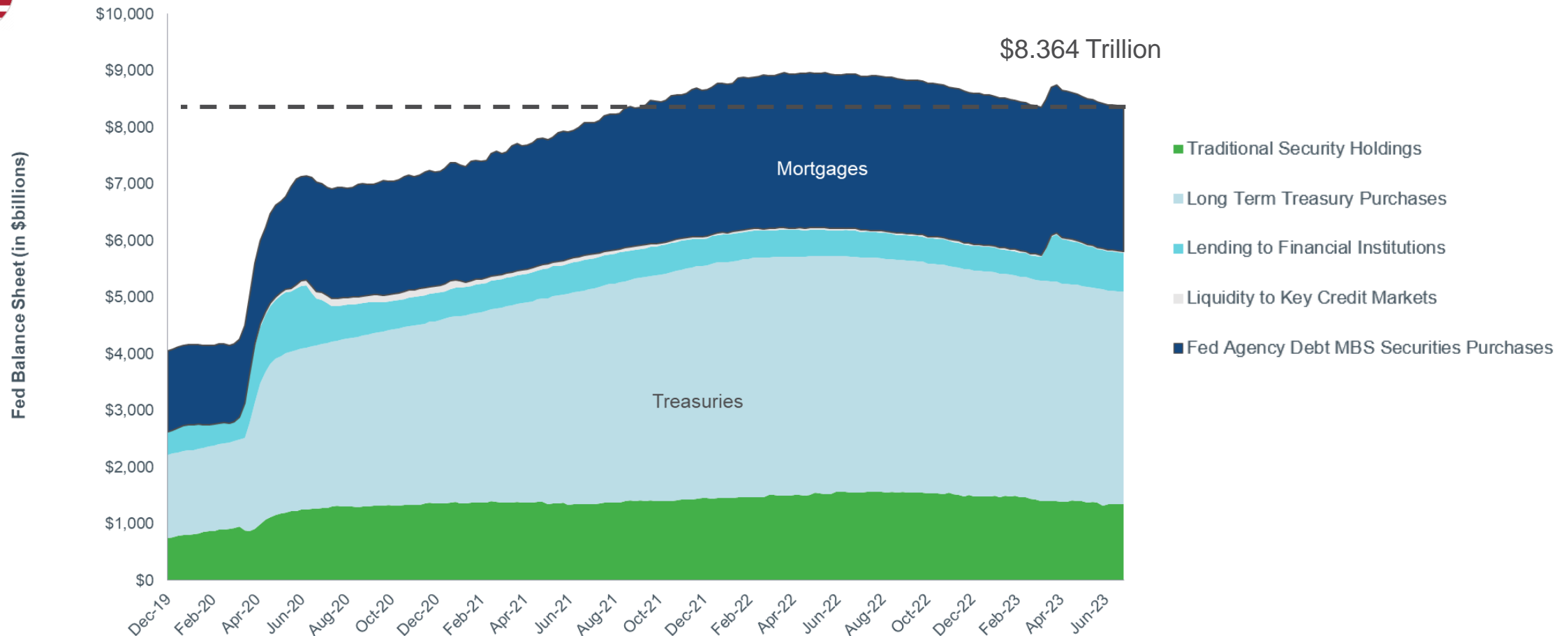
Source: Cleveland Federal Reserve, S&P Capital IQ

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)

Kroll recommends normalizing the risk-free rate:

Abnormally Low R_f

Use Normalized Risk-free Rate

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

Normalization can be accomplished in several ways, including:

1. **Simple averaging**

2. **Various "buildup" methods**

U.S. 20-Year Treasury Yield, Including Trailing Average

December 31, 2007 – June 30, 2023

2008 Financial Crisis

COVID-19

10-year moving average

December 31, 2008
3.1%

December 19, 2019
2.2%
(Kroll decreases ERP to 5.0%
from 5.5%)

March 25, 2020
1.2%
(Kroll increases ERP to 6.0%
from 5.0%)

December 09, 2020
1.5%
(Kroll decreases ERP to 5.5%
from 6.0%)

October 18, 2022
4.3%
(Kroll increases ERP to
6.0% from 5.5%)

June 8, 2022
3.4%
(Kroll decreases
ERP to 5.5% from
6.0%)

June 30, 2023
4.1%

2.6%
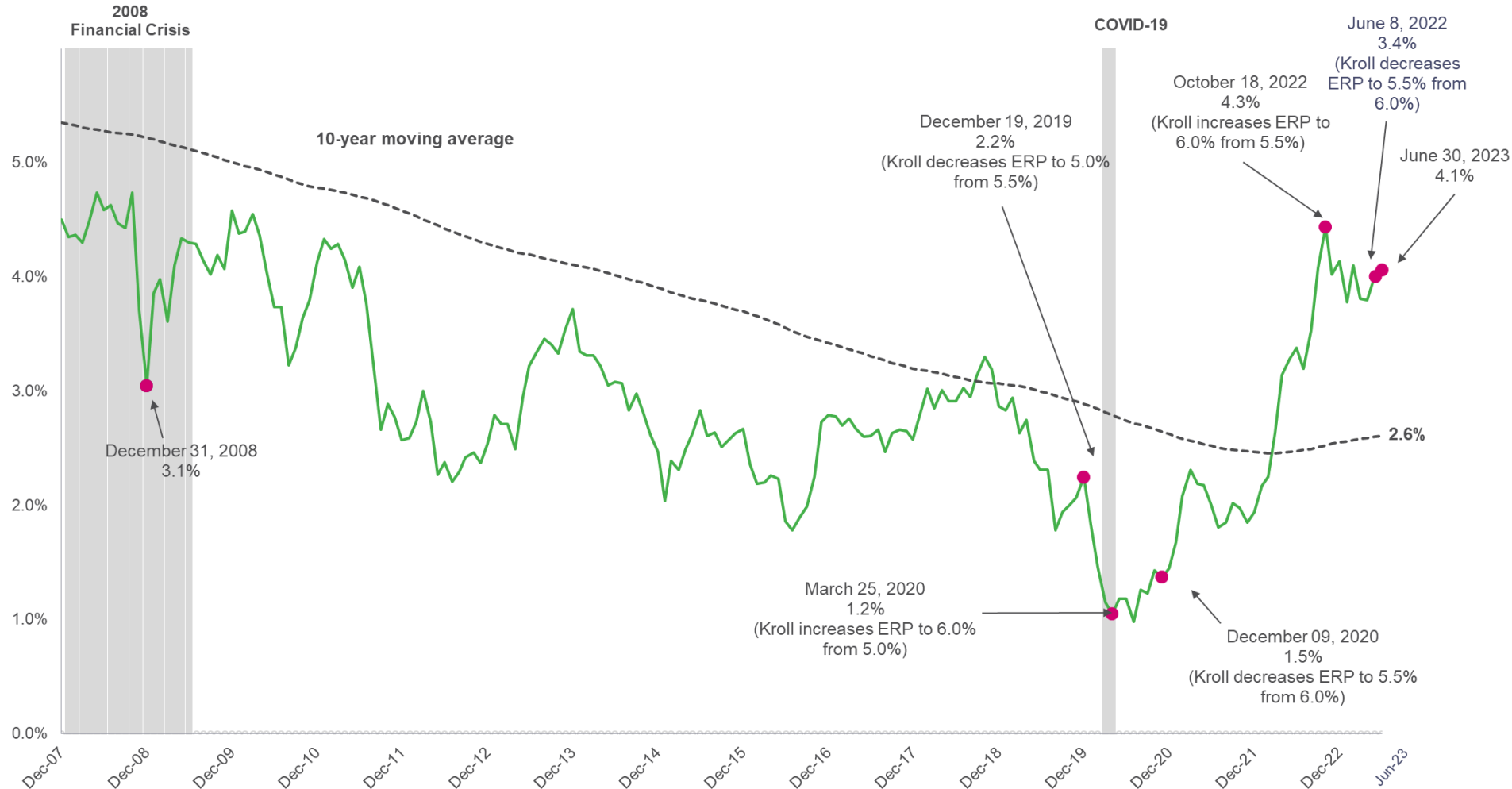
**What is it as of
18 July 2023?**

4.1%

Source: 20-year U.S. government bond series. Board of Governors of the Federal Reserve System
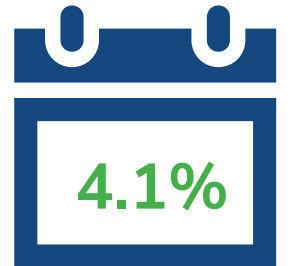
Risk-free Rate Normalization – by Build Up "Fisher Equation"

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

Risk-free Rate	=	Real Rate	+	Expected Inflation

* This is a simplified version of the "Fisher equation", named after Irving Fisher. Fisher's "The Theory of Interest" was first published by Macmillan (New York), in 1930. The Fisher equation is formally expressed as (1 + Nominal Rate) = (1 + Real Rate) x (1 + Expected Inflation). When rates are low, there is very little difference between the simple form and the Fisher equation. Various academic research papers show that the decomposition of the nominal rate into a real rate and expected inflation should include an additional component excluded from the Fisher equation: the inflation risk premium. This premium reflects the risk that actual inflation may vary significantly from expected inflation, and it can be positive or negative, with some academic estimates at close to 0%.

Real Rate Estimates

United States

Several academic studies have suggested the long-term real risk-free rate to be somewhere in the range of -1.1% to 2.2% for the 2015-2023 period, but in a narrower range since 2022. The studies are based on the study of inflation swap rates, yields on long-term U.S. Treasury Inflation-Protected Securities (TIPS), OLG, DSGE and other econometric models *

-0.3 % ⟵————————— **Long-term Real Rate** —————————⟶ **2.2%**

* Based on academic studies issued in 2022 and 2023. In academic literature, this is also sometimes called the natural rate of interest, the neutral rate, or the equilibrium rate.

OLG = Overlapping Generational Model

DGSE = Dynamic Stochastic General Equilibrium Model

KROLL

Long-Term Inflation Expectations

Estimates as of June 2023 (approximately)

SOURCES	Long-Term Average (%)
Aruoba Term Structure of Inflation Expectations	2.2
Blue Chip Economic Indicators	2.3
Blue Chip Financial Forecasts	2.3
Consensus Economics	2.5
Federal Reserve Bank of Cleveland	1.7
IHS Markit (S&P Global Market Intelligence)	2.4
Oxford Economics	2.4
Livingston Survey (Federal Reserve Bank of Philadelphia)	2.4
Survey of Professional Forecasters (Federal Reserve Bank of Philadelphia)	2.4
University of Michigan Survey 5-10 Year Ahead Inflation Expectations	3.0

Range of Inflation Estimates **1.7% – 3.0%** ◀ **Median** 2.4%

Risk-Free Rate Normalization – United States

As of June 30, 2023

-0.3% ←— Long-term Real Rate* —→ 2.2%

+   +

1.7% ←— Long-term Expected Inflation —→ 3.0%

=   =

1.4% ←— Long-term Normalized Risk-Free Rate —→ 5.2%
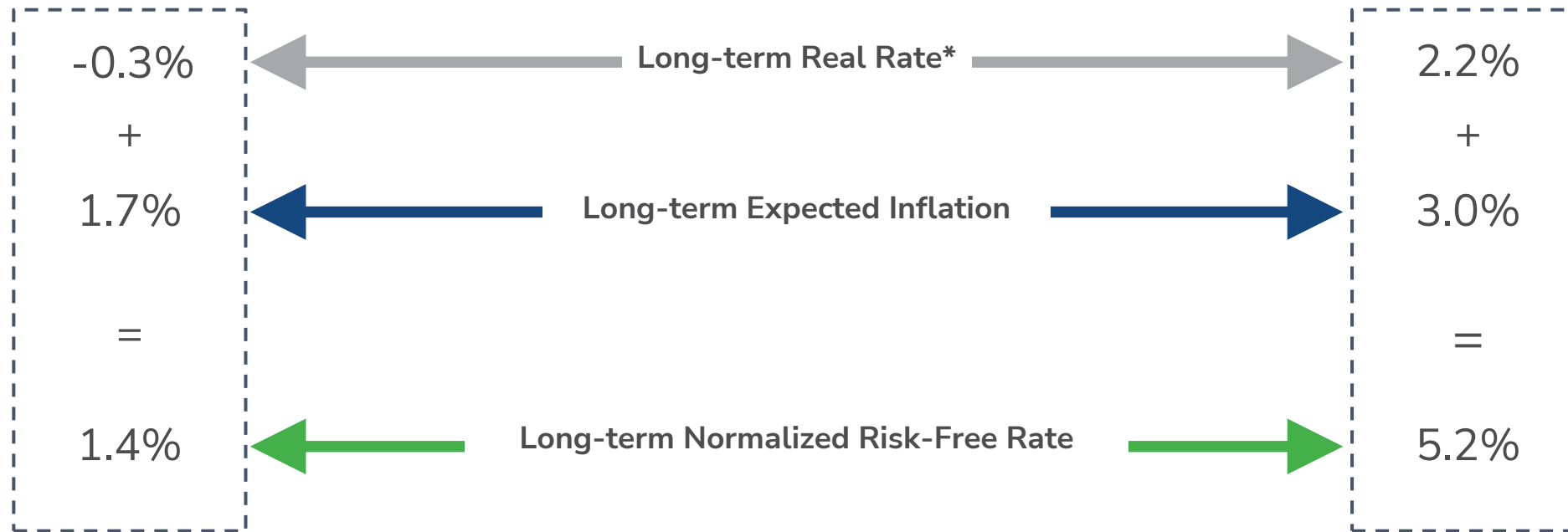
What is the spot 20-year yield as of 18 July 2023?

4.1%
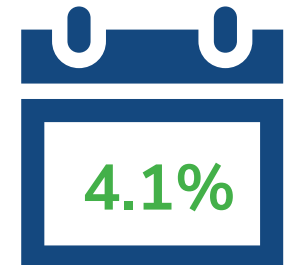
- **Fisher Equation:** Midpoint = 3.3% / Median = 3.4%
- **LT Average:** 10-Year Trailing Average of 20-Year U.S. Treasury Yield = 2.6%

Concluded Normalized R_f = 3.5%

* Long-term real rate based on academic studies issued in 2022 and 2023.

Guidance: Use the higher of the Spot Rate or the Normalized Risk-free Rate.

Rolling Average Maturity Premium of U.S. 20-Year over 10-Year Treasury Yield

December 2008 – June 2023

Source: Federal Reserve Board, Kroll Analysis
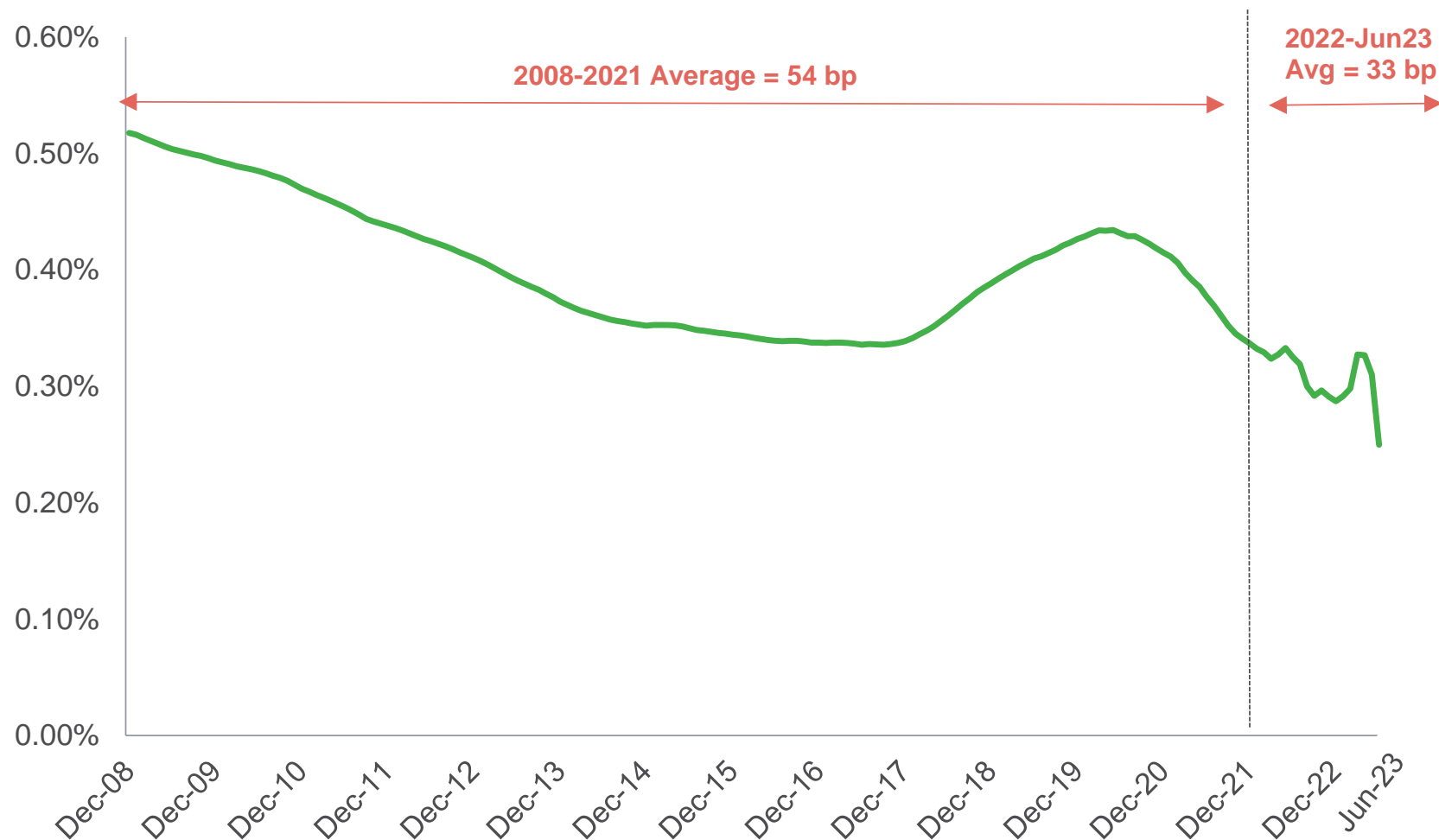
U.S. Equity Risk Premium

The Kroll 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?"

Kroll Considers Multiple Models to Estimate U.S. ERP

"Historical" ERP Estimates

+

Forward-looking ERP Estimates

3.5% ← Range of Unconditional ERP → 6.0%
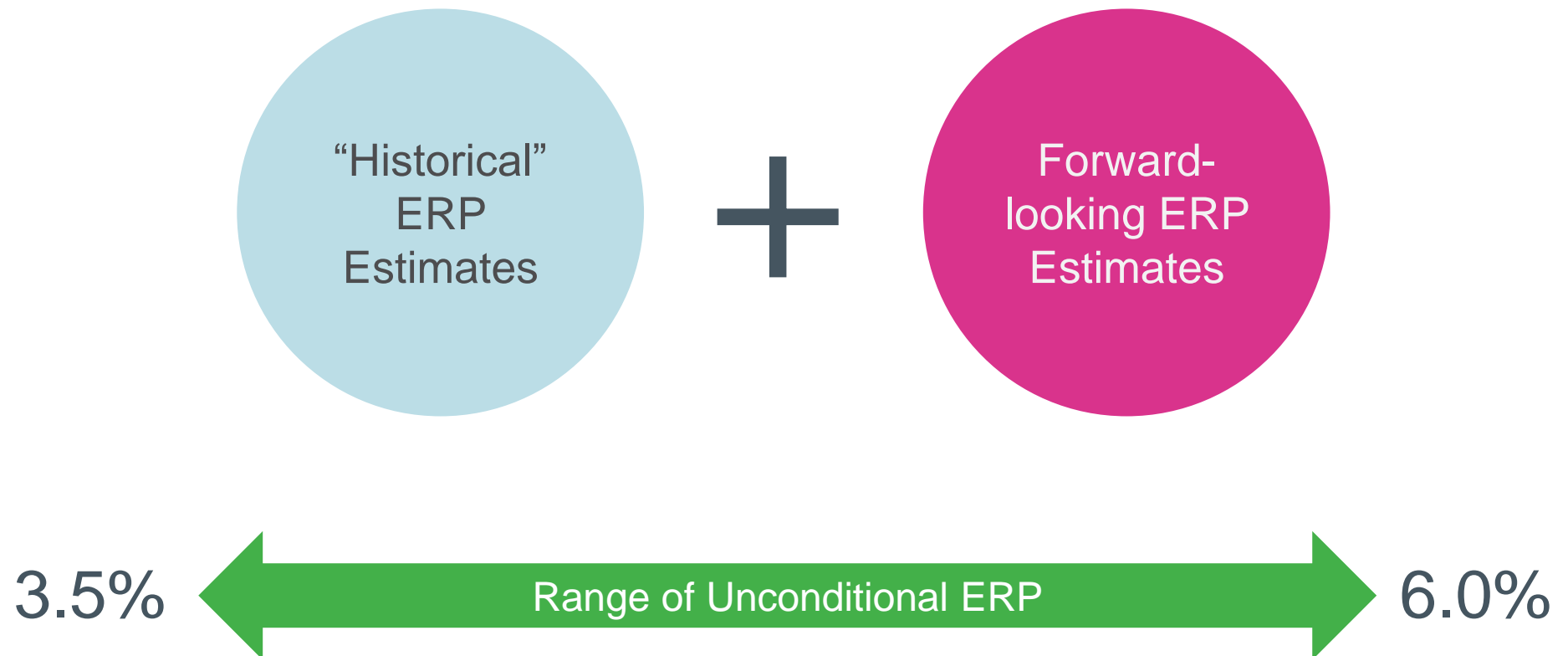
Realized Equity Risk Premiums: Stock Market Returns Minus U.S. Government Bonds Through 2021

Length (Yrs.)	Period Dates	Arithmetic Average (%)	Standard Deviation (%)	Standard Error (%)	Geometric Average (%)
20	2002–2021	7.56	18.12	4.05	5.80
30	1992–2021	7.60	17.51	3.20	5.89
40	1982–2021	7.79	16.14	2.55	6.19
50	1972–2021	6.31	17.23	2.44	4.61
96	1926–2021	7.46	19.79	2.02	5.36
122	1900–2021	7.07	19.51	1.77	5.04
150	1872–2021	6.27	18.62	1.52	4.44
224	1798–2021	5.38	17.90	1.20	3.72

Source: Cost of Capital Navigator

Long-term Realized Risk Premiums Measured Relative to Long-term Government Bonds

| Adjusted Realized Risk Premium	Period	Arithmetic Average (%)	Geometric Average (%)
Long-term "Historical" ERP	1926–2021	7.46	5.36
Long-term "Supply-side" ERP	1926–2021	6.22	4.29

Source: Cost of Capital Navigator

Early 2023 Academic Estimates of Equity Risk Premium Over the Next 10 Years (Except as Noted)

Source	ERP Estimate	Method
Roger Ibbotson	5.0%	Arithmetic – LT Data
Elroy Dimson	2.5%	Geometric – LT Data
Cliff Asness	3.0%	Geometric
Rob Arnott 1) No Mean Reversion 2) With Mean Reversion	3.1% 0.7%	Geometric
Marty Leibowtiz	*	*
Mary Ida Compton	5.0%	Arithmetic?
Antti Ilmanen	3.0%	Geometric
Tom Phillips	0.1%	Geometric
Rajnish Mehra	4.5% - 5%	Arithmetic
Jeremy Siegel	3.5% - 4%	Geometric
Will Goetzmann	5.0%	Arithmetic – LT Data

* No current estimate, but states that "today's risk premium is actually rather low on a historical basis"

KROLL

Base Cost of Equity* = Spot 20-Year U.S. Government Yield in Conjunction with Unadjusted "Historical" Equity Risk Premium**

As of May 31, 2023
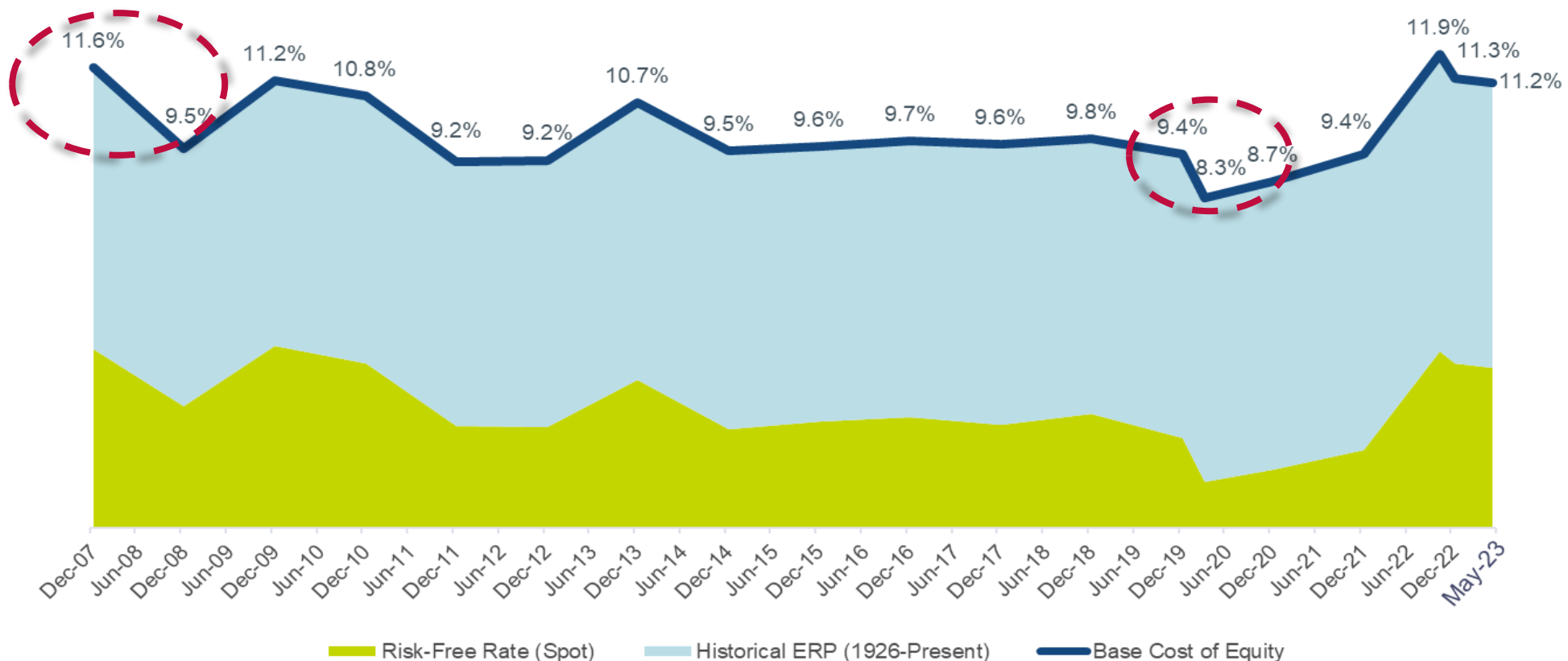
Legend: Risk-Free Rate (Spot) · Historical ERP (1926-Present) · Base Cost of Equity

* Base cost of equity assumes a Capital Asset Pricing Model (CAPM) beta of 1.0 for the overall market.
** 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 2019 spans the years 1926–2019, while the Historical ERP for 2020 spans the years 1926–2020.

The Kroll 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?
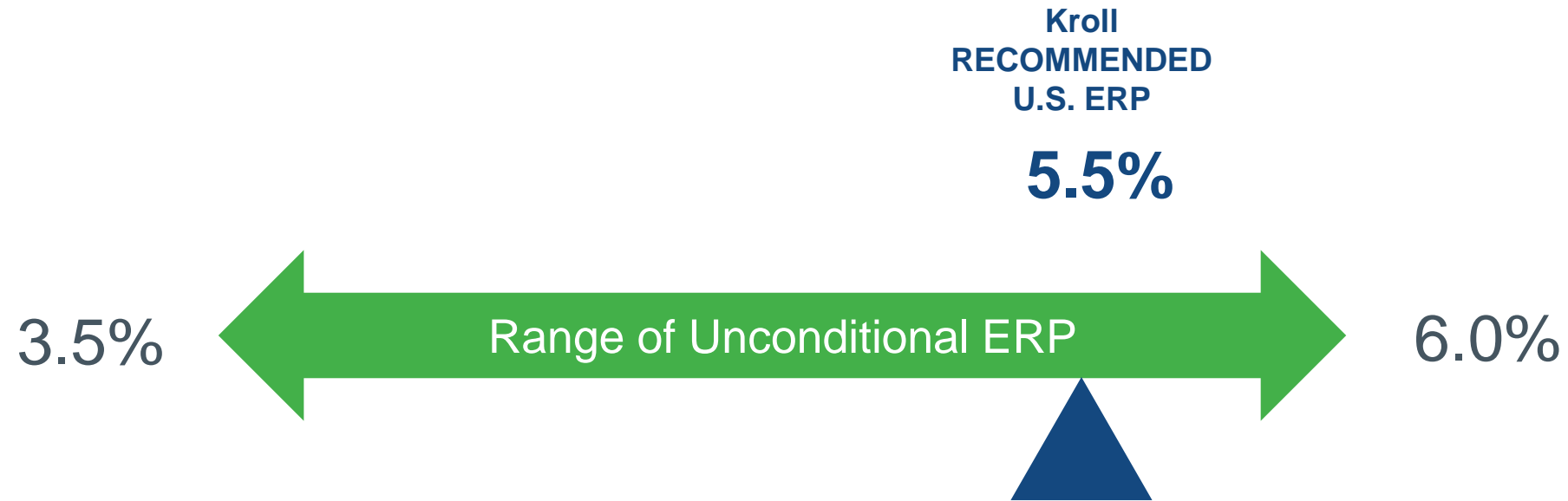
"What is the range?"

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?"

Kroll Considers Multiple Models to Estimate U.S. ERP

Effective June 8, 2023

**Kroll
RECOMMENDED
U.S. ERP**

5.5%

3.5% ← Range of Unconditional ERP → 6.0%

Factors Considered in ERP Recommendation – Summary Table

Changes from October 10, 2022 to June 30, 2023

	Factor	Change	Effect on ERP
Financial Markets	U.S. Equity Markets	▲	▼
	Implied Equity Market Volatility	▼	▼
	Corporate Credit Spreads	▼	▼
	Damodaran Implied ERP Model	▼	▼
	Default Spread Model	◄►	◄►
	U.S. Equity Market Uncertainty Index	▼	▼
Economic Indicators	Historical & Projected Real GDP Growth	◄►	◄►
	Unemployment	◄►	◄►
	Consumer Sentiment	▲	▼
	Business Confidence	◄►	◄►
	Sovereign Credit Ratings	◄►	◄►
	Economic Policy Uncertainty (EPU) Index	▲	▲

S&P 500 Index Performance
Overall Index vs. Individual Constituents

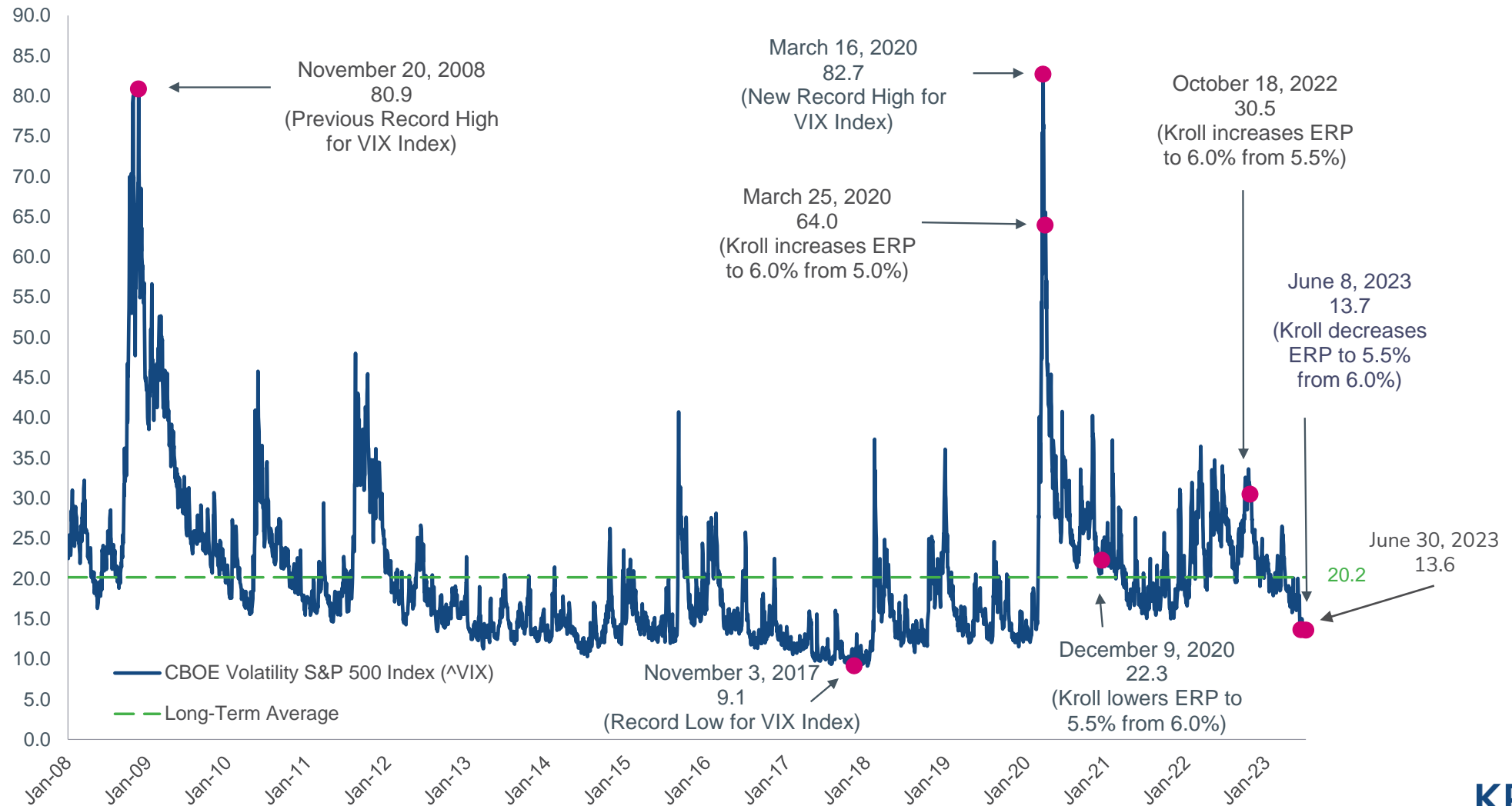|	2022	2023 YTD*
S&P 500 Index Price Return	-19.4%	18.6%
Individual Constituents – Average Return	-11.0%	10.1%
Individual Constituents – Median Return	-14.1%	7.0%

Index Record High (Jan 3, 2022)	Current Level (July 18, 2023)	Difference
4,796.56	4,554.98	-5.0%

Source: Capital IQ, Kroll analysis.
* Data collected as of July 18, 2023 market close.

Chicago Board Options Exchange "VIX" Index

January 2008 to June 30, 2023

November 20, 2008
80.9
(Previous Record High for VIX Index)

March 16, 2020
82.7
(New Record High for VIX Index)

October 18, 2022
30.5
(Kroll increases ERP to 6.0% from 5.5%)

March 25, 2020
64.0
(Kroll increases ERP to 6.0% from 5.0%)

June 8, 2023
13.7
(Kroll decreases ERP to 5.5% from 6.0%)

June 30, 2023
13.6

20.2

November 3, 2017
9.1
(Record Low for VIX Index)

December 9, 2020
22.3
(Kroll lowers ERP to 5.5% from 6.0%)

— CBOE Volatility S&P 500 Index (^VIX)
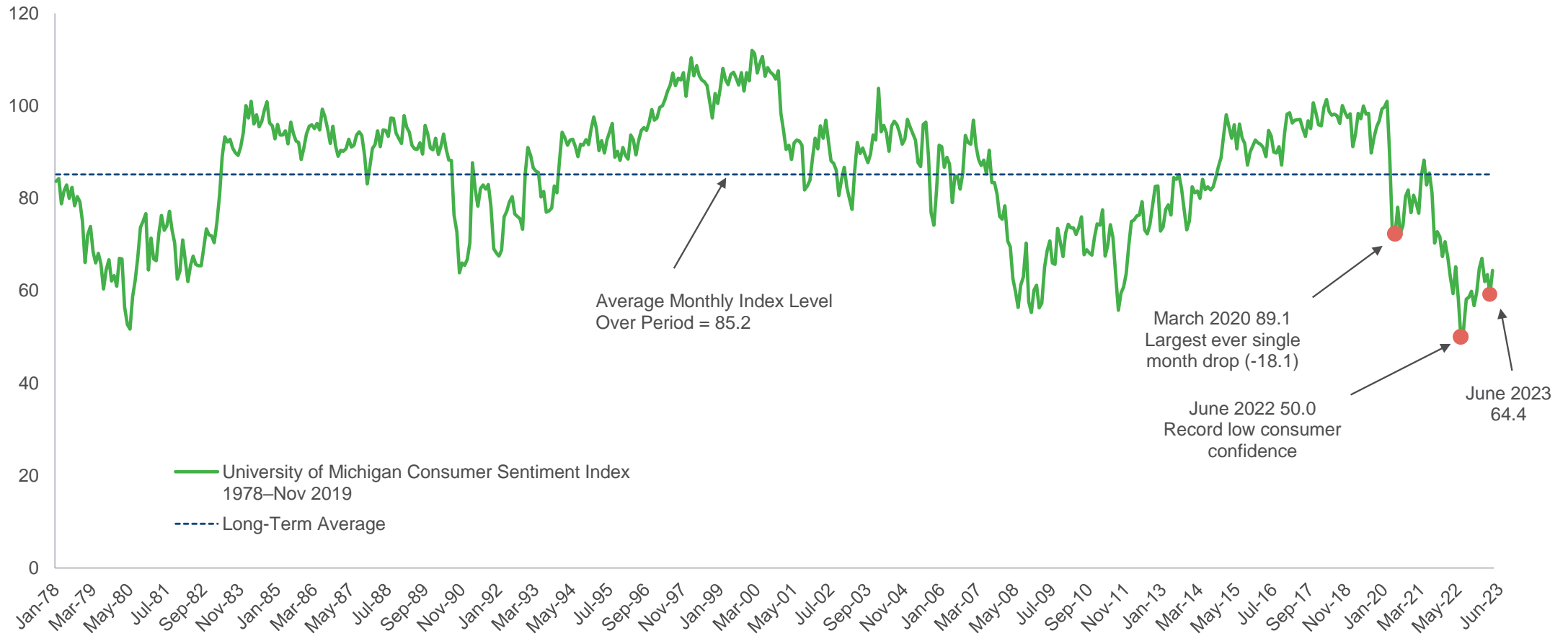
- - - Long-Term Average

Source: Capital IQ

KROLL 44

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

December 2007 – June 30, 2023

Source: Capital IQ
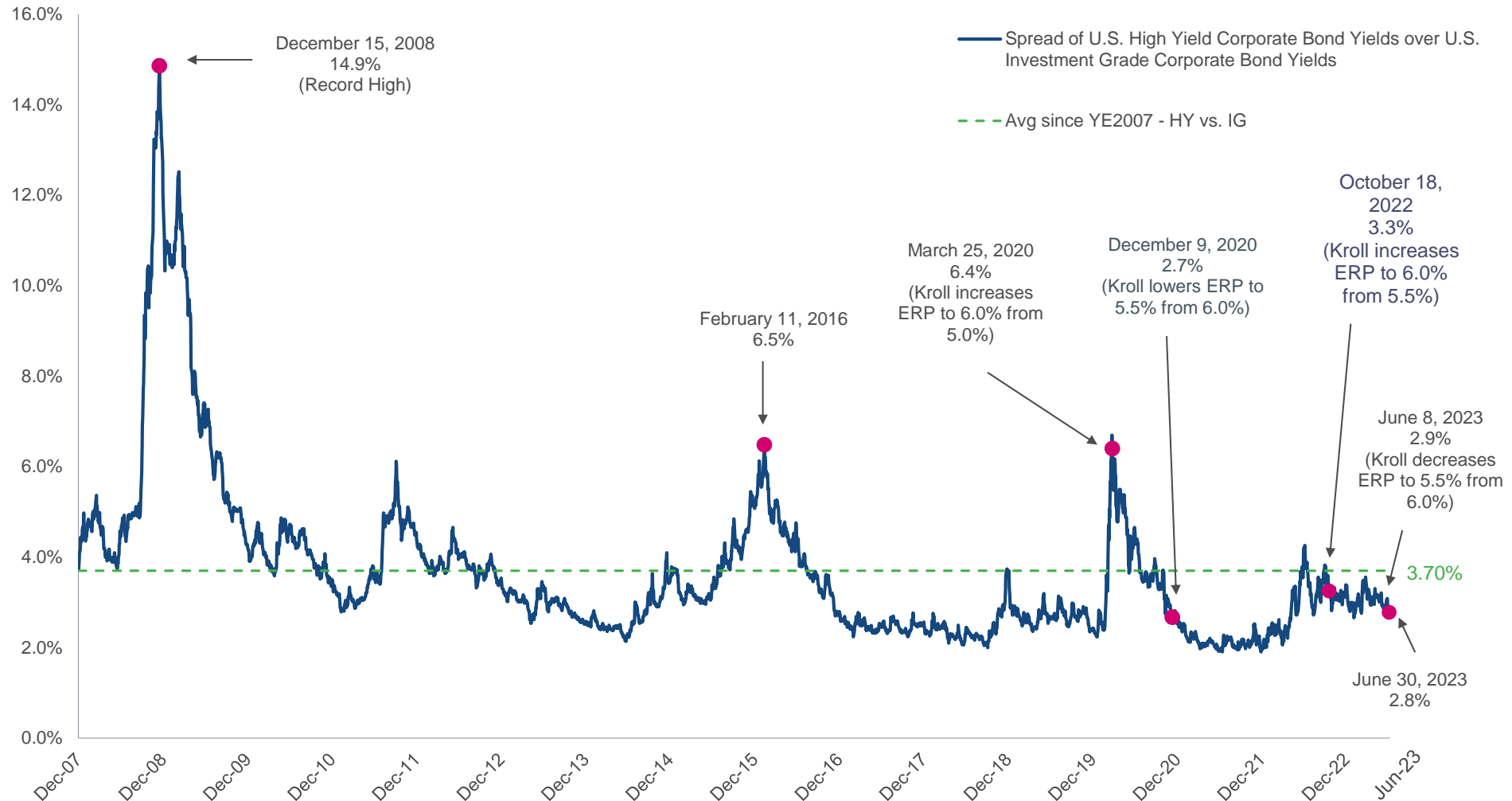
University of Michigan Consumer Sentiment Index

January 1978 – June 2023

Average Monthly Index Level
Over Period = 85.2

March 2020 89.1
Largest ever single
month drop (-18.1)

June 2022 50.0
Record low consumer
confidence

June 2023
64.4

University of Michigan Consumer Sentiment Index
1978–Nov 2019

Long-Term Average

OECD Business Confidence Index
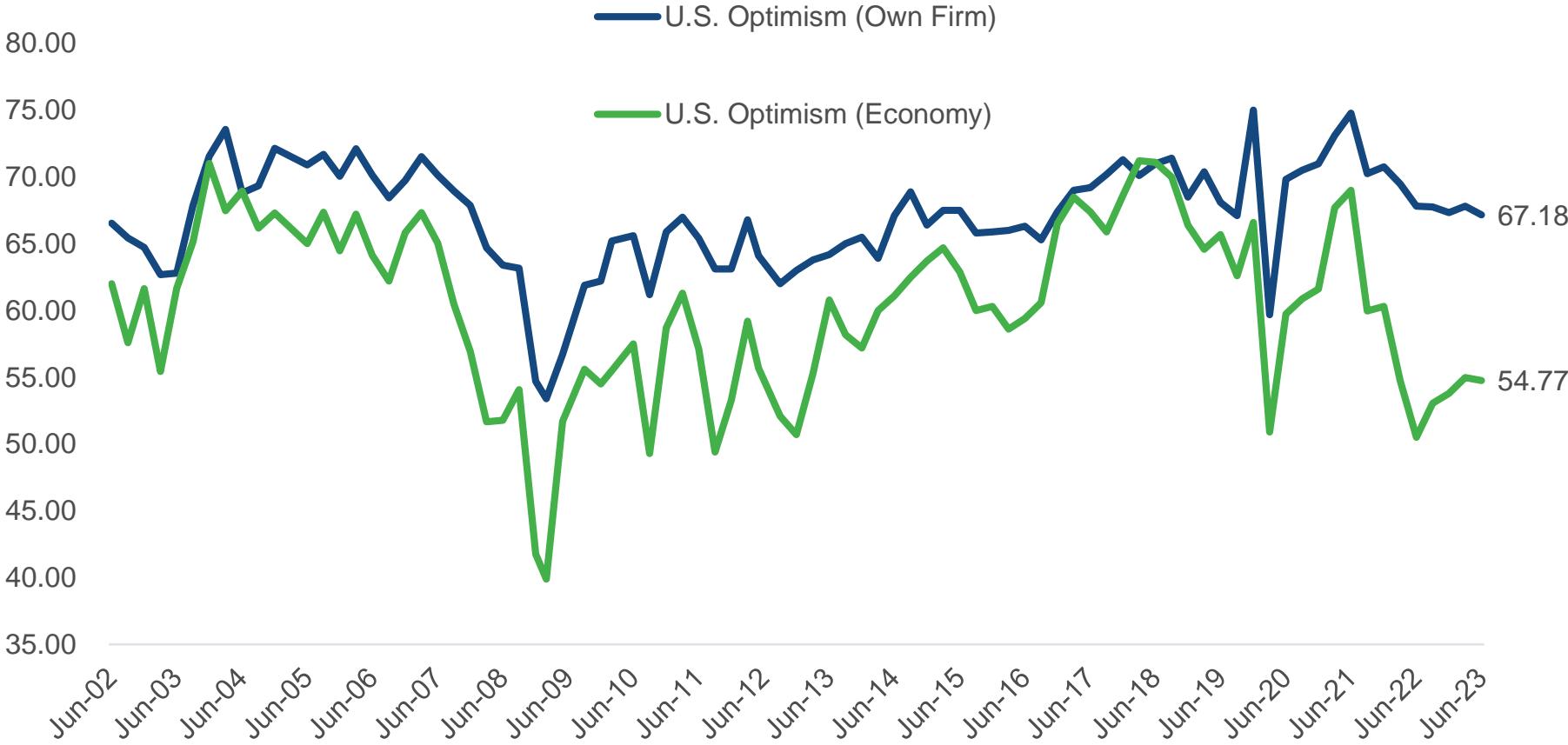
December 2007 – June 2023

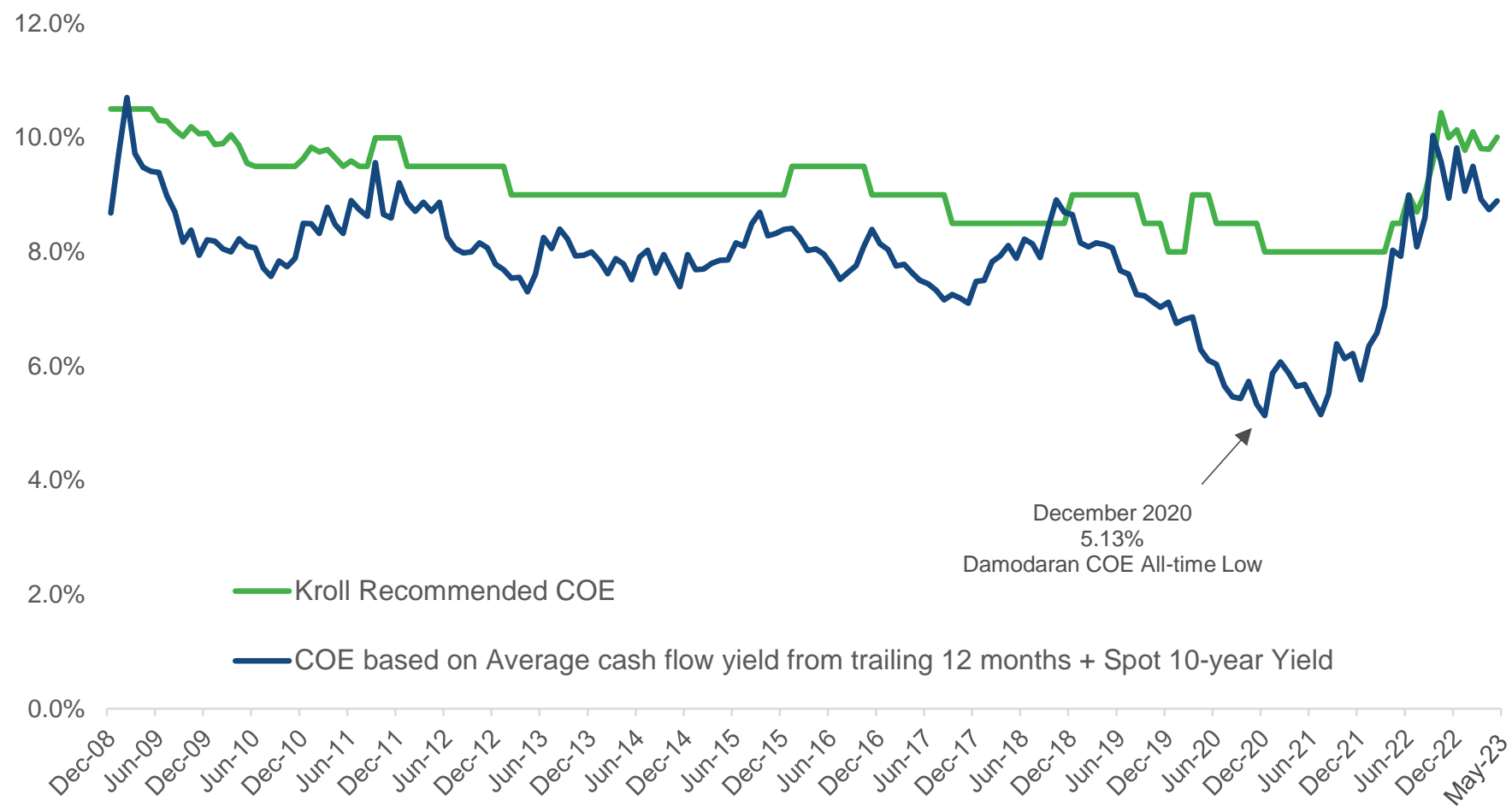March 25, 2020
98.60
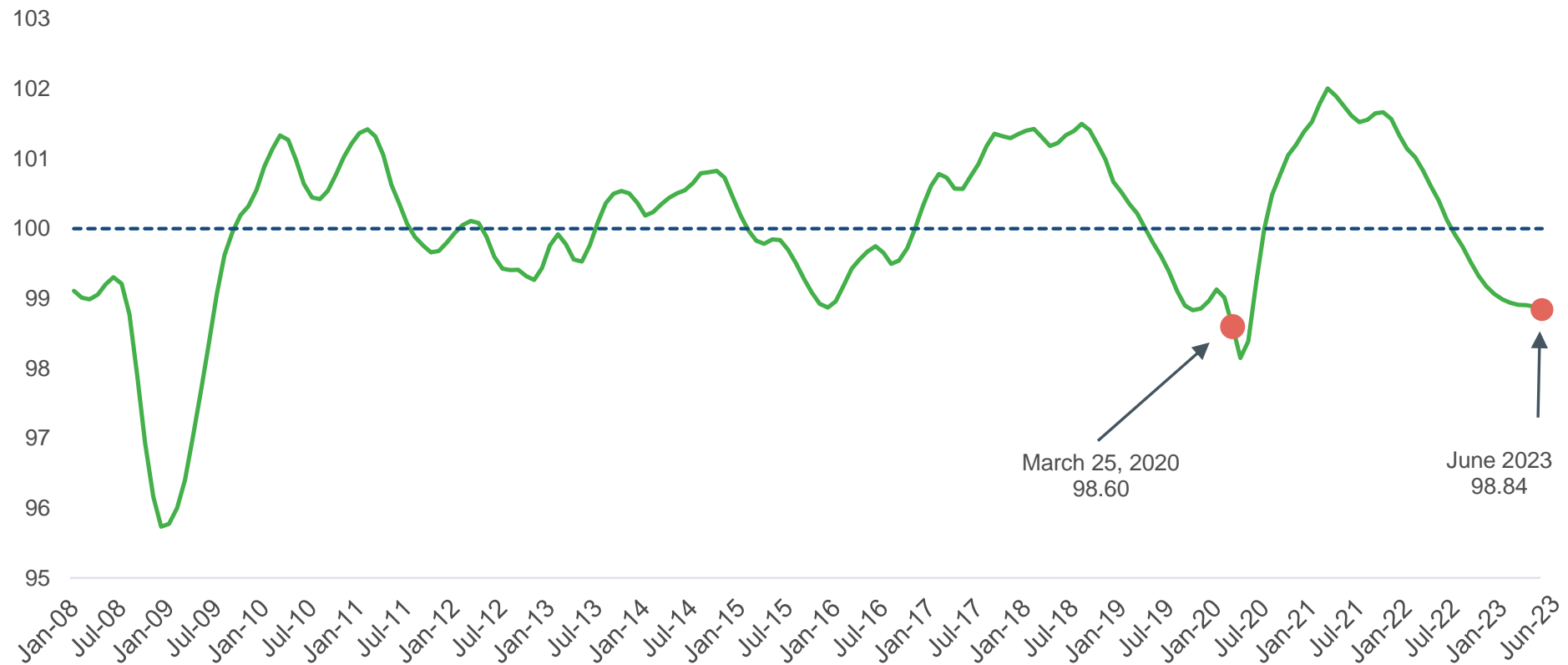
June 2023
98.84

Duke University and Federal Reserve Banks of Richmond and Atlanta CFO Survey – Business Confidence

June 2002 – June 2023

Base Cost of Equity – Kroll Recommended vs. Damodaran Preferred Method

December 2020
5.13%
Damodaran COE All-time Low

— Kroll Recommended COE

— COE based on Average cash flow yield from trailing 12 months + Spot 10-year Yield

Base Cost of Equity: Kroll Recommended vs. Damodaran Covid-19 Adjusted

August 2020
5.34%
Covid-Adjusted ERP
All-time Low

Kroll Recommended COE

COVID Adjusted ERP (using the Average cash flow yield from trailing 12 months) + Spot 10-year yield
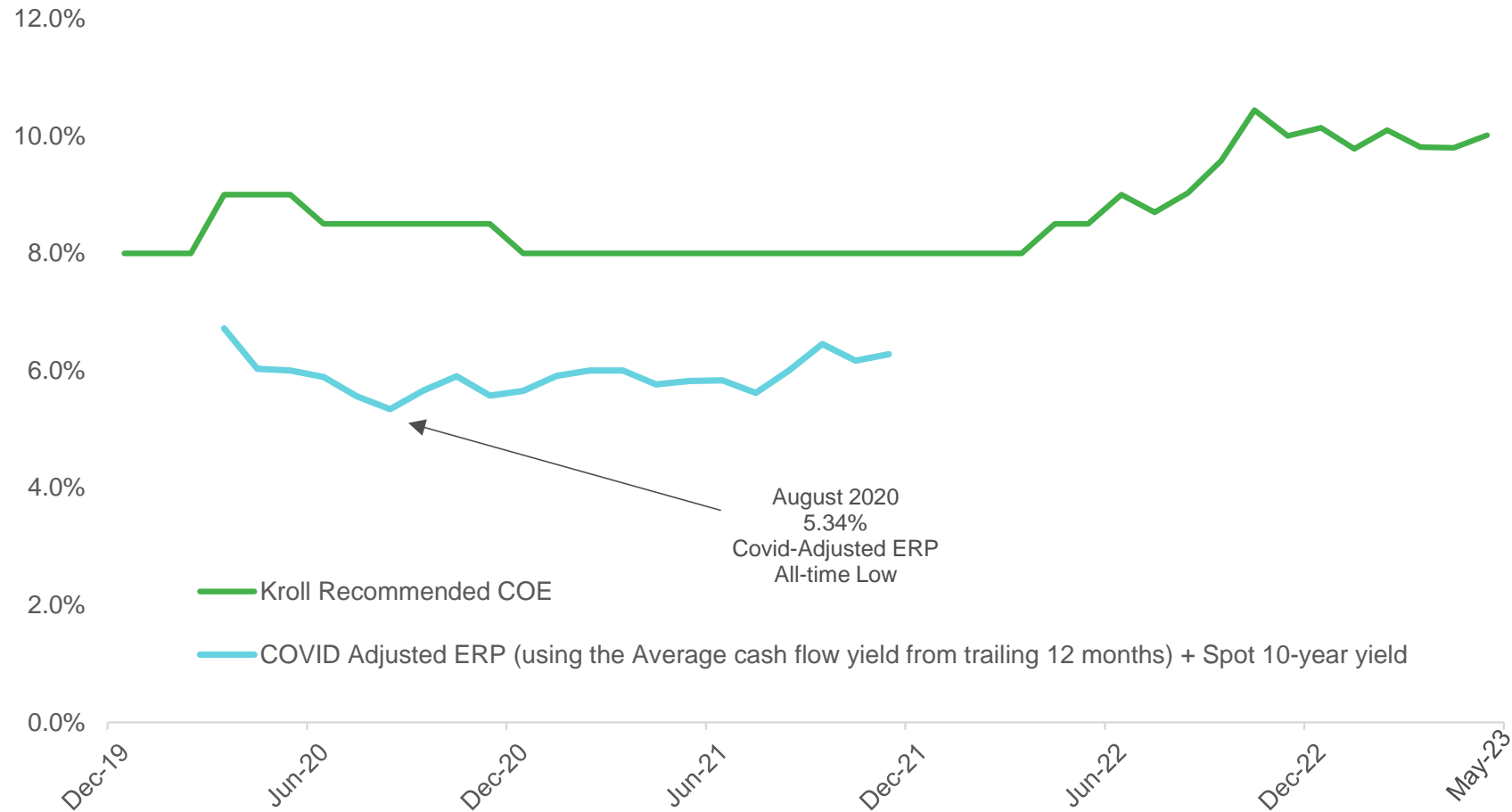
Kroll Base Cost of Equity* = Current Kroll U.S. Risk-free Rate and ERP Recommendations**

As of May 31, 2023
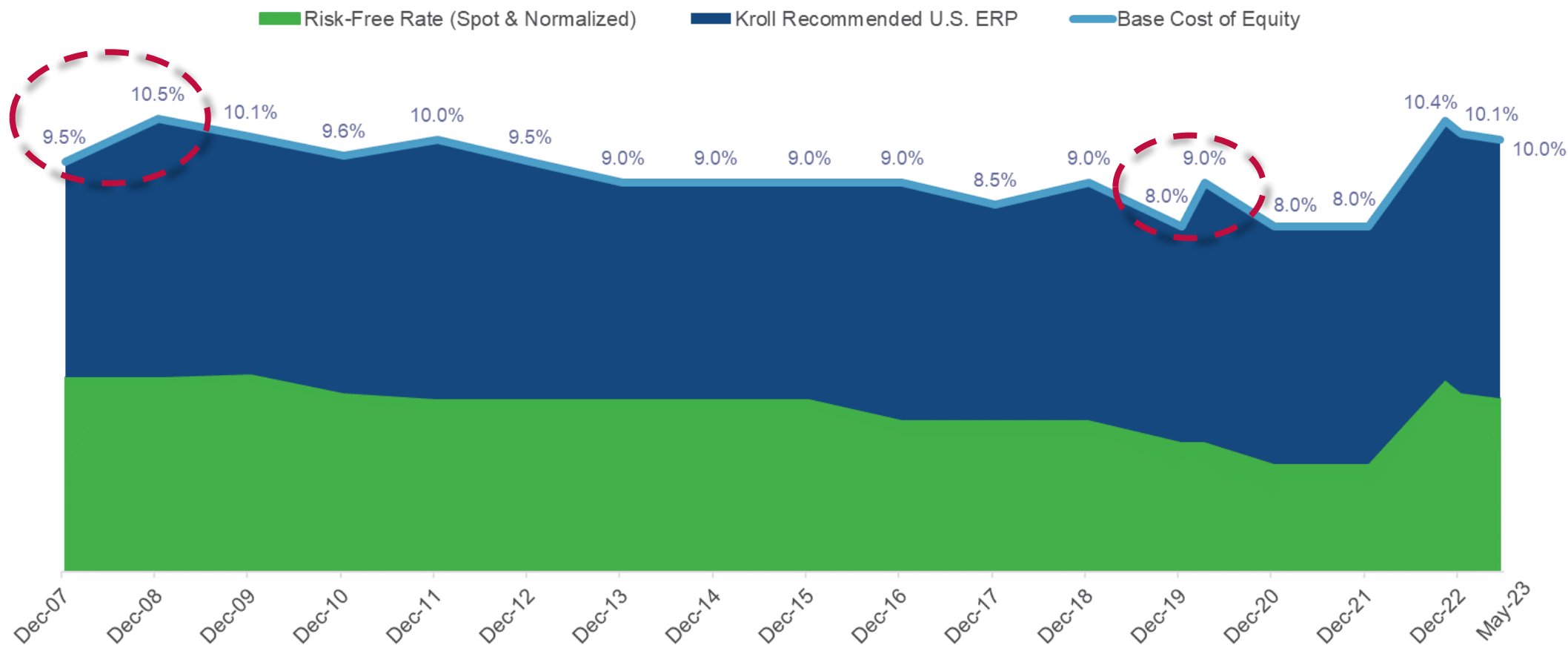
* Base cost of equity assumes a Capital Asset Pricing Model (CAPM) beta of 1.0 for the overall market.
** Current guidance recommends using a spot-risk free rate when it exceeds the Normalized Risk-free Rate of 3.5%. Where applicable, the spot rate is used in the exhibit above.

Industry Betas

KROLL

COVID-19 Impact on Industry Betas

OLS Betas by Industry Before and During COVID-19 Recovery (Dec 19 – Jun 22)

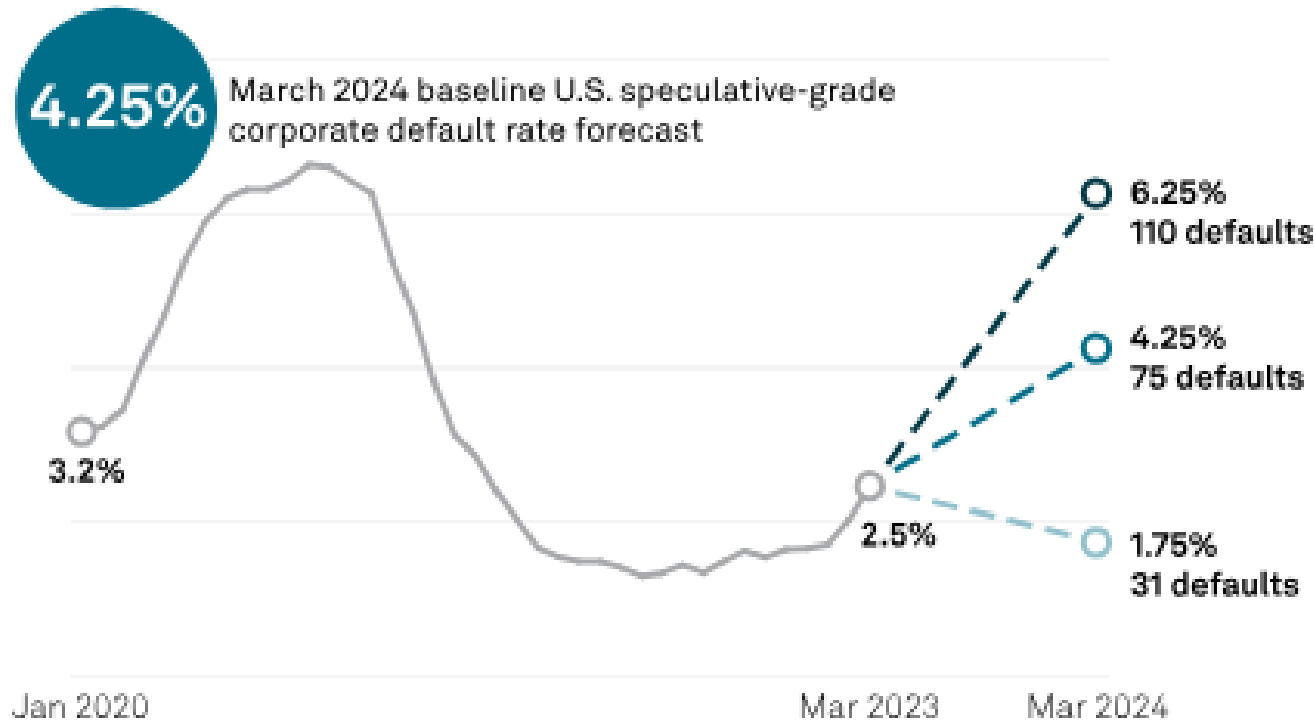| Industry	Pre COVID-19 Beta As of 31-Dec-2019	COVID-19 Beta As of 30-Jun-2022	Difference
Pharmaceuticals	1.12	0.59	-0.53
Telecommunications	0.99	0.55	-0.44
Food, Beverage, and Tobacco	0.72	0.62	-0.10
Banks	0.86	0.82	-0.04
Automobiles	1.45	1.42	-0.03
Software	1.05	1.05	0.00
Insurance	0.71	0.82	0.11
Energy	1.27	1.48	0.21
Retail	0.83	1.45	0.62

Source: : Based on the median OLS (raw) betas by industry from the Cost of Capital Navigator's U.S. Industry Benchmarking Module. The summary above is based on USD-denominated returns of companies in United States as of December 31, 2019 and June 30, 2022.

KROLL

Cost of Debt Considerations

Cost of Debt – Negative Outlook

S&P Global Ratings Projected U.S. Speculative-Grade Default Rate for Corporate Issuers

Defaults pick up into 2024

4.25% March 2024 baseline U.S. speculative-grade corporate default rate forecast

3.2%

2.5%

6.25%
110 defaults

4.25%
75 defaults

1.75%
31 defaults

Jan 2020   Mar 2023   Mar 2024

As of March 2023, 1,762 U.S. speculative-grade corporate issuers are rated by S&P Global Ratings

Pessimistic scenario: Defaults spike as the U.S. enters a prolonged period of low growth with persistent price pressures and higher-for-longer rates.

Base scenario: Balance sheet liquidity gives way amid persistent cash flow constraints. Tight financial conditions restrict access to capital.

Optimistic scenario: The default rate falls as macroeconomic pressures resolve and financial conditions ease.

Data as of March 2023.
Sources: Leveraged Commentary and Data (LCD) from PitchBook, a Morningstar company; and S&P Global Ratings Credit Research & Insights.
Copyright © 2023 by Standard & Poor's Financial Services LLC. All rights reserved.

Cost of Debt Considerations:

U.S. High Yield versus U.S. Investment Grade Corporate Bond Yields

December 2007 – June 2023

Legend:
- High Yield
- Investment Grade

December 15, 2008
(Peak of 2008 Global Financial Crisis)
23.3%

October 30, 2008
(Peak of 2008 Global Financial Crisis)
9.3%

March 23, 2020
(Peak of COVID-19 Crisis)
11.4%

March 23, 2020
(Peak of COVID-19 Crisis)
4.7%

June 30, 2023
8.4%

June 30, 2023
5.6%

Source: Federal Reserve Bank of St. Louis. Based on the effective yields of the ICE BofA U.S. Corporate Index (investment grade) and the ICE BofA U.S. High Yield Index
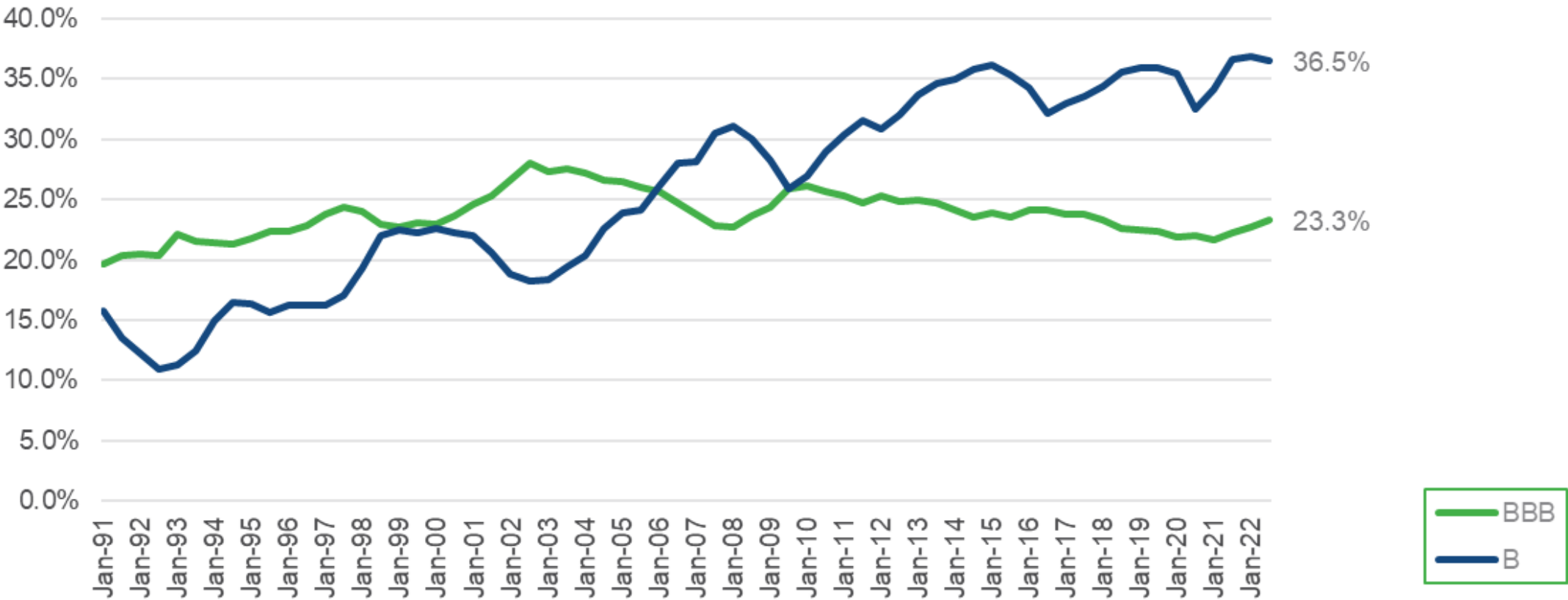
KROLL

S&P Rating Distribution by Debt Amount vs. Issuer Count

July 2022

Credit Rating	% of Total by Debt Amount	% of Total by Nr. of Issuers
AAA	0.8%	0.1%
AA	5.3%	3.5%
A	24.8%	16.1%
BBB	**40.9%**	**23.3%**
BB	12.4%	15.7%
B	13.4%	**36.5%**
CCC/CC	2.4%	4.9%
Total	**100.0%**	**100.0%**

KROLL

S&P Ratings BBB vs. B Over Time by Issuer Count

January 1991 – July 2022

Source: S&P Global Ratings, "Credit Trends: Global State Of Play: Dollar Strength And Diminished Issuance Weigh On Global Debt Growth", September 15, 2022

KROLL

Takeaways of Today's Presentation

Record high inflation is profoundly changing key value drivers:

- Projected Growth Rates and operating margins
- 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 still relatively low from an historical perspective, but have risen rapidly and significantly due to Central Banks actions in their attempt to tame inflationary pressures. **Cost of debt** has increased accordingly.

Equity Risk Premium is cyclical

- Historical measures are countercyclical and used without further adjustments may lead to the wrong conclusion

Betas for certain industries may be distorted

KROLL

Q&A

KROLL

Extra Resources

Cost of Capital Overview

As the world's premier valuation provider, we are a trusted expert in the field of cost of capital. For more than two decades, our professionals have published books, conducted studies, provided recommendations and built digital tools to help businesses and valuation professionals calculate cost of capital. Our databases are developed with rigorous analysis and based on the latest trends and insights. **Coming soon: ESG Returns Study**

Subject Matter Experts

Carla S. Nunes, CFA
Managing Director, Kroll

Anas Aboulamer, Ph.D.,
Director, Kroll

James P. Harrington
Director, Kroll

Our Valuation Digital Solutions experts strive to empower companies and finance professionals with cost of capital thought leadership and high-quality valuation data that enables them to make sound business decisions.

Cost of Capital Navigator

Our industry-leading Cost of Capital Navigator digital platform is built upon decades of valuation data and relies on established cost of capital theory and methodologies.

U.S. Cost of Capital Module

U.S. Industry Benchmarking Module

International Cost of Capital Module

International Industry Benchmarking Module

Company-level Beta Module

Key Cost of Capital Recommendations
(as June 8, 2023)

Kroll regularly reviews fluctuations in global economic and financial market conditions that warrant a periodic reassessment of the equity risk premium and accompanying risk-free rate for the United States and Eurozone. We also provide support for normalized risk-free rates for Canada, Australia, and the UK.

	U.S. (in USD)	Eurozone ** (in EUR)	U.K. †† (in GBP)	Canada †† (in CAD)	Australia †† (in AUD)
Normalized Risk-free Rate	Higher of 3.5% or Spot*	Higher of 3.0% or Spot†	Higher of 4.0% or Spot‡	Higher of 3.5% or Spot§	Higher of 3.5% or Spot#
Equity Risk Premium	5.5%	5.5% to 6.0%	n/a	n/a	n/a

* We recommend using the spot 20-year U.S. Treasury yield as the proxy for the risk-free rate, if the prevailing yield as of the valuation date is higher than our recommended U.S. normalized risk-free rate of 3.5%. This guidance is effective when developing USD-denominated discount rates as of June 16, 2022 and thereafter.

† We recommend using the spot 15-year German government bond yield as the proxy for the risk-free rate, if the prevailing yield as of the valuation date is higher than our recommended German normalized risk-free rate of 3.0%. This guidance is effective when developing EUR-denominated discount rates as of October 18, 2022 and thereafter.

‡ We recommend using the spot 20-year U.K. Gilt yield as the proxy for the risk-free rate, if the prevailing yield as of the valuation date is higher than our recommended U.K. normalized risk-free rate of 4.0%. This guidance is effective when developing GBP-denominated discount rates as of October 18, 2022 and thereafter.

§ We recommend using the spot Government of Canada Benchmark Long-Term Bond yield as the proxy for the risk-free rate, if the prevailing yield as of the valuation date is higher than our recommended Canada normalized risk-free rate of 3.5%. This guidance is effective when developing CAD-denominated discount rates as of October 18, 2022 and thereafter.

We recommend using the spot 10-year Australia Commonwealth Government bond yield as the proxy for the risk-free rate, if the prevailing yield as of the valuation date is higher than our recommended Australia normalized risk-free rate of 3.5%. This guidance is effective when developing AUD-denominated discount rates as of October 31, 2022 and thereafter.

** German normalized risk-free rate and Eurozone equity risk premium (ERP) for use in EUR-denominated discount rates from a German investor perspective. Additional country risk adjustments may be warranted when estimating discount rates for other countries in the Eurozone.

†† Although currently we do not have an official Kroll Recommended ERP for the U.K., Canada and Australia, historical and other forward-looking ERP information for these countries is available in the International Cost of Capital module within the Cost of Capital Navigator.

Webinars and Conferences

With deep technical expertise, our team continually presents virtually, live at conferences, and hosts webinars on latest trends for the global economy and financial markets, industry developments impacting cost of capital, impact of COVID-19 on valuations, and much more.

Cost of Capital Infographic, Country Risk Heatmap and Other Tools

We provide insights and tools to assist users with quantifying risk during uncertain times, when performing cross-border valuations and more.

Kroll Recommended ERP is the benchmark reference in valuation

58%

of participants said that they use our recommended U.S. ERP*

**Based on polling during our May 2021 webinar, COVID-19 One Year Later – Impact on Cost of Capital of ~600 external live participants.

Cost of Capital Navigator

The Cost of Capital Navigator is an online platform that guides you through the process of developing global cost of capital estimates, a key component of any valuation analysis. The four Modules are available for 1-year subscriptions.
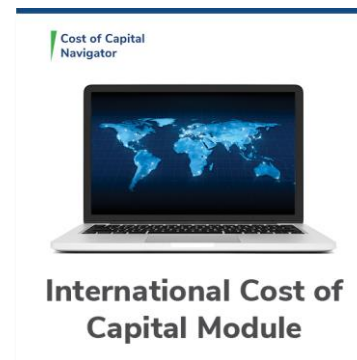
- **U.S. Cost of Capital**

- **U.S. Industry Benchmarking**

- **International Cost of Capital**

- **International Industry Benchmarking**

- **Company-Level Beta Module**
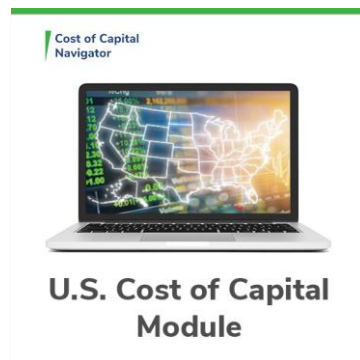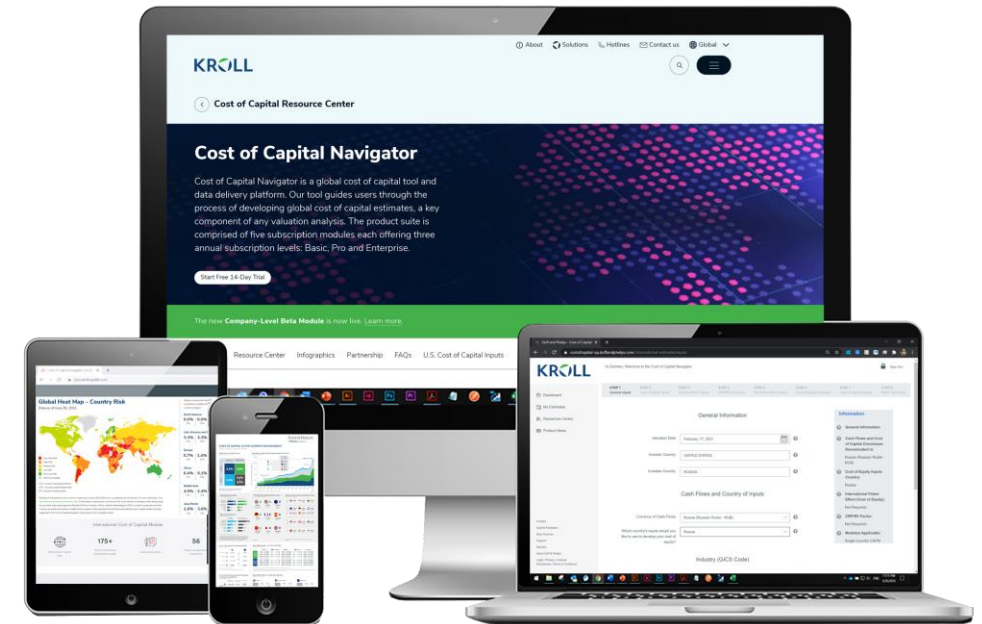
U.S. Cost of Capital Module
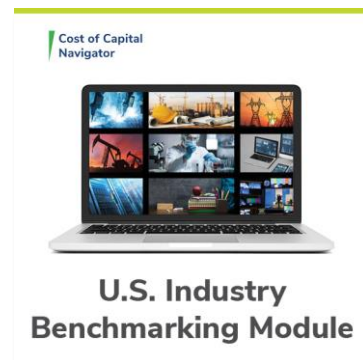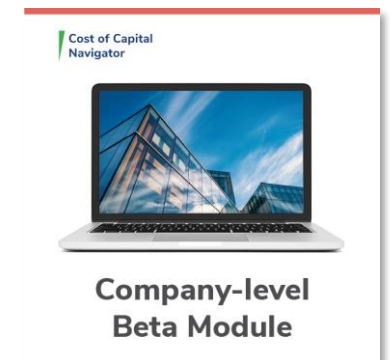
U.S. Industry Benchmarking Module

International Cost of Capital Module

International Industry Benchmarking Module

Company-level Beta Module

KROLL

KROLL

For more information, please contact:

Carla S. Nunes, CFA
Managing Director
Kroll Digital Solutions / Valuation Advisory Services
Carla.nunes@kroll.com

About Kroll

As the leading independent provider of risk and financial advisory solutions, Kroll leverages our unique insights, data and technology to help clients stay ahead of complex demands. Kroll's team of over 6,500 professionals worldwide continues the firm's nearly 100-year history of trusted expertise spanning risk, governance, transactions and valuation. Our advanced solutions and intelligence provide clients the foresight they need to create an enduring competitive advantage. At Kroll, our values define who we are and how we partner with clients and communities. Learn more at Kroll.com.

M&A advisory, capital raising and secondary market advisory services in the United States are provided by Duff & Phelps Securities, LLC. Member FINRA/SIPC. Pagemill Partners is a Division of Duff & Phelps Securities, LLC. M&A advisory, capital raising and secondary market advisory services in the United Kingdom are provided by Duff & Phelps Securities Ltd. (DPSL), which is authorized and regulated by the Financial Conduct Authority. Valuation Advisory Services in India are provided by Duff & Phelps India Private Limited under a category 1 merchant banker license issued by the Securities and Exchange Board of India.