



Cost of Capital in a Year of Elections

Presented by:

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25 September 2024

Our Evolution

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Nearly 100 Years

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- Started as valuation and corporate finance advisor
- Rapid growth into other governance, risk, compliance and complementary solutions
- Acquired 30+ businesses, including Kroll

ONE TEAM, ONE KROLL 2021-present

- Duff & Phelps rebrands as Kroll and completes brand unification
- Acquired Crisp and Resolver risk companies
- Acquired AVC Ltd. to create dedicated energy team within FAAS practice
- Talent Acquisition of the BFI Team to strengthen and expand valuation services in the Netherlands

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Carla S. Nunes, CFA, ABV 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 as 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 authored a chapter titled "Cost of Capital for Divisions and Reporting Units" included in the 4th and 5th editions of the textbook *Cost of Capital: Applications and Examples* (2014), by Shannon Pratt and Roger Grabowski. She was also a contributing author to the chapter "Risk-free Rate" in the 5th edition. In addition, she is a co-author of the Duff & Phelps Valuation Handbook series (published annually between 2014 and 2019), now available exclusively online in the Kroll Cost of Capital Navigator, which she also co-created. Carla is a co-author of the 2021, 2022 and 2023 updates of the *Valuation Handbook – International Guide to Cost of Capital: Summary Edition* published by the CFA Institute Research Foundation. She also co-authored a chapter for *The Art of Valuation*, published by The Appraisal Foundation. Carla is a frequent speaker in webinars, conferences, and top business schools on the topics of cost of capital, the economy, ESG, goodwill impairment, and valuation in general.
- Carla was a co-author of the Kroll's "ESG and Global Investor Returns Study" (2023) which examined the relationship between historical returns of over 13,000 publicly traded companies across a variety of geographies and industries and their ESG ratings to determine the correlation of ESG ratings to company performance.
- Carla has recently completed her term as Practitioner Director in the Board of the Financial Management Association (FMA) International and she is a member of the Education Committee of the International Institute of Business Valuers (iIBV), the Financial Reporting Committee (FRC) at the Institute of Management Accountants (IMA) and the ESG Working Group at the IVSC Standards Review Boards. Carla is also a board member of the Simon Women's Alliance, and she was a Fellow of the (now-sunset) Kroll Institute.
- Carla received her MBA in finance from the University of Rochester's Simon School, an honors degree in business administration from Lisbon's School of Economics and Management (ISEG Lisbon) and completed coursework (50%) 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 passed the exam and fulfilled all the requirements for the Certified in Entity and Intangibles Valuations (CEIV) credential (now-discontinued). Carla also holds an ESG Executive Certificate for Financial Professionals Program awarded by The Wharton School, University of Pennsylvania.

James P. Harrington



Director

James P. Harrington is a Director at Kroll (previously Duff & Phelps) James is a member of the Kroll Valuation Digital Solutions group, which produces cost of capital thought leadership content and data housed in the Cost of Capital Navigator at kroll.com/costofcapitalnavigator.

- James provides technical support on client engagements involving cost of capital and is a leading contributor to Kroll's efforts in the development of studies, surveys, and online content and tools.
- Previously, James was director of valuation research in Morningstar's Financial Communications Business where he led the group that produced the Stocks, Bonds, Bills, and Inflation® (SBBI®) Valuation Yearbook, Stocks, Bonds, Bills, and Inflation® (SBBI®) Classic Yearbook, Cost of Capital Yearbook, various international cost of capital reports, and created a website dedicated to cost of capital issues.
- James is co-author of the "Valuation Handbook" series with colleagues Carla Nunes and Roger Grabowski. The four Valuation Handbooks were published as physical books starting in 2014; as of 2021 the information and data previously published in the Valuation Handbooks has been transitioned over to the Cost of Capital Navigator at kroll.com/costofcapitalnavigator.
- James is co-author of the Stocks, Bonds, Bills, and Inflation® (SBBI®) 2021 Summary Edition with Roger Ibbotson (Professor in the Practice Emeritus of Finance at Yale School of Management). The SBBI® 2021 Summary Edition is produced in a partnership of Kroll, the CFA Institute Research Foundation, and Morningstar, Inc.
- James is a contributing author to Cost of Capital: Applications and Examples, 5th edition, by Shannon P. Pratt and Roger J. Grabowski (John Wiley & Sons, Inc., 2014).
- James is a contributing author to Shannon Pratt's Valuing a Business – The Analysis and Appraisal of Closely Held Companies, Sixth ed. (McGraw-Hill, 2022).
- James was a co-author of the Kroll's "ESG and Global Investor Returns Study" (2023) which examined the relationship between historical returns of over 13,000 publicly traded companies across a variety of geographies and industries and their ESG ratings to determine the correlation of ESG ratings to company performance.

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5. U.S. Cost of Debt
6. Eurozone Equity Risk Premium
7. Country Risk
8. Extra Resources

Projected Economic Growth

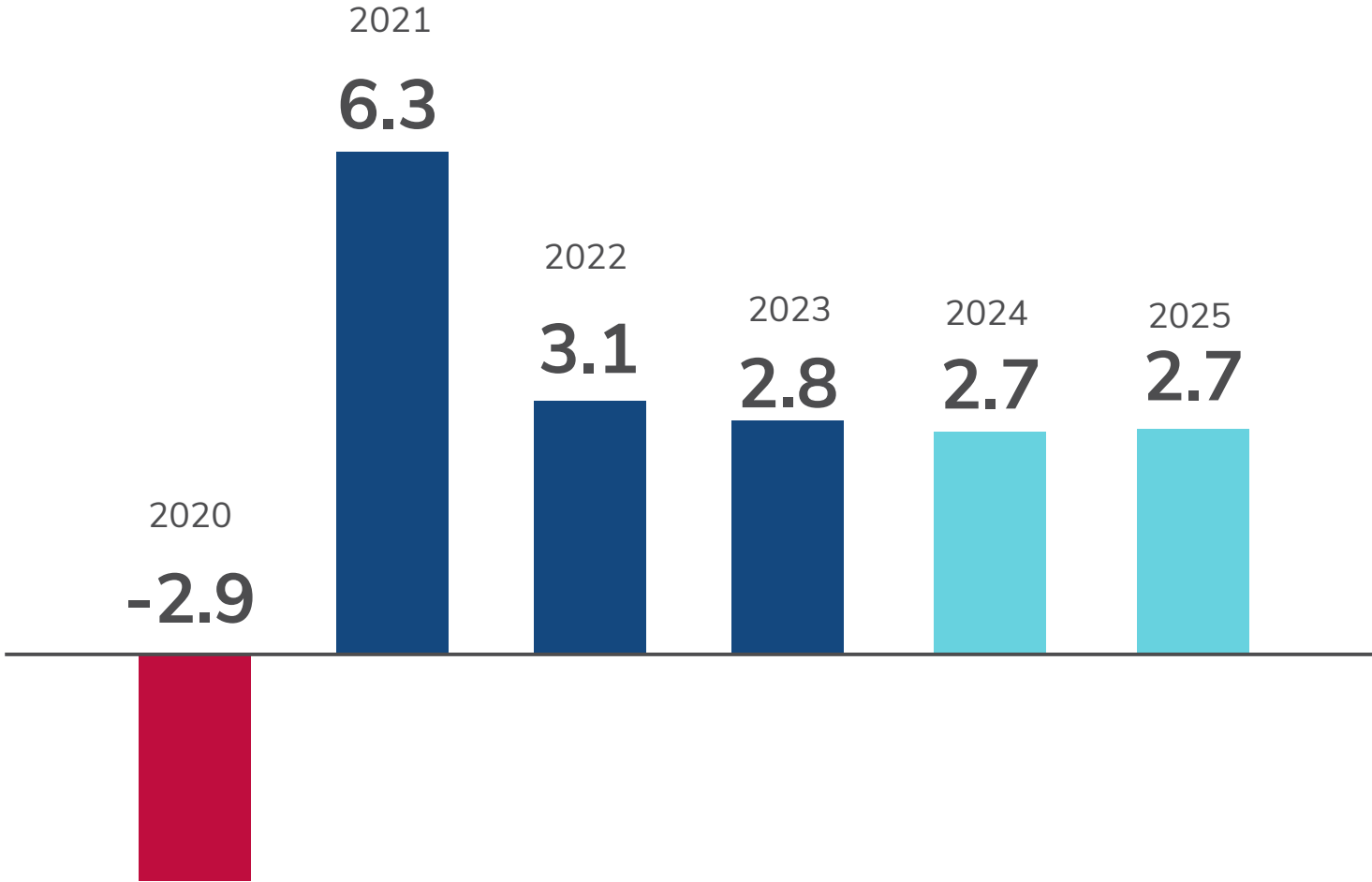
Real GDP Growth – Source of Estimates

We review 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 (S&P Global Market Intelligence)
9. Oxford Economics
10. Standard & Poor's

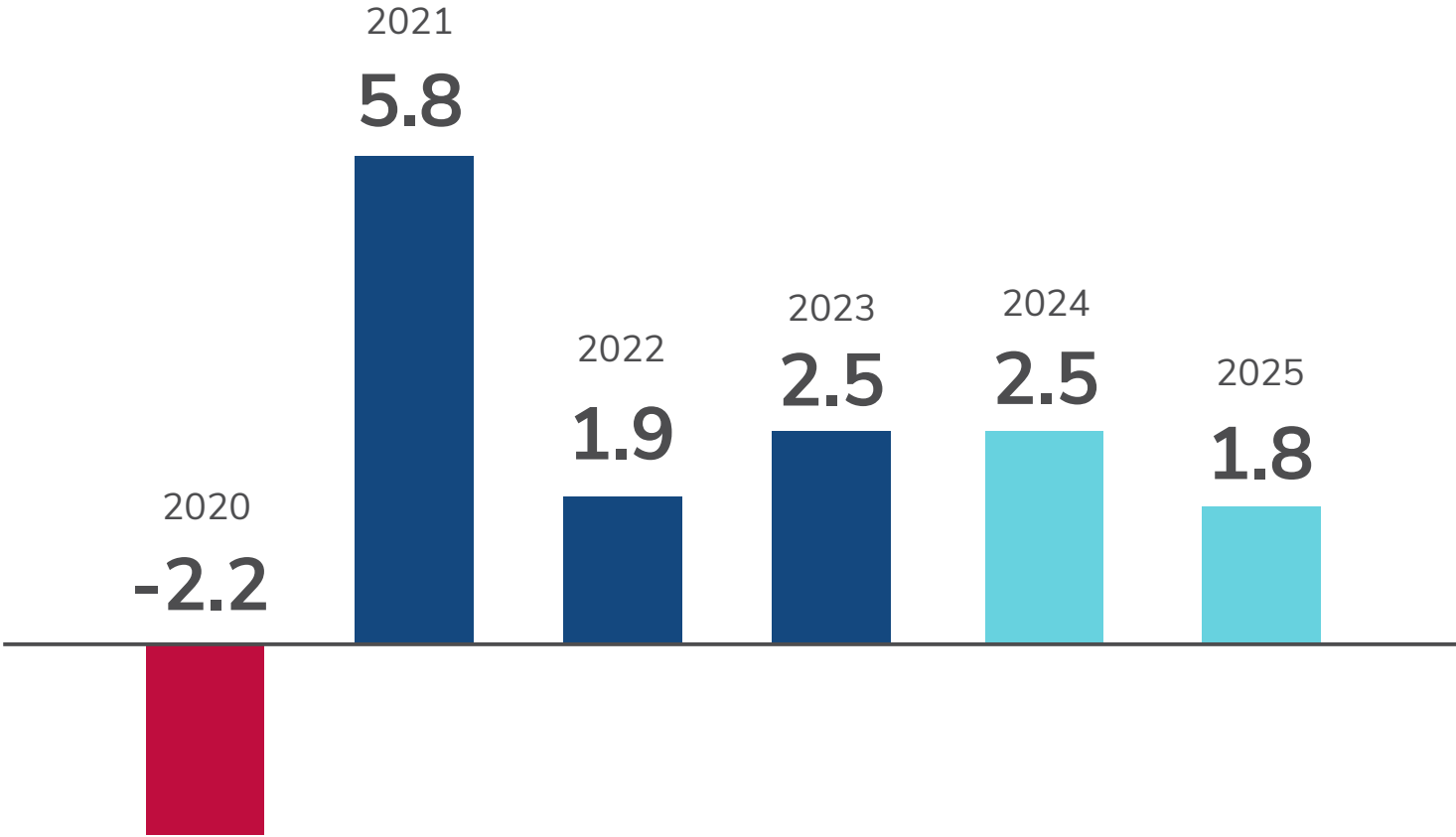
Real GDP Growth (%) Estimates by Region: World

Data as of September 20, 2024

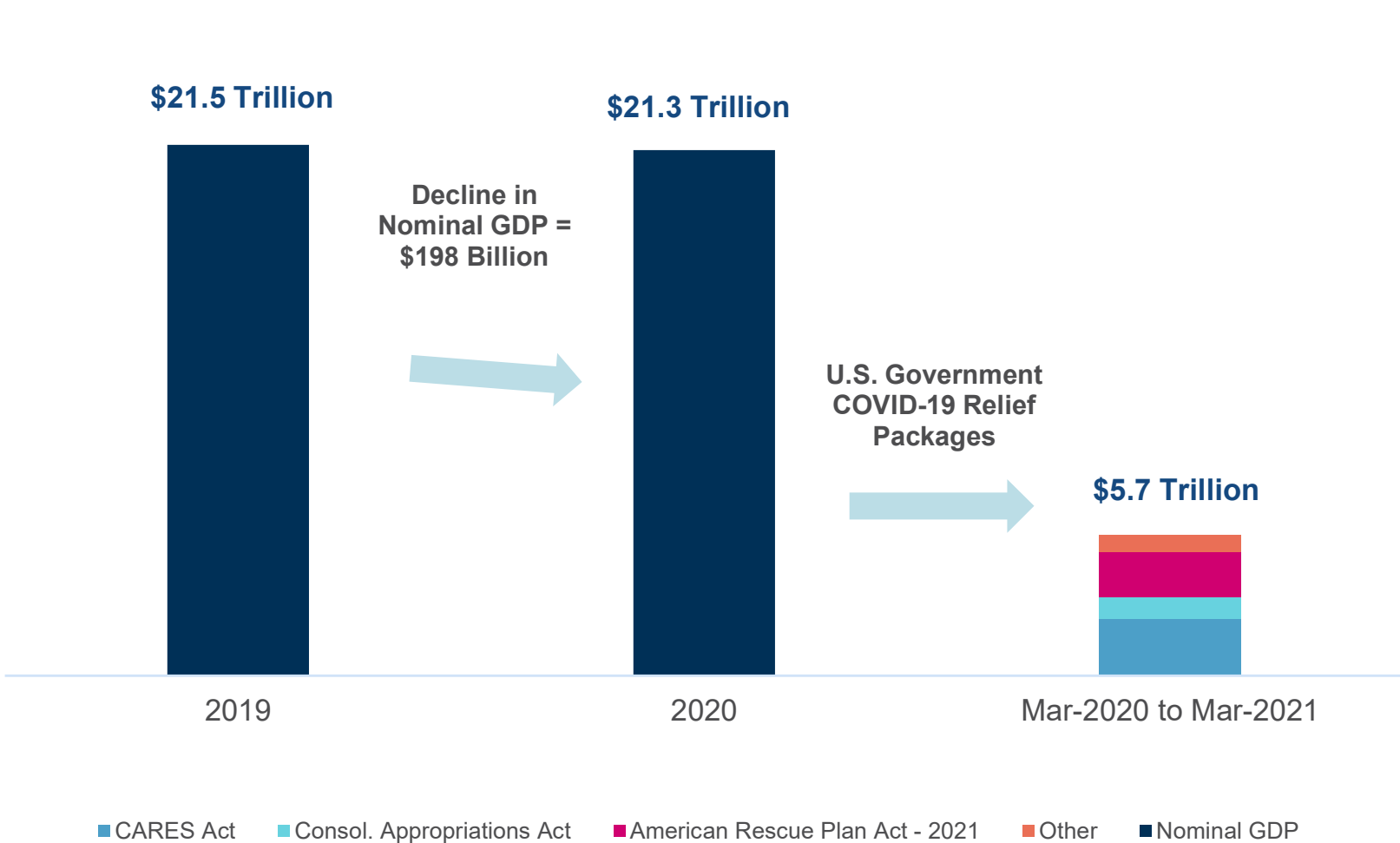


Real GDP Growth (%) Estimates by Region: U.S.

Data as of September 20, 2024



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



Size of Combined COVID-19 Fiscal Stimulus Packages:
26%
of 2019 Nominal GDP

2020 GDP Decreased:
0.9%
Compared to 2019 GDP

Sources: U.S. nominal GDP data from Bureau of Economic Analysis, updated August 29, 2024. Magnitude of Covid-19 packages based on IMF analysis.

Post-COVID Fiscal Initiatives in the U.S.

Latest Independent Estimates of Government Spending Over the Next 10 Years



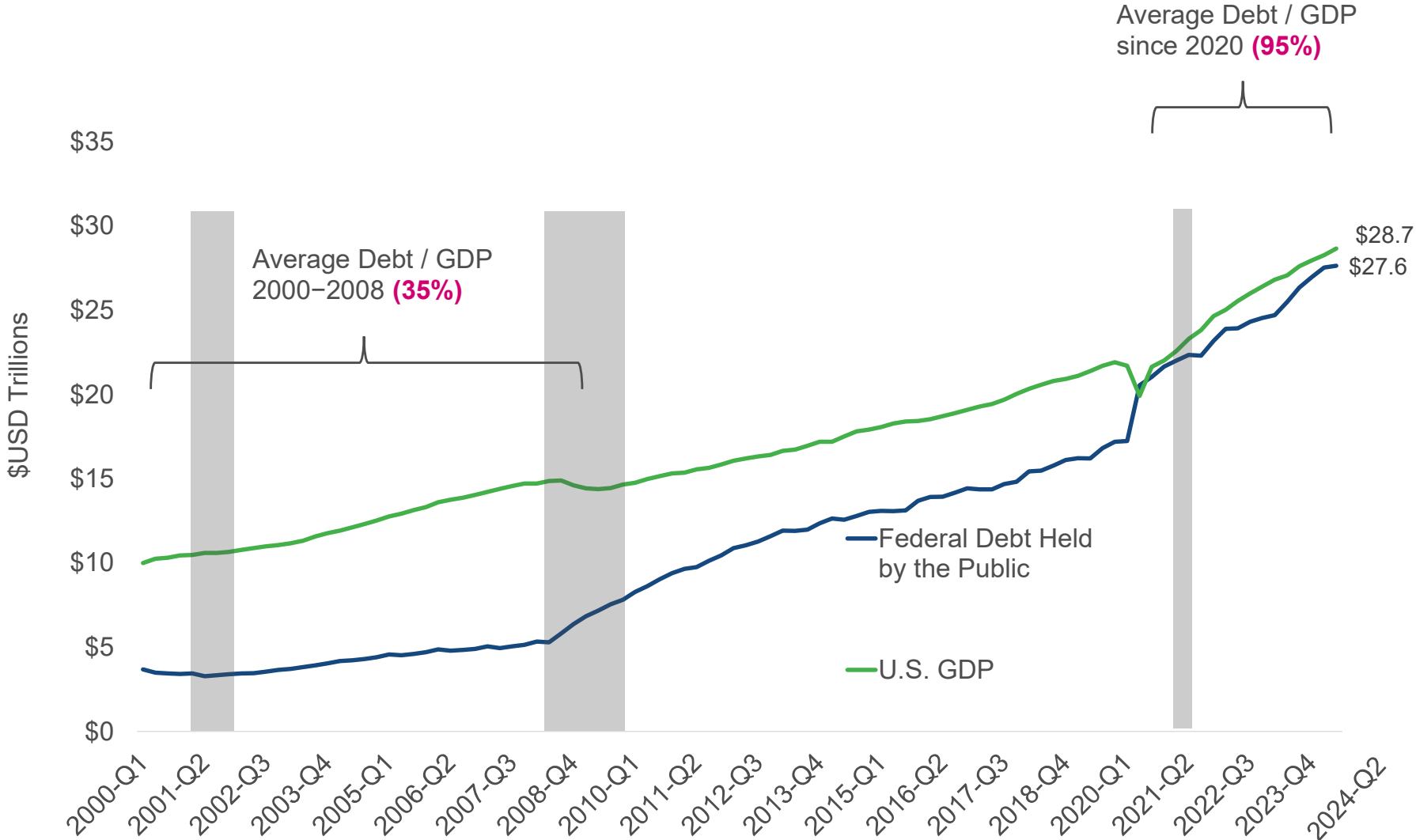
Program	Estimate (USD in Billions)	Source*
Bipartisan Infrastructure Investment and Jobs Act	\$1,200	McKinsey
CHIPS and Science Act of 2022	\$280	McKinsey
Inflation Reduction Act of 2022 (IRA)	\$1,045	Penn-Wharton Budget Model
Income-Driven Repayment Plan (the “SAVE” plan)**	\$455	Penn-Wharton Budget Model
“New Plans” for Student Debt Relief	\$84	Penn-Wharton Budget Model
TOTAL	\$3,064	

* Kroll analysis of cited sources. Other sources may actually exceed these estimates. For example, the Committee for a Responsible Federal Budget estimates that the total student debt cancellation policies will have a combined cost between \$870 bn and \$1.4 tn.

** The “Save Plan” was blocked by an 8th Circuit Court of Appeals’ ruling on July 19, 2024. But the \$169 billion of relief already approved is not affected by the ruling. The estimate under the “Save Plan” was revised down from \$475 bn in August 2024 and includes parents PLUS loans. Excluding these loans, the estimated cost of the “Save Plan” would amount to \$409 bn.

U.S. Federal Debt Held by the Public vs. Nominal GDP (USD in Trillions)

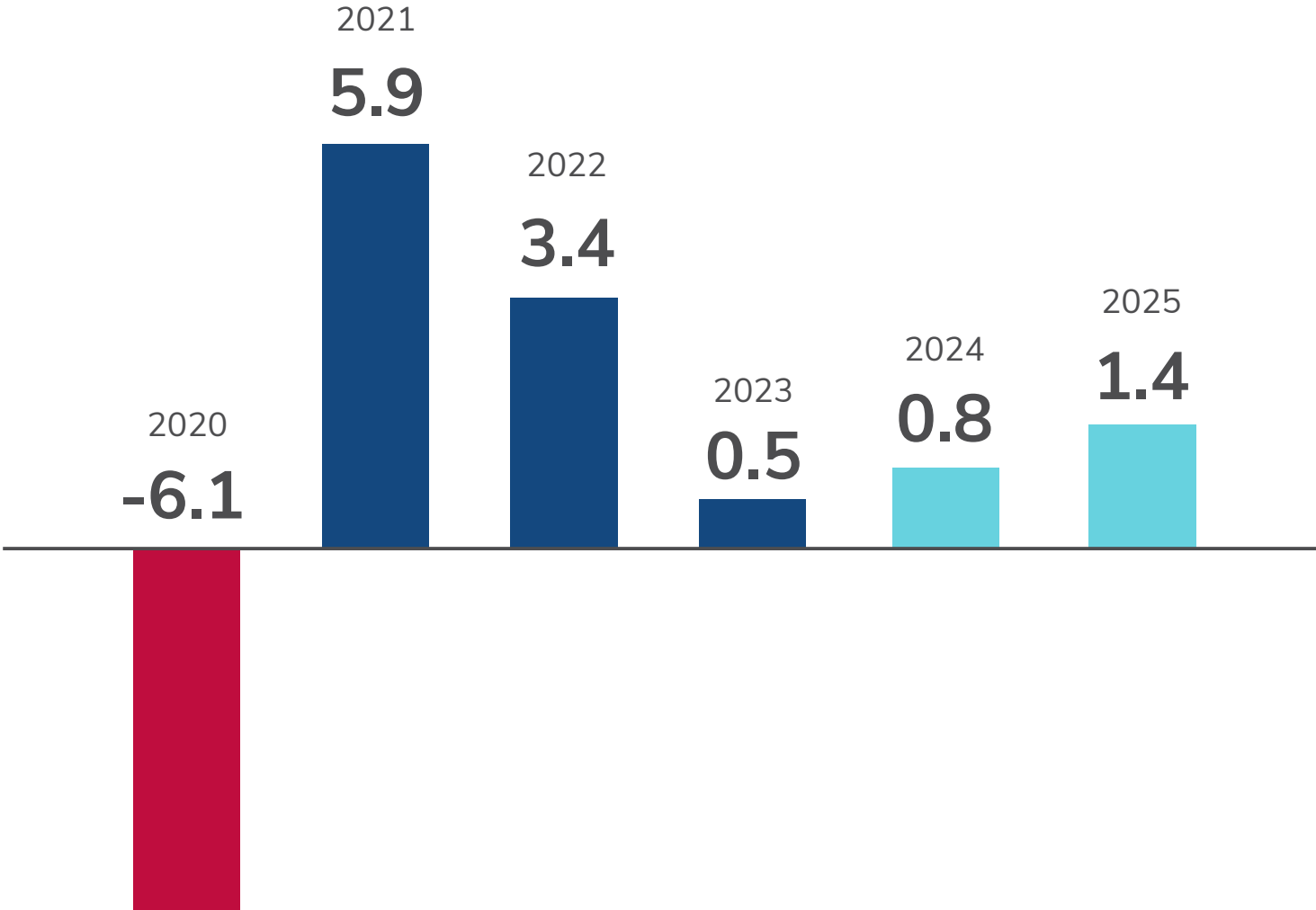
Q1 2000 to Q2 2024



Source: Federal Reserve

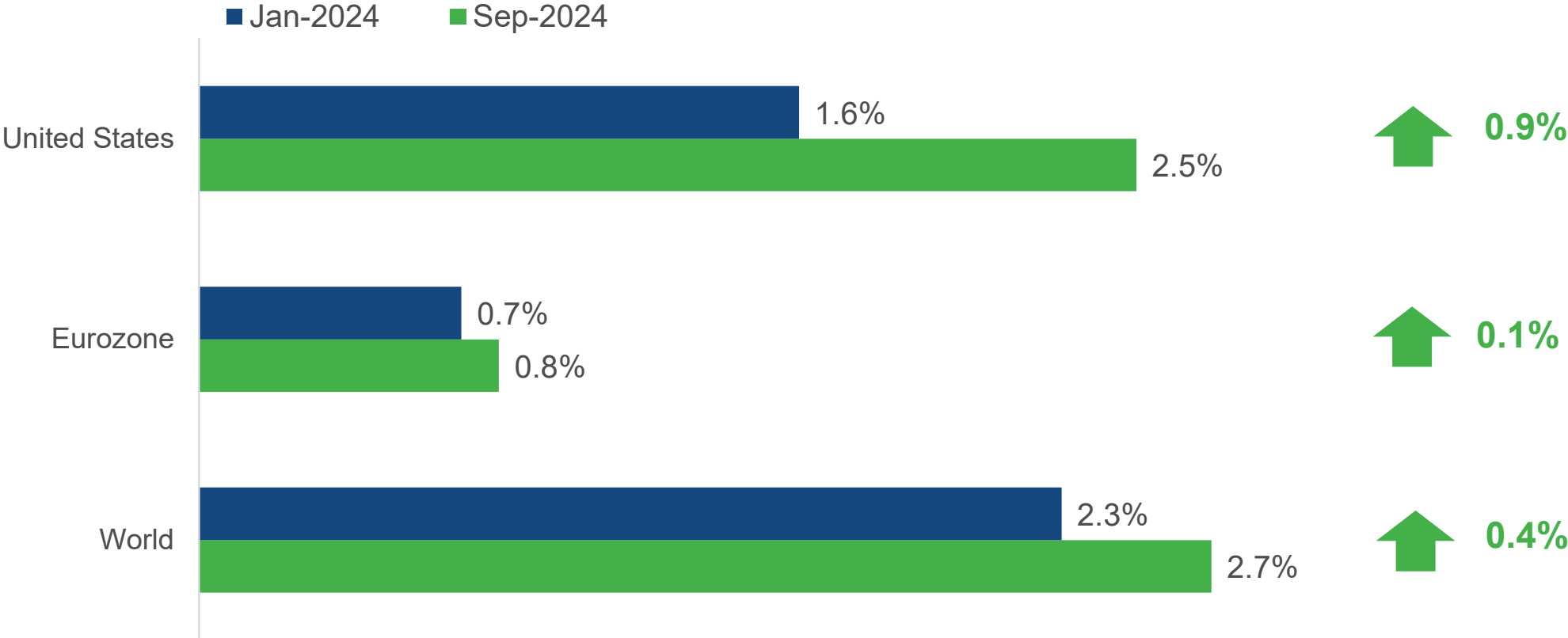
Real GDP Growth (%) Estimates by Region: Eurozone

Data as of September 20, 2024



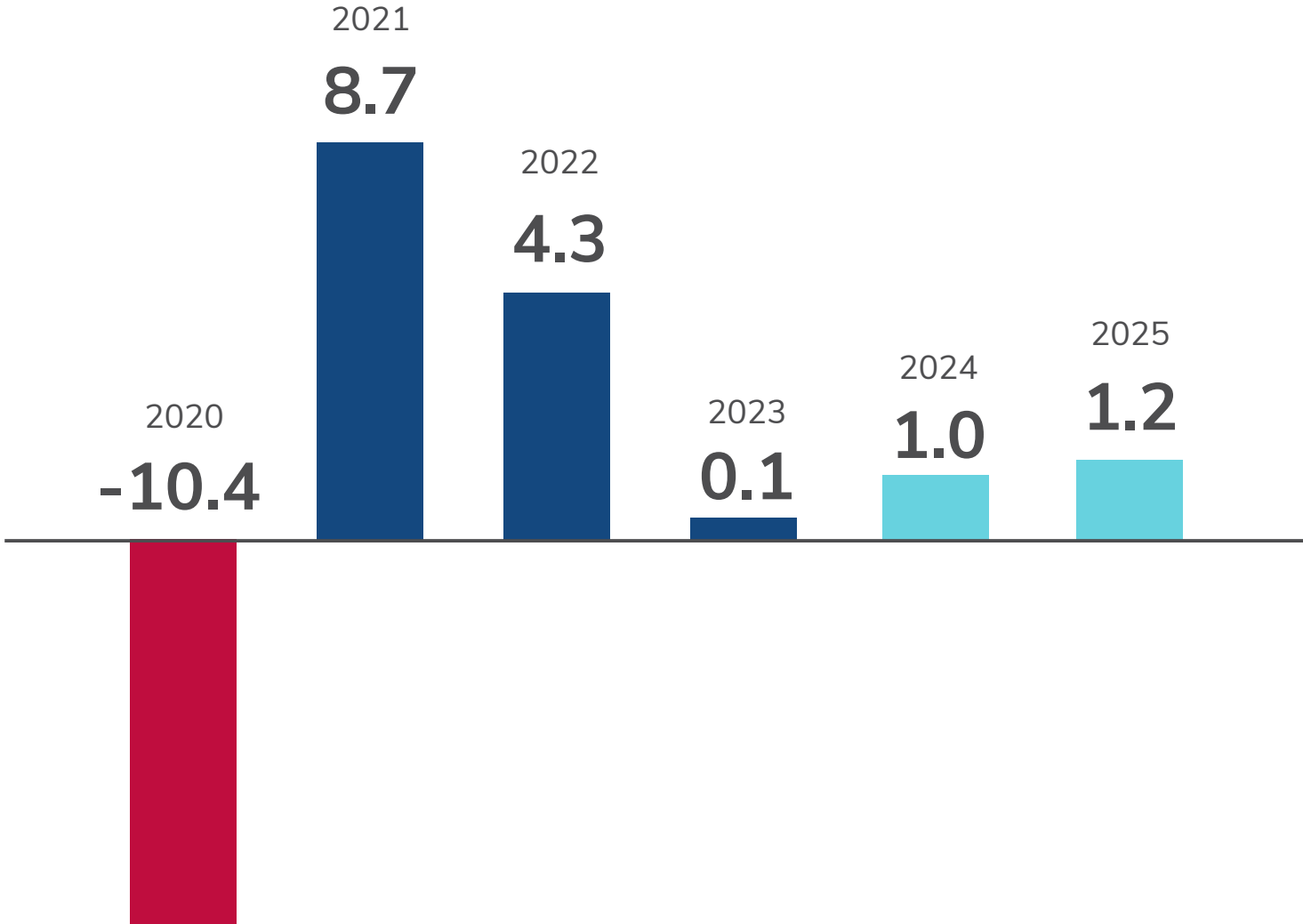
2024 Real GDP Growth Rates of World, U.S., Eurozone

Data as of September 20, 2024



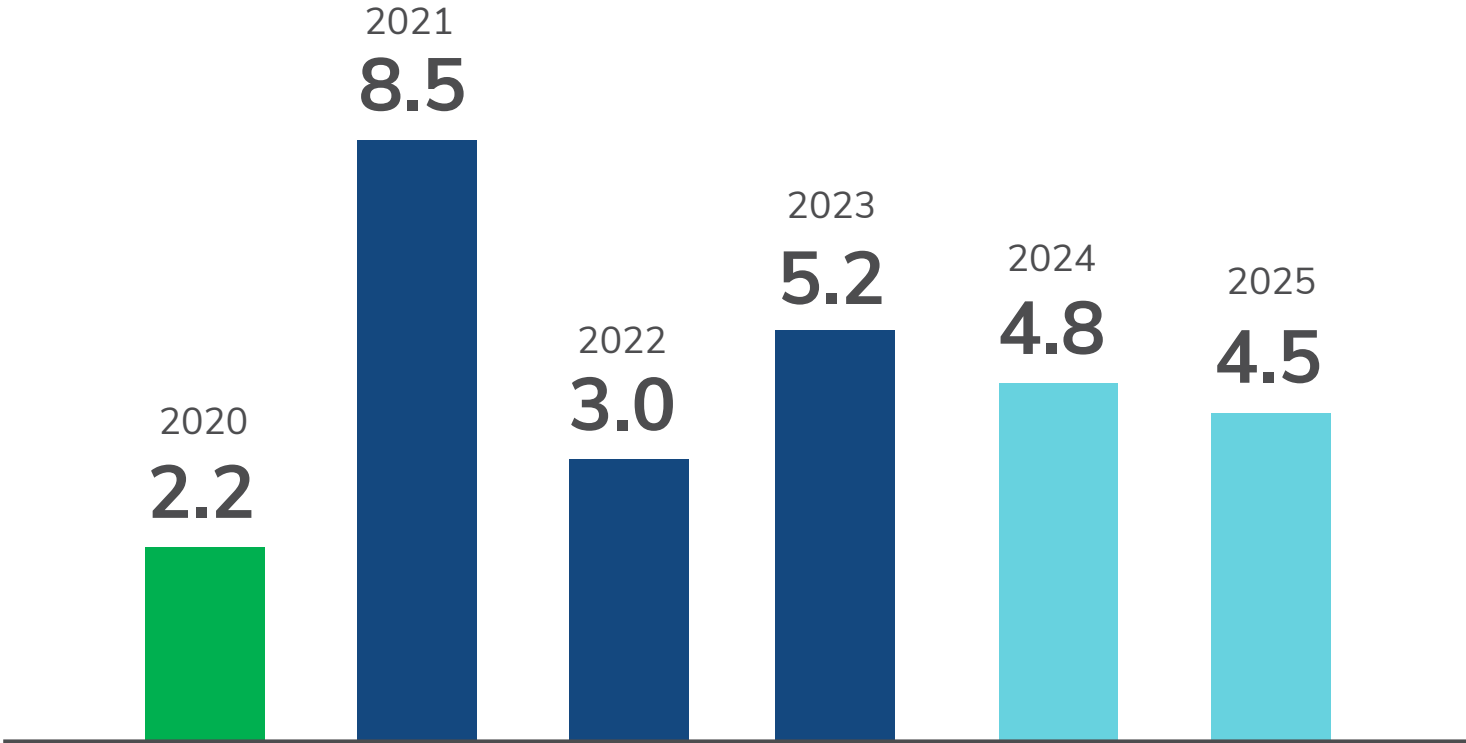
Real GDP Growth (%) Estimates by Region: United Kingdom

Data as of September 20, 2024



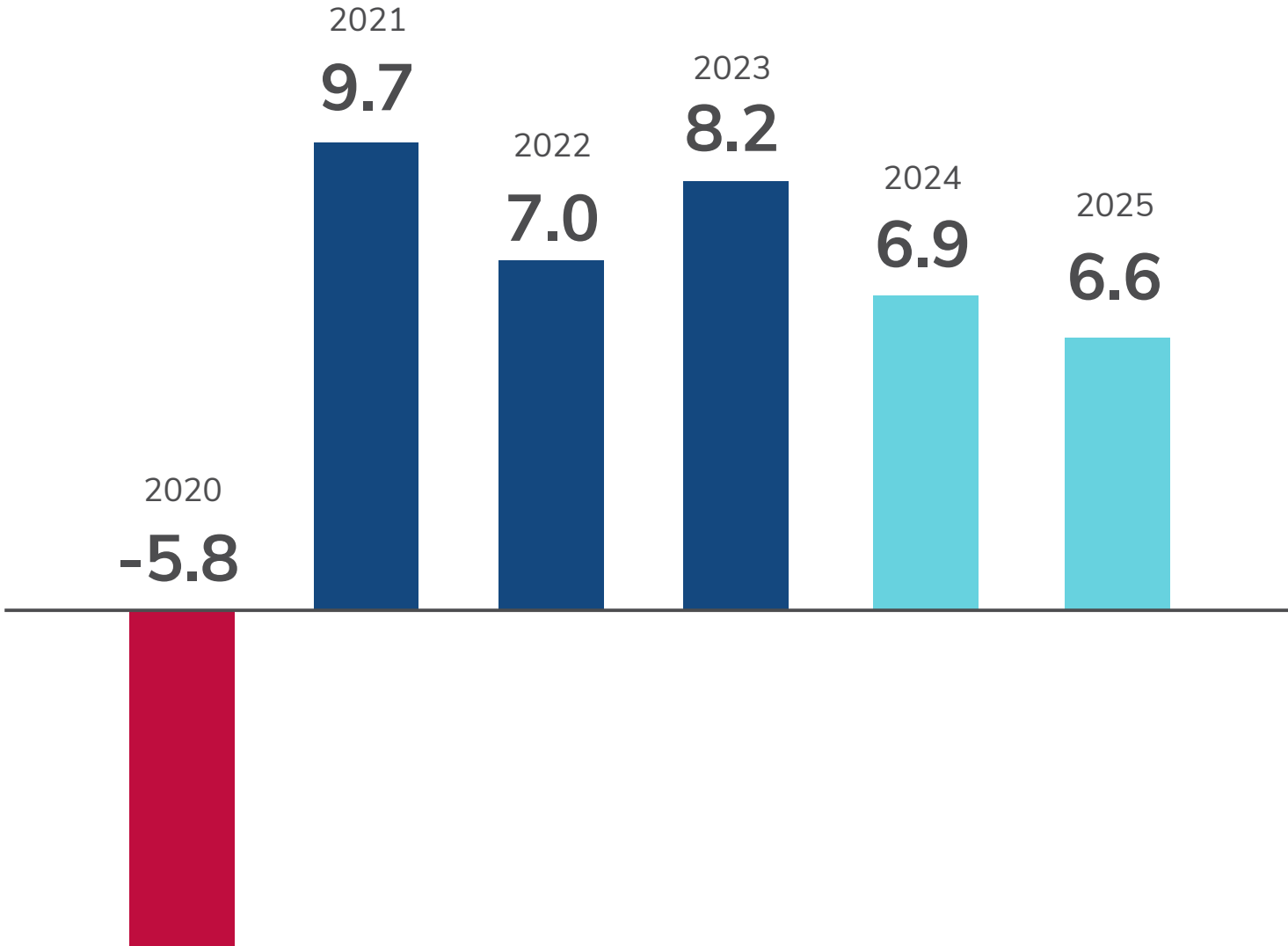
Real GDP Growth (%) Estimates by Region: China

Data as of September 20, 2024



Real GDP Growth (%) Estimates by Region: India

Data as of September 20, 2024



Financial Market Performance

S&P 500 (Price) Index (USD)

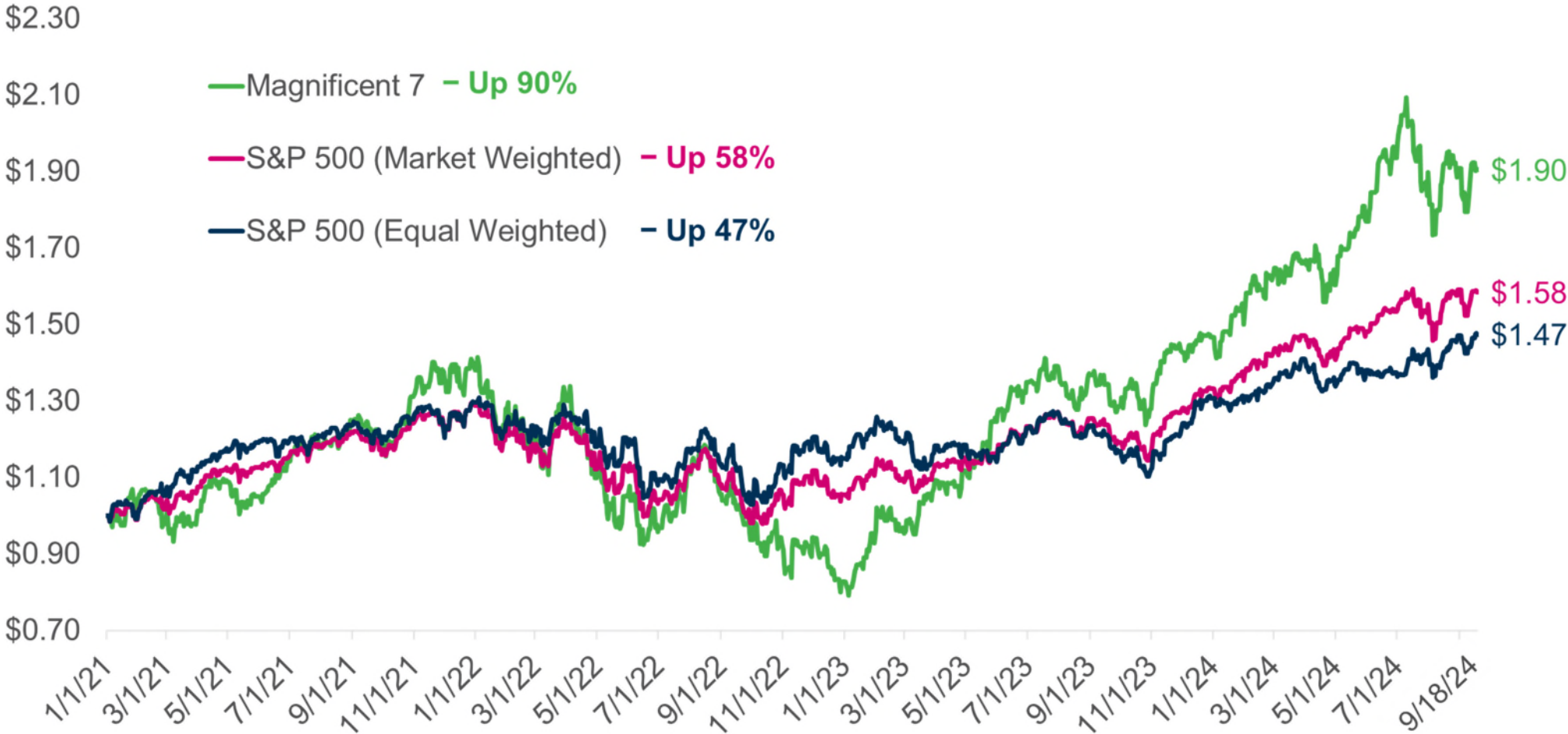
December 31, 2019 – September 18, 2024



Source of underlying data: Capital IQ

Just a Few Stocks Have Driven the U.S. Market

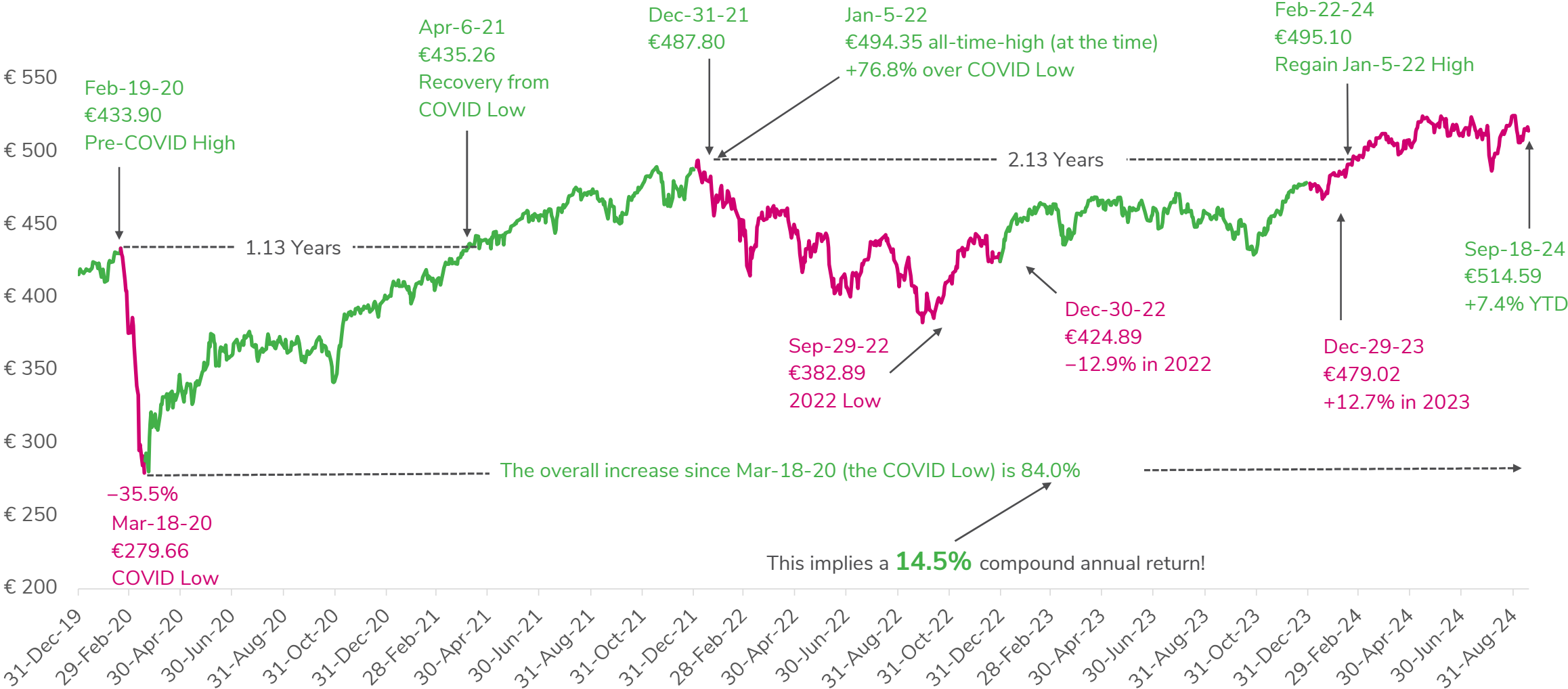
Total Return Indices; January 1, 2021 – September 18, 2024



Source of underlying data: LSEG's Refinitiv and Capital IQ. Total returns and market capitalizations used to form Magnificent 7 portfolio, which includes Alphabet (formerly Google), Amazon, Apple, Meta Platforms (formerly Facebook), Microsoft, Nvidia, and Tesla.

STOXX Europe 600 (Price) Index (EUR)

December 31, 2019 – September 18, 2024



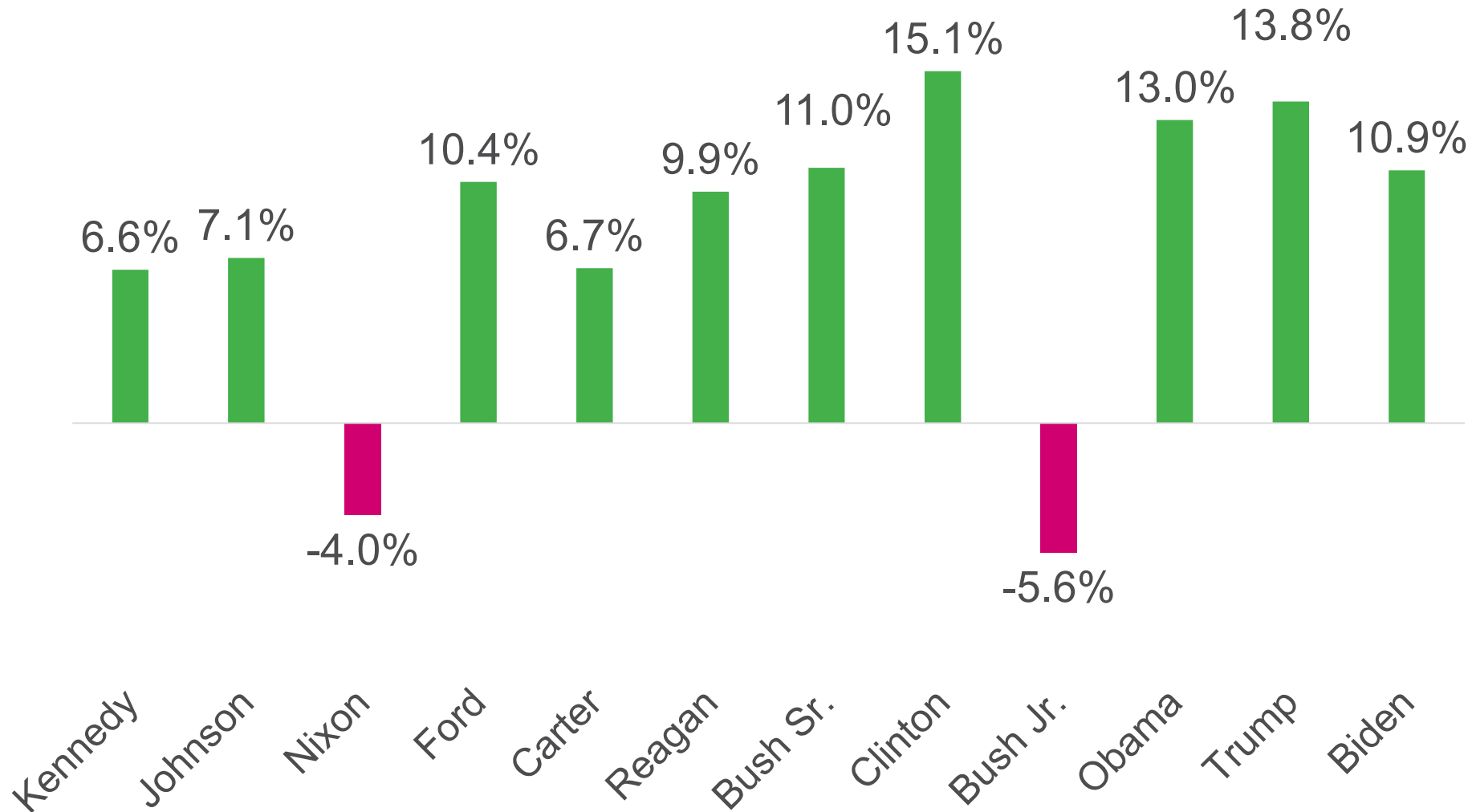
Source of underlying data: Capital IQ

Financial Market Performance

U.S. Election Analysis

S&P 500 Index Performance by President

All presidents January 20, 1961 – September 18, 2024



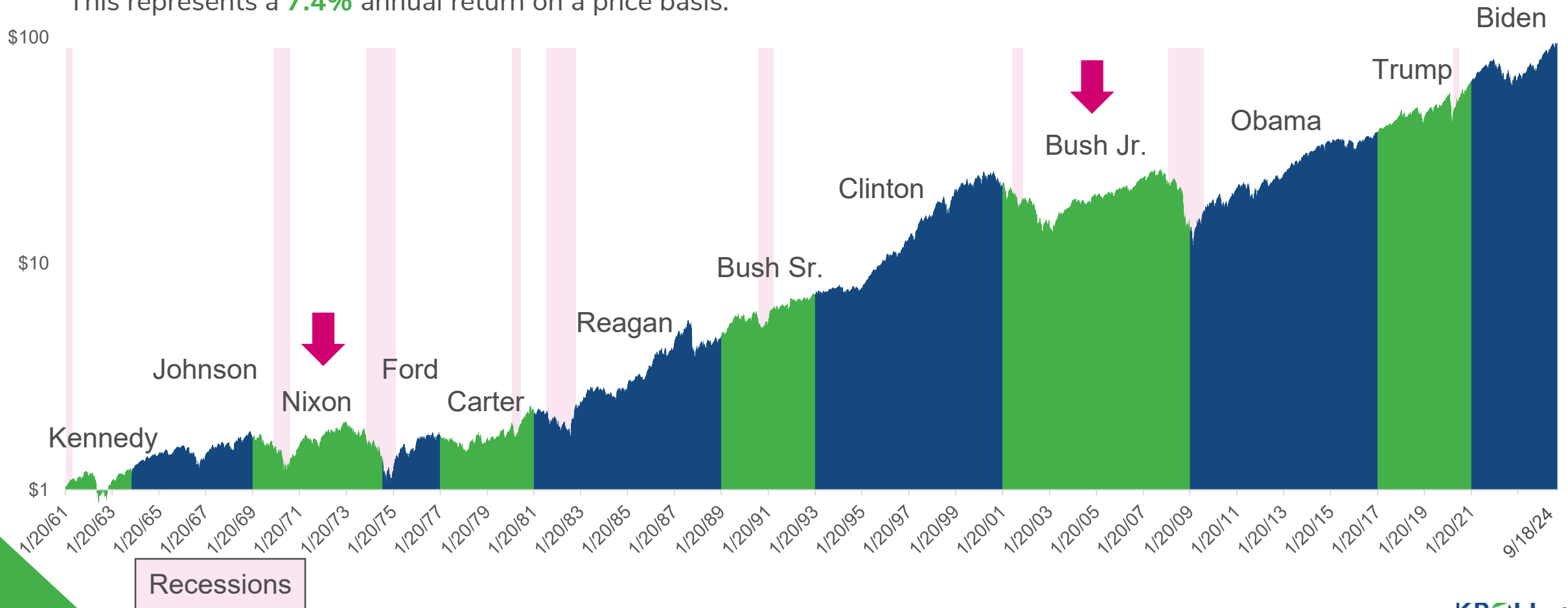
Source of underlying data: LSEG's Refinitiv. Daily S&P 500 "price" returns used. Compound annual returns shown.

Stock Performance by President

All presidents January 20, 1961 – September 18, 2024

\$1 invested on January 19, 1961 would have grown to **\$94.00** by September 18, 2024.

This represents a **7.4%** annual return on a price basis.



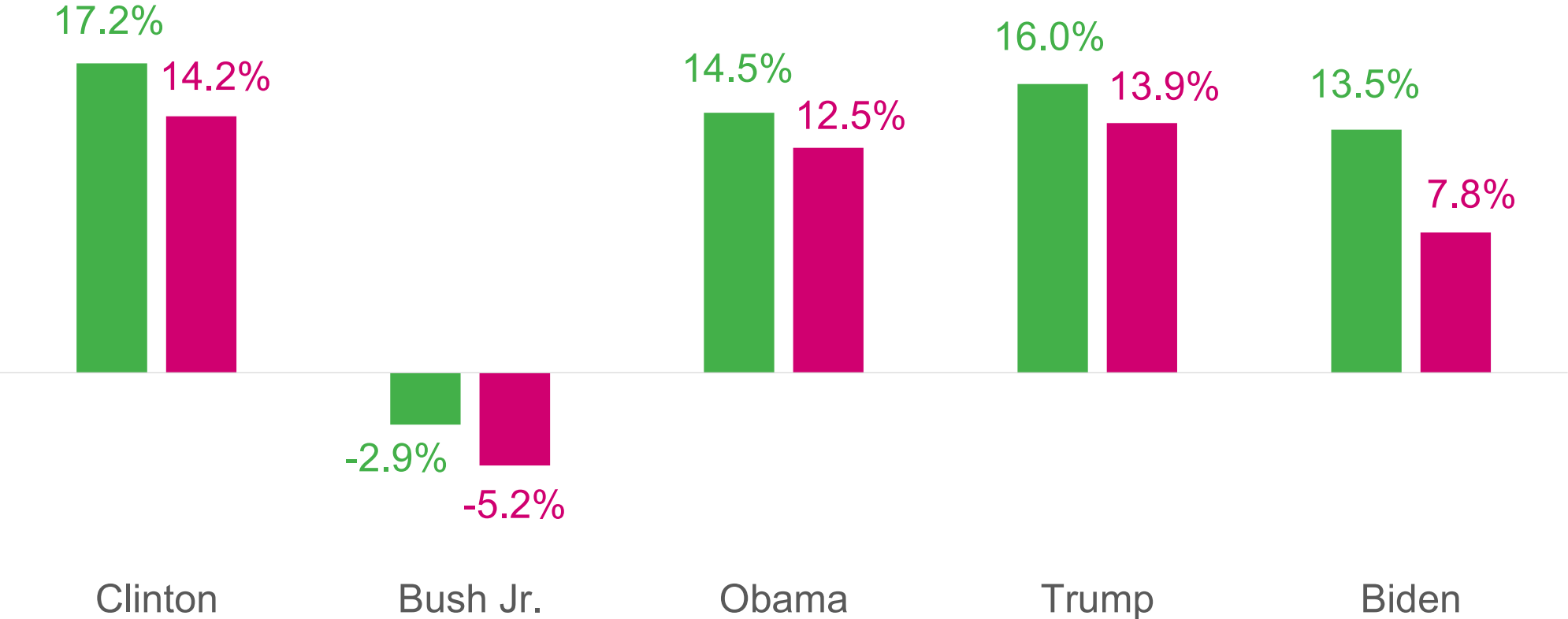
Recessions

Source of underlying data: LSEG's Refinitiv. Daily S&P 500 "price" returns used. Source of recession data: Federal Reserve Bank of St. Louis, based on NBER data.

Nominal Total Returns vs Real Total Returns

January 1993 – August 2024

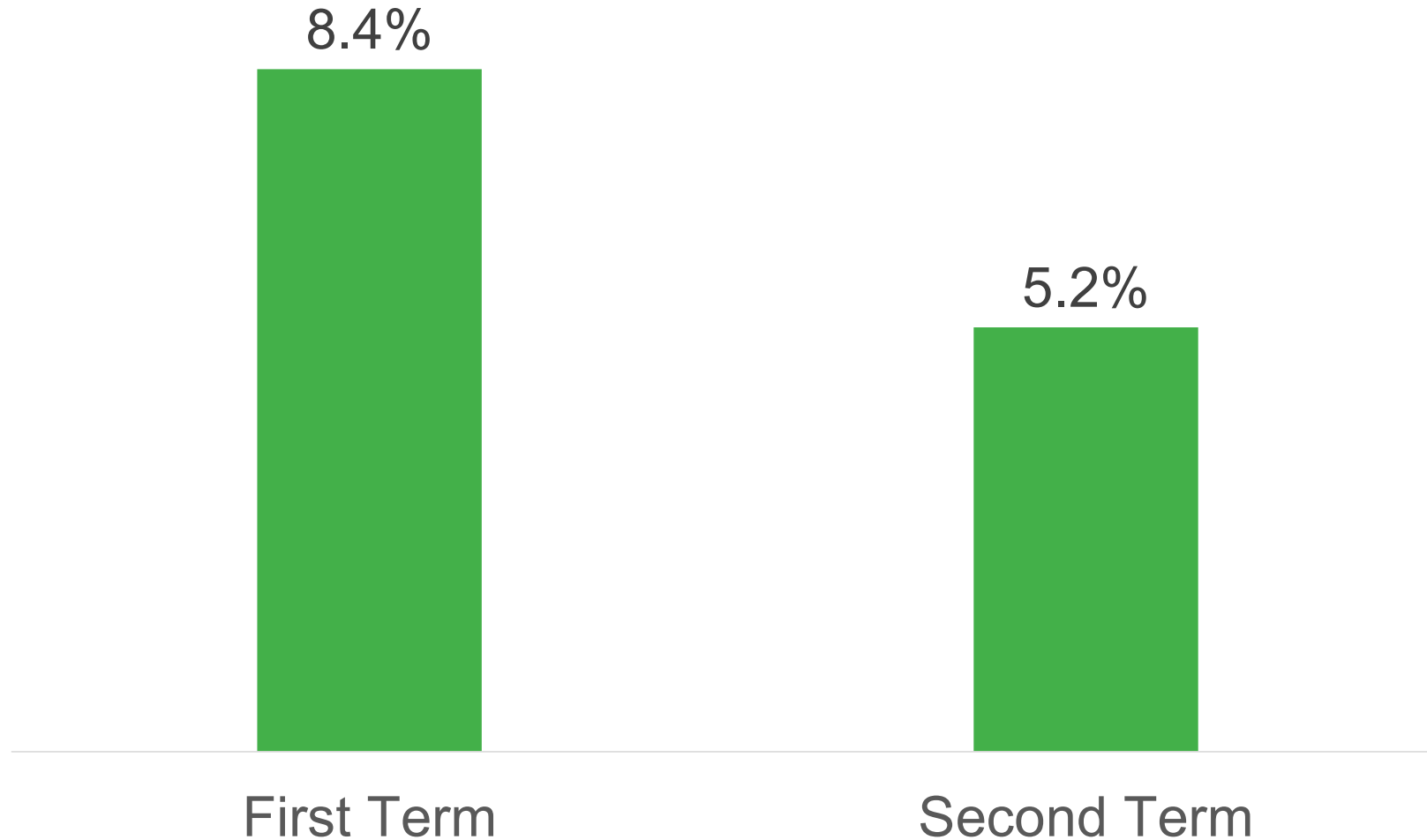
- Nominal Annual Compound TOTAL Returns (S&P 500)
- Real (Inflation Adjusted) Annual Compound TOTAL Returns (S&P 500)



Source of underlying data: LSEG's Refinitiv. Daily S&P 500 "total" returns used (i.e., includes both dividends and capital appreciation). Compound annual returns shown.

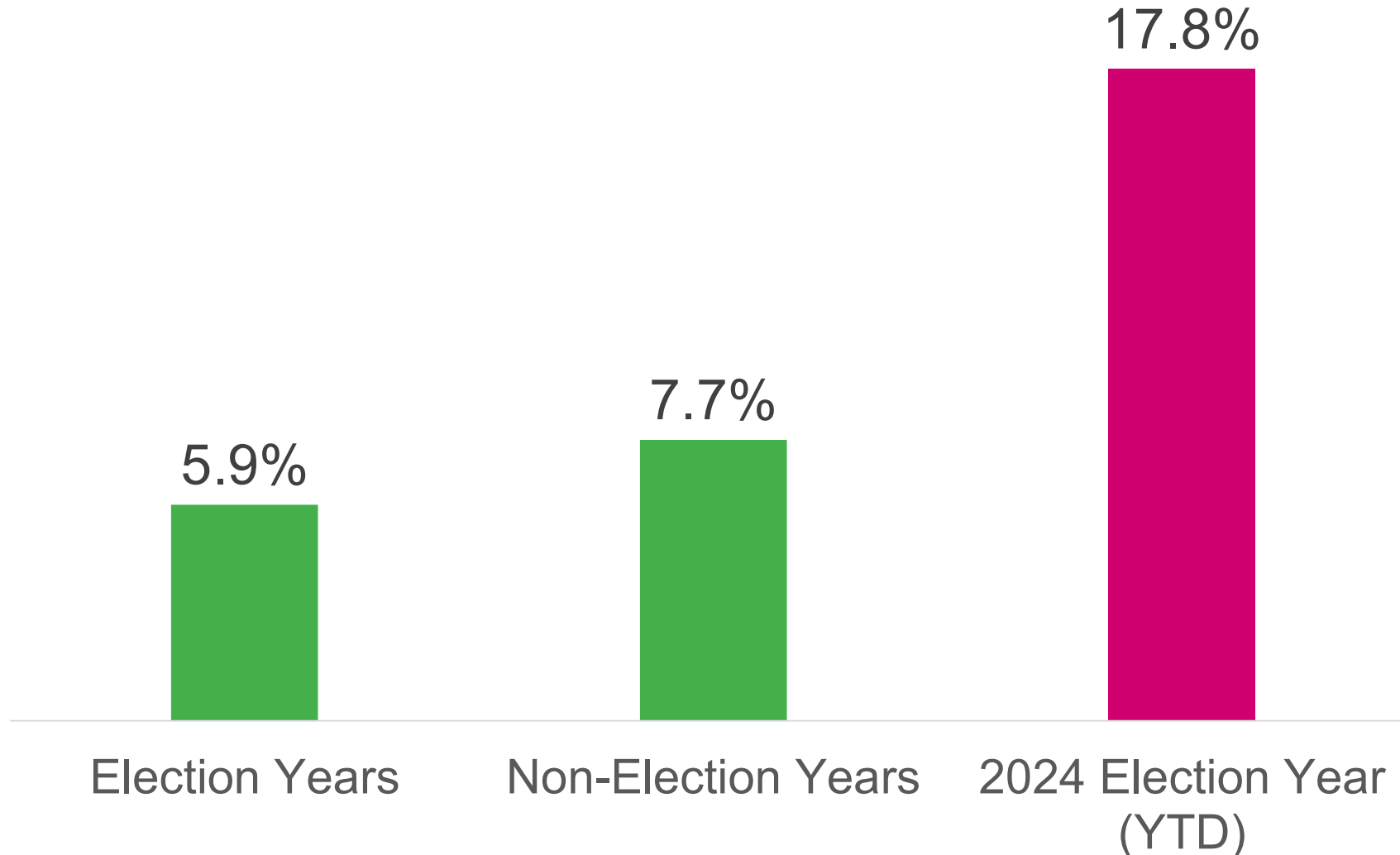
S&P 500 Index Performance by First and Second Term

All presidents January 20, 1961 – September 18, 2024



S&P 500 Index Election Years versus Non-Election Years

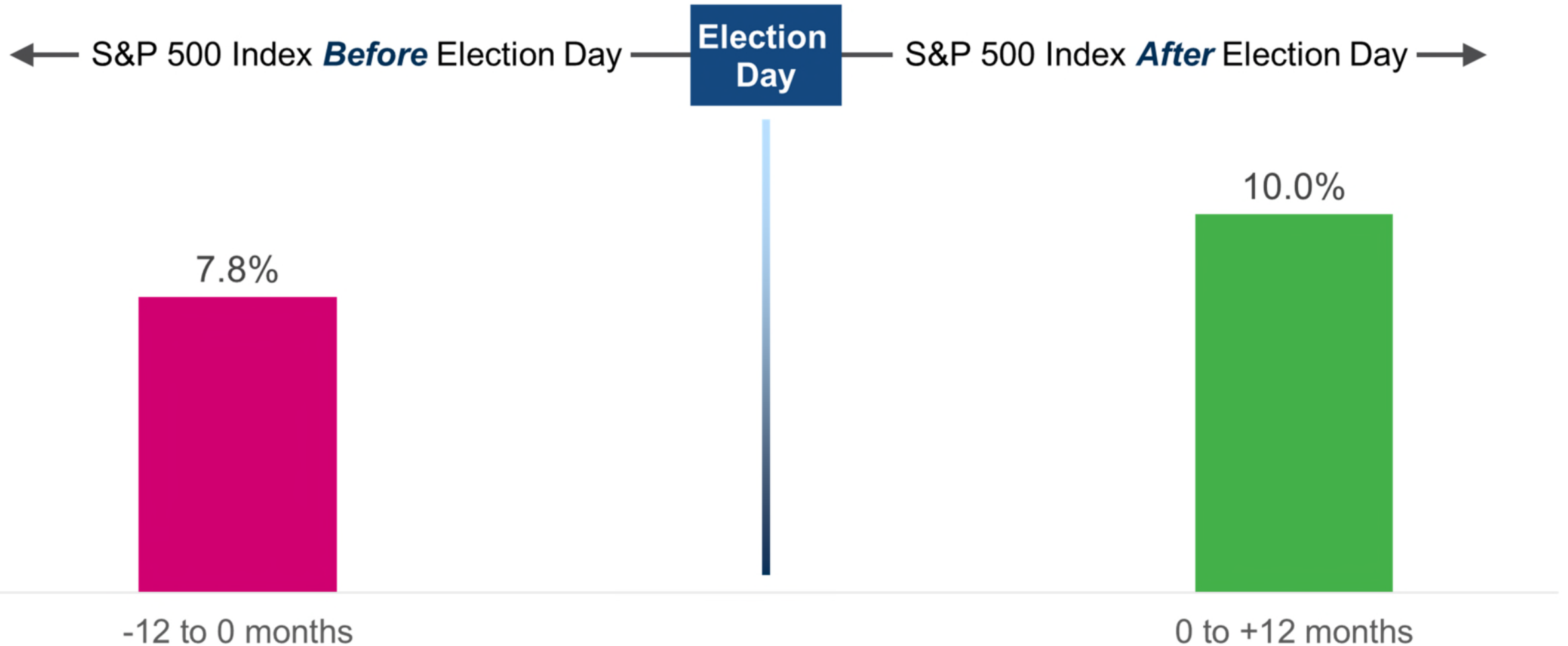
1960 General Election to 2024 General Election (through September 18, 2024)



Source of underlying data: LSEG's Refinitiv. Daily S&P 500 "price" returns used. Compound annual returns shown. Includes returns for 2024 (Biden's 4th year) YTD.

Before and After Election Day

November 8, 1960 (Kennedy's Election Date) – November 3, 2020 (Biden's Election Date)



Source of underlying data: LSEG's Refinitiv. Daily S&P 500 "price" returns used.

Control of the Executive and Legislative Branches

1960 General Election to 2024 General Election (through September 18, 2024)

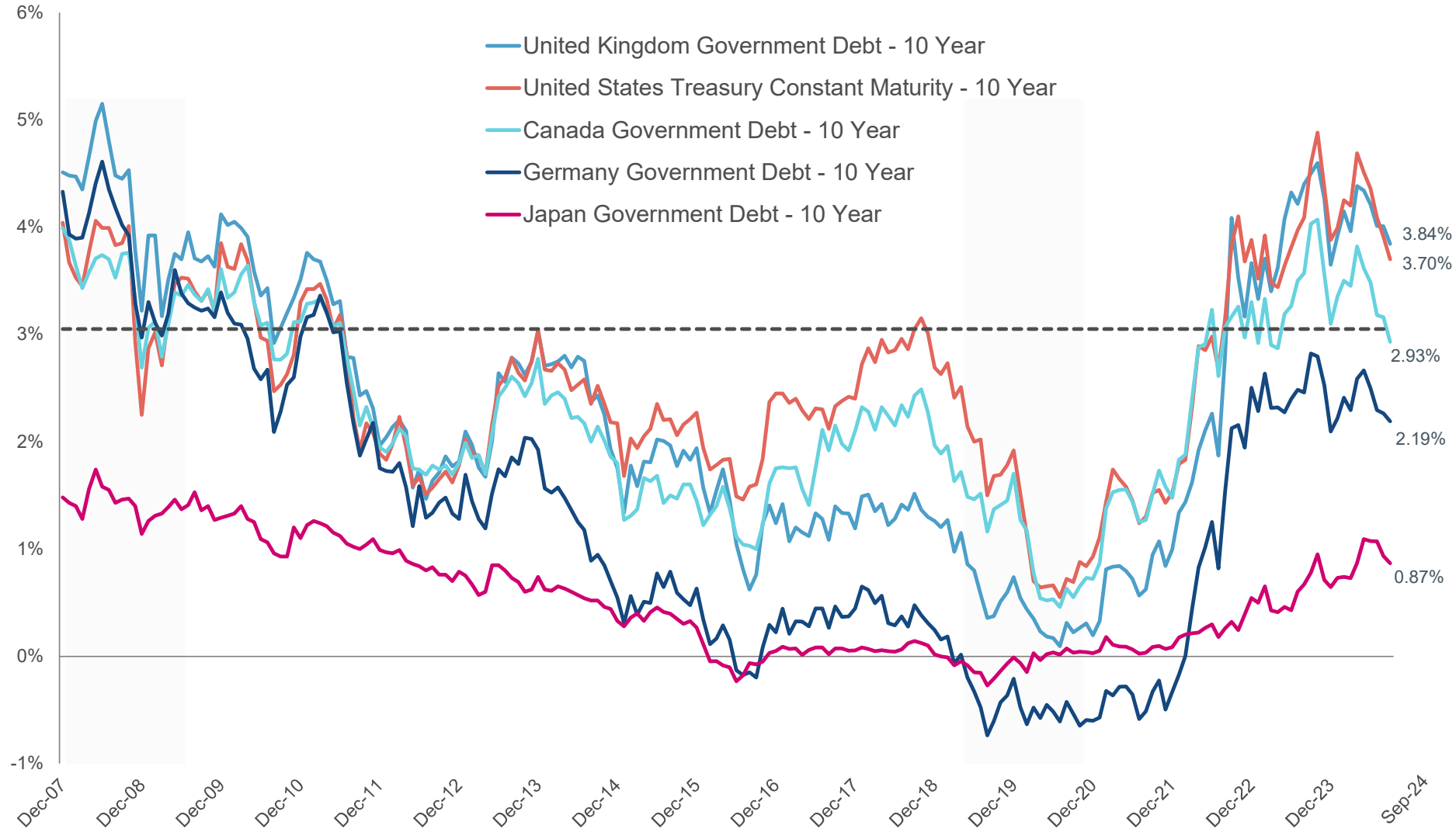
<u>President</u>	<u>House</u>	<u>Senate</u>	<u>Days</u>	<u>Years</u>	<u>Total Days (%)</u>	<u>Compound Annual Return</u>	
D	R	D	2,104	5.76	9.0%	16.7%	
D	R	R	2,936	8.04	12.6%	15.3%	
R	D	R	2,908	7.96	12.5%	13.8%	
R	R	R	2,364	6.47	10.2%	8.7%	"United" Government
D	D	D	6,510	17.82	28.0%	7.4%	
R	D	D	5,892	16.13	25.3%	0.4%	
R	R	D	524	1.43	2.3%	-23.4%	
D	D	R	15	0.04	0.1%	-29.8%	

Source of underlying data: LSEG's Refinitiv. Daily S&P 500 "price" returns used. Compound annual returns shown. Includes returns for 2024 (Biden's 4th year) YTD.

Risk-free Rate Analysis

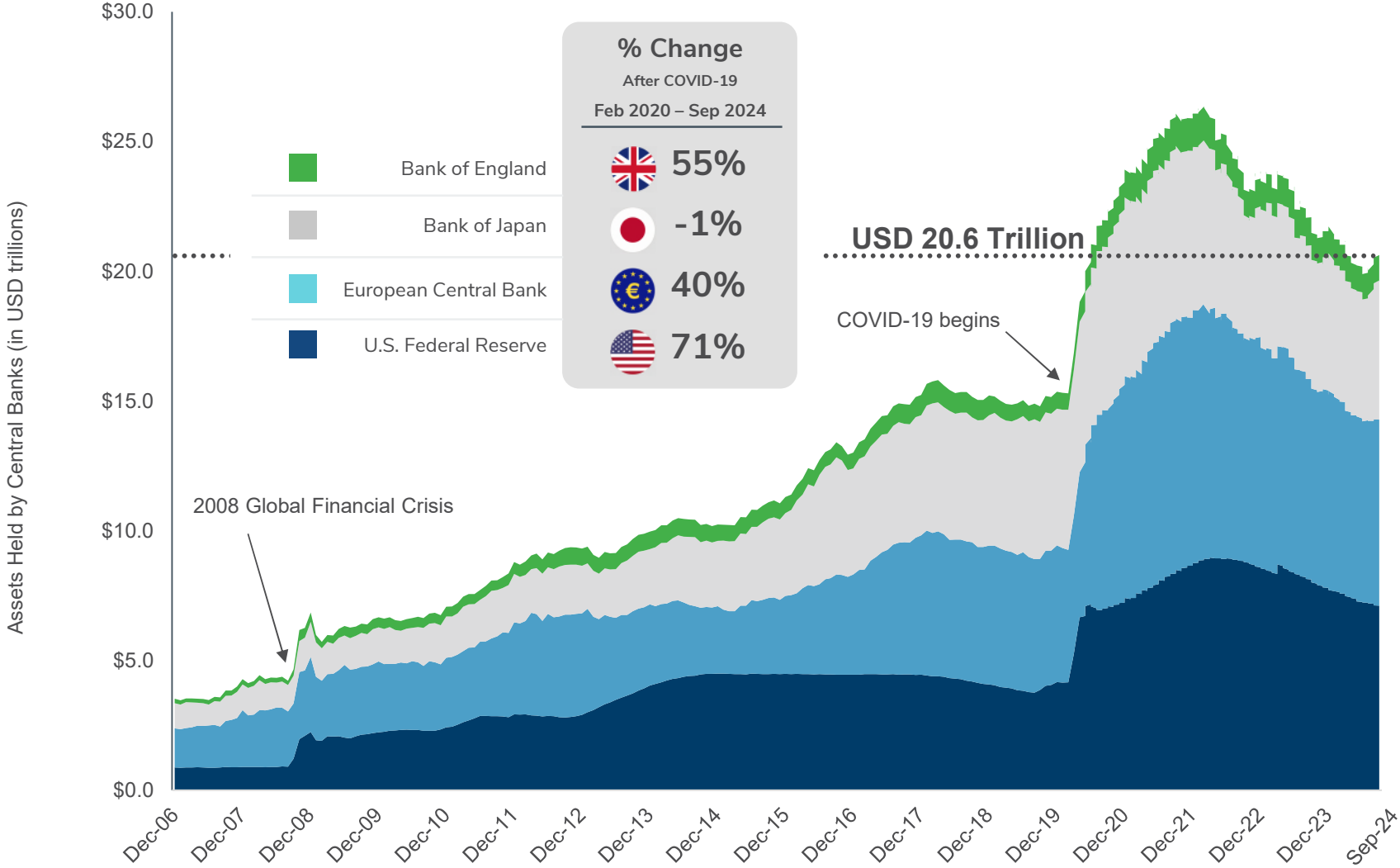
10-Year Yields for U.K., U.S., Canada, Germany, Japan

December 31, 2007 – September 18, 2024



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

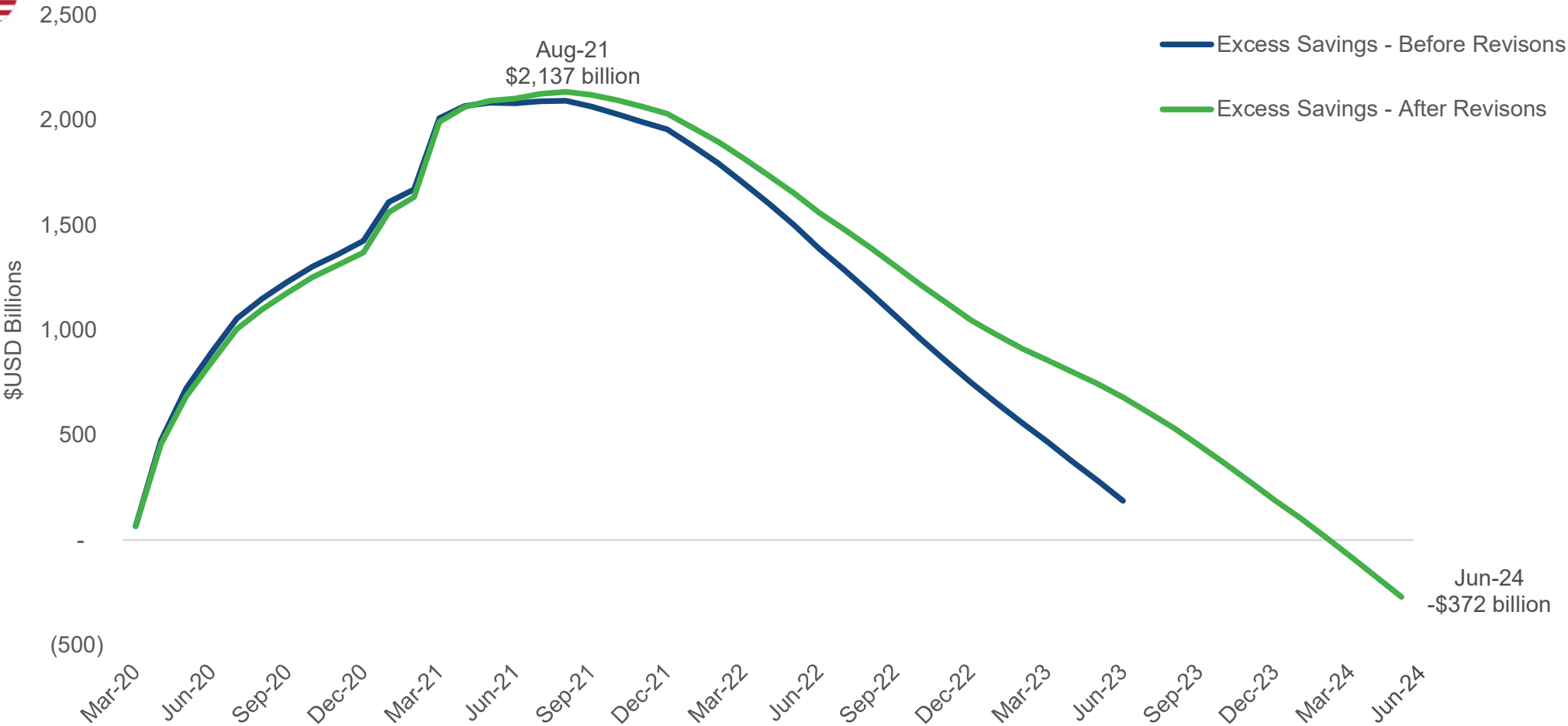
February 2020 – Mid-September 2024



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






COVID and Post-COVID Excess Savings in U.S.

Before and After Bureau of Economic Analysis Data Revisions in July 2024



Source: Federal Reserve Bank of San Francisco

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

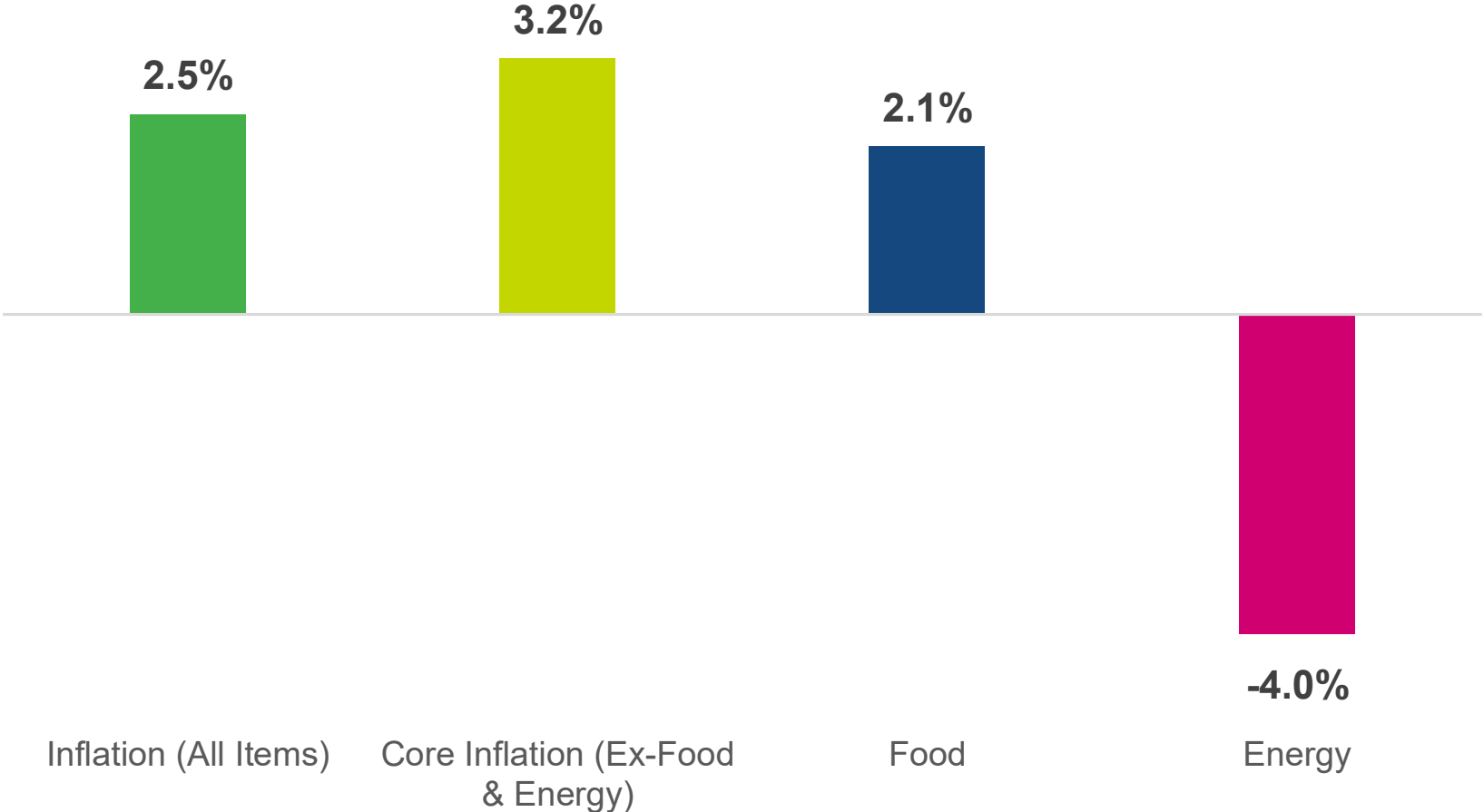
		Cycle High	Aug 2024	Comments
	United States	Jun-22: 9.1%	2.5%	Decrease from 2.9% in July 2024, a fifth consecutive monthly decrease. Lowest point since March 2021.
	Canada	Jun-22: 8.1%	2.0%	Decrease from 2.5% in July 2024. Lowest point since February 2021.
	United Kingdom	Oct-22: 11.1%	2.2%	Flat from 2.2% in July 2024. July 2024 was first increase since December 2023. Services inflation continues to be stubbornly high.
	Germany*	Oct-22 and Nov-22: 8.8%	2.0%	Decrease from 2.6% in July 2024. Lowest point since February 2021.
	Eurozone	Oct-22: 10.6%	2.2%	Decrease from 2.6% in July 2024. Lowest level since June 2021. Inflation driven primarily by services, which ticked up from July.

Source: U.S. Bureau of Labor Statistics, Statistics Canada, U.K. Office for National Statistics, Eurostat.

*Non-harmonized value for Germany was 2.3% in July 2024 and 1.9% in August. Source: Germany's Destatis Statistisches Bundesamt.

12-Month Percentage Change, CPI Inflation by Major Categories (%)

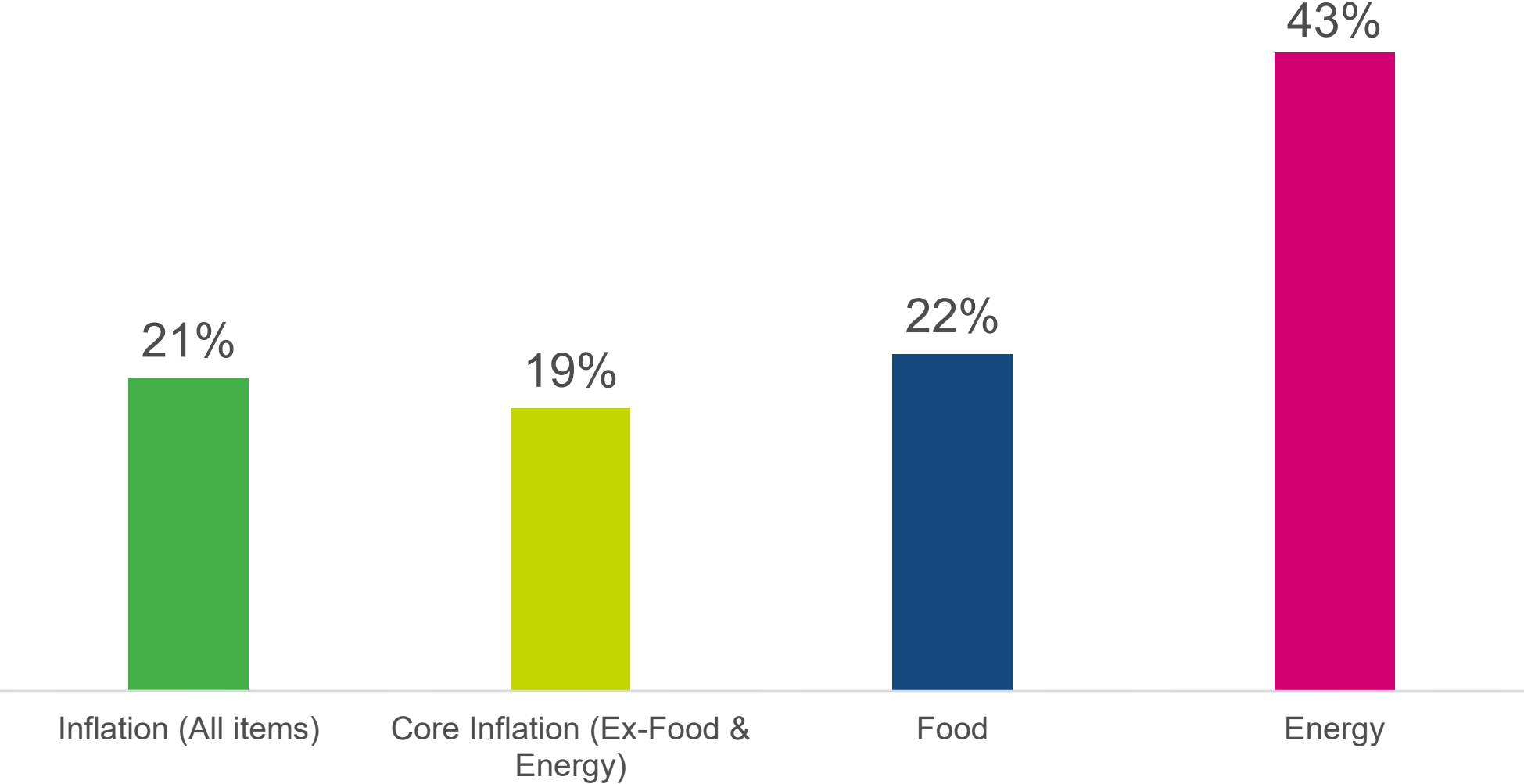
August 2024



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

Cumulative Price Increases in the Post-Covid Period

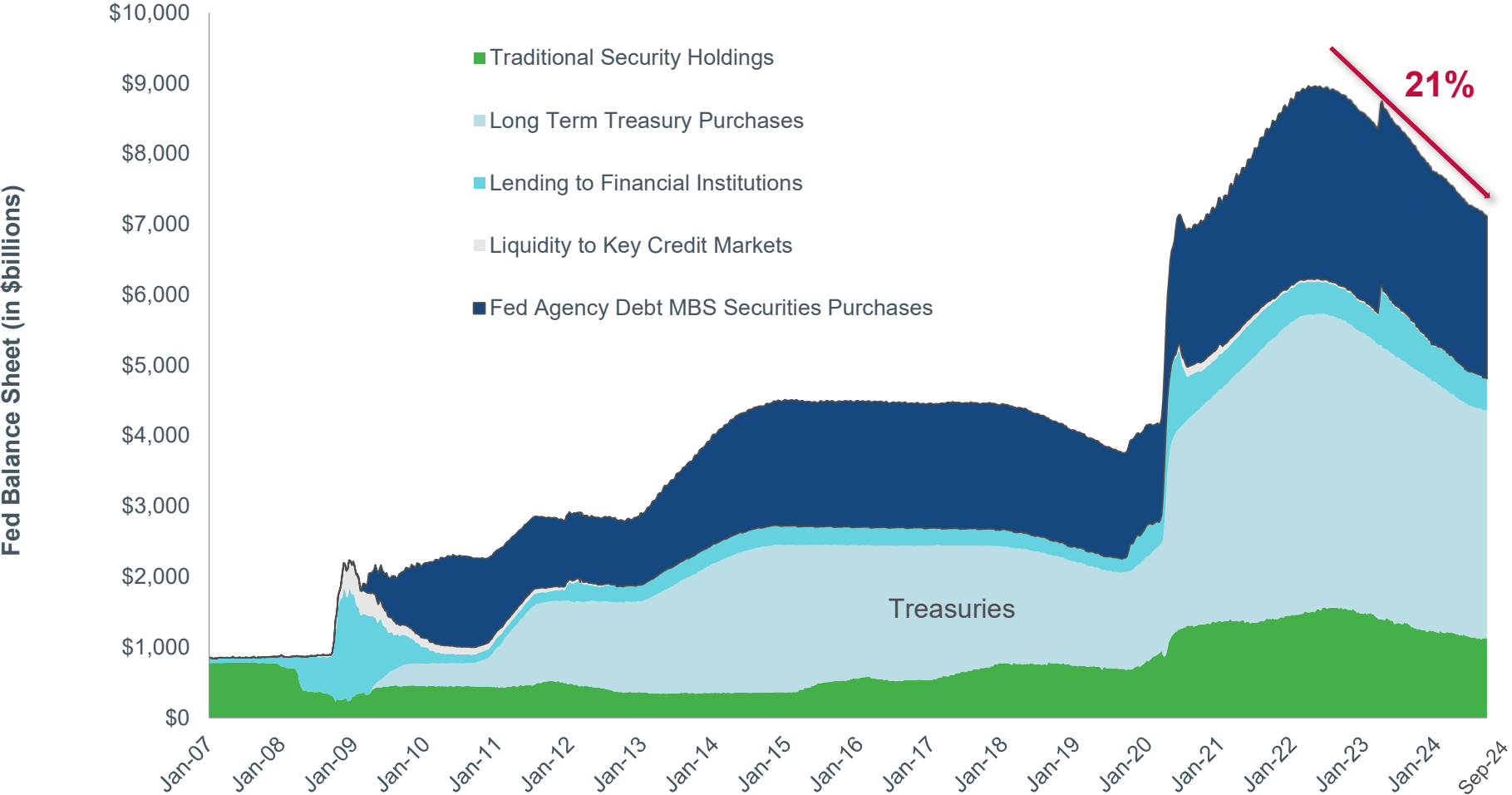
December 2020 – August 2024



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

U.S. Central Bank Balance Sheet

January 1, 2007 – September 18, 2024

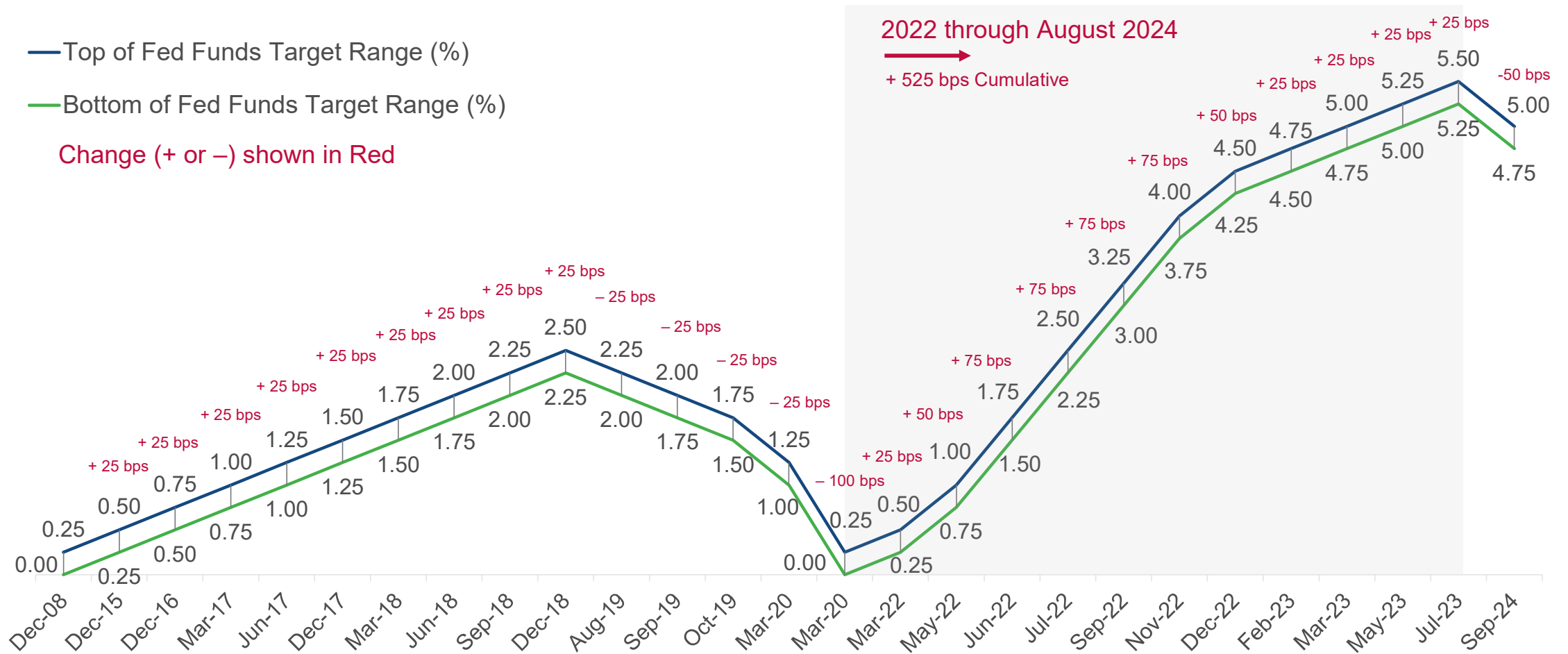


All-time high of **\$9.0** trillion as of March 2022.
Currently **\$7.1** trillion.

21% decrease from the record high on March 23, 2022

Source: Cleveland Federal Reserve

Fed Funds Target Range (Dec 2008 – Sep 2024)



Date the Federal Open Market Committee (FOMC) Announced the Change to the Fed Funds Target Rate

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

Normalization can be accomplished in several ways, including:

- 1 Simple averaging
- 2 Various “buildup” methods

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:*



* 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 $(1 + \text{Nominal Rate}) = (1 + \text{Real Rate}) \times (1 + \text{Expected Inflation})$. 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 2.6% for the 2015-2024 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 *



* Based on academic studies issued from 2022 to 2024. In academic literature, this is also sometimes called the natural rate of interest, the neutral rate, or the equilibrium rate.

OLG = Overlapping Generational Model

DSGE = Dynamic Stochastic General Equilibrium Model

Long-Term Inflation Expectations – United States

Estimates as of Mid-September 2024 (approximately)

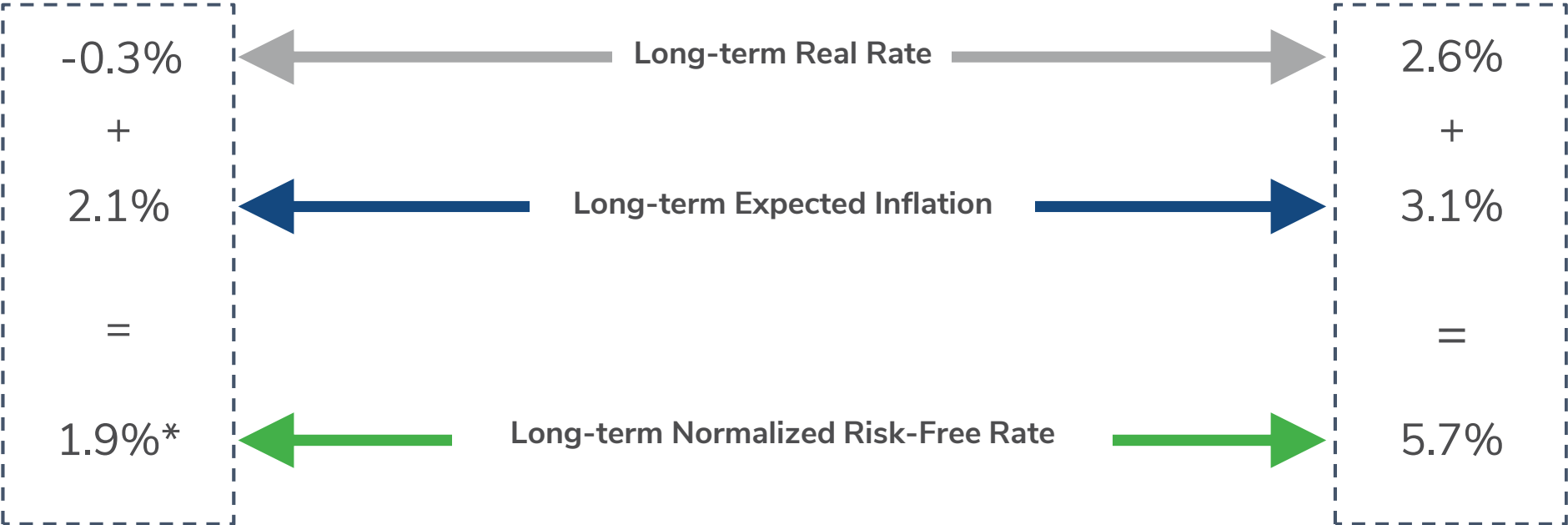


SOURCES	Long-Term Average (%)
Aruoba Term Structure of Inflation Expectations	2.3
Blue Chip Economic Indicators	2.3
Blue Chip Financial Forecasts	2.3
Consensus Economics	2.3
Federal Reserve Bank of Cleveland	2.1
IHS Markit (S&P Global Market Intelligence)	2.3
Livingston Survey (Federal Reserve Bank of Philadelphia)	2.3
Survey of Professional Forecasters (Federal Reserve Bank of Philadelphia)	2.3
University of Michigan Survey 5-10 Year Ahead Inflation Expectations	3.1
Range of Inflation Estimates	2.1% – 3.1%
	Median 2.3%

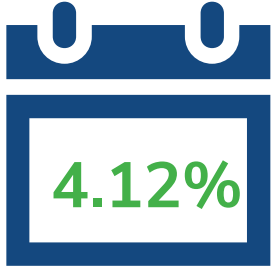
Risk-Free Rate Normalization – United States



As of Mid-September 2024 (approximately)



What is the spot 20-year yield as of 23 Sep 2024?



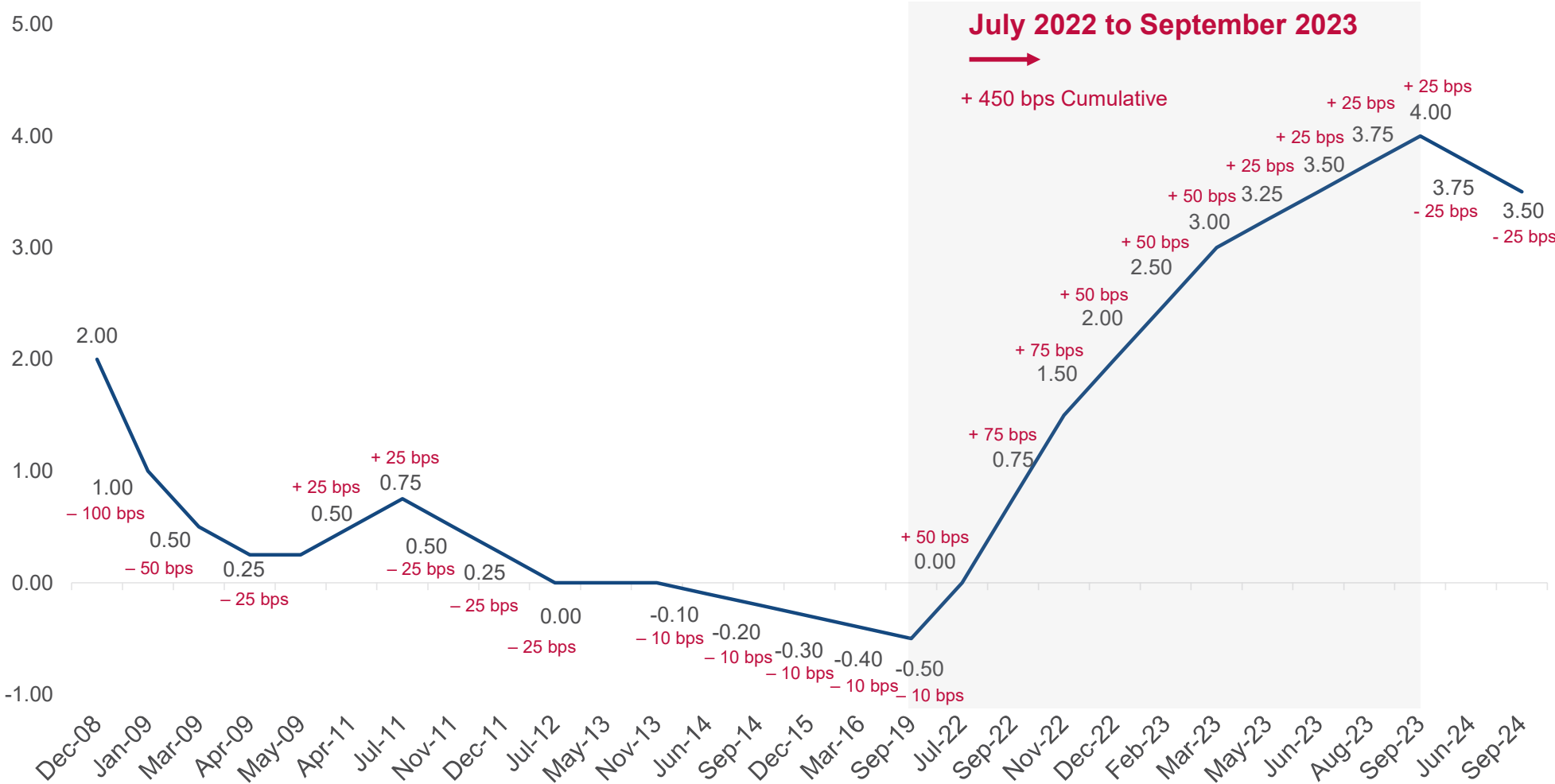
- **Fisher Equation:** Midpoint = 3.8% / Median = 3.3%
- **LT Average:** 10-Year Trailing Average of 20-Year U.S. Treasury Yield = 2.8%

Concluded Normalized R_f = 3.5%

* Differences due to rounding.

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

European Central Bank Deposit Rate (Dec 2008 – September 2024)

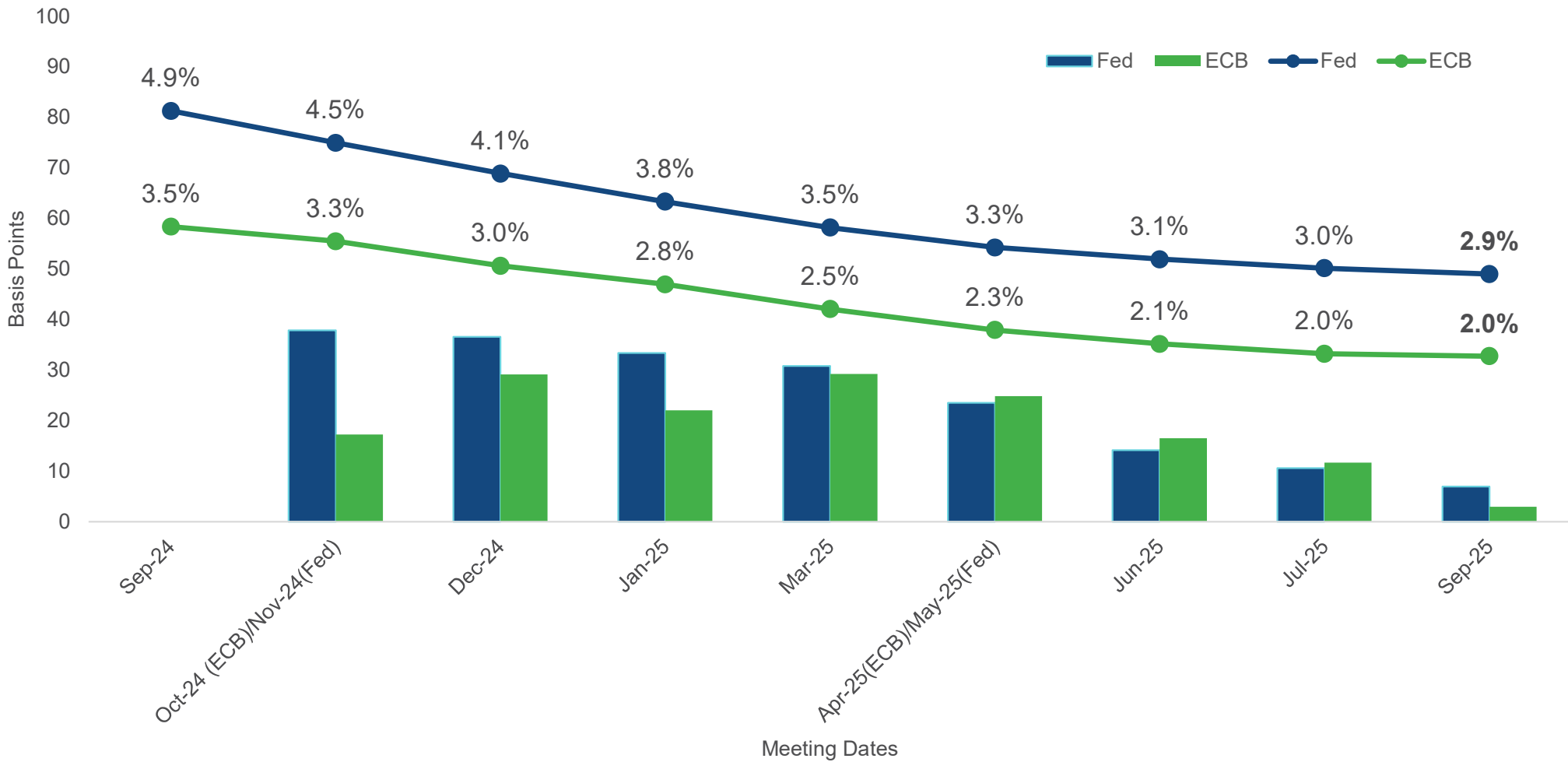


Date the European Central Bank Announced the Change to the Policy Rate

Source: European Central Bank

Expected Future Rate Cuts for the Fed and the ECB

As of September 20, 2024

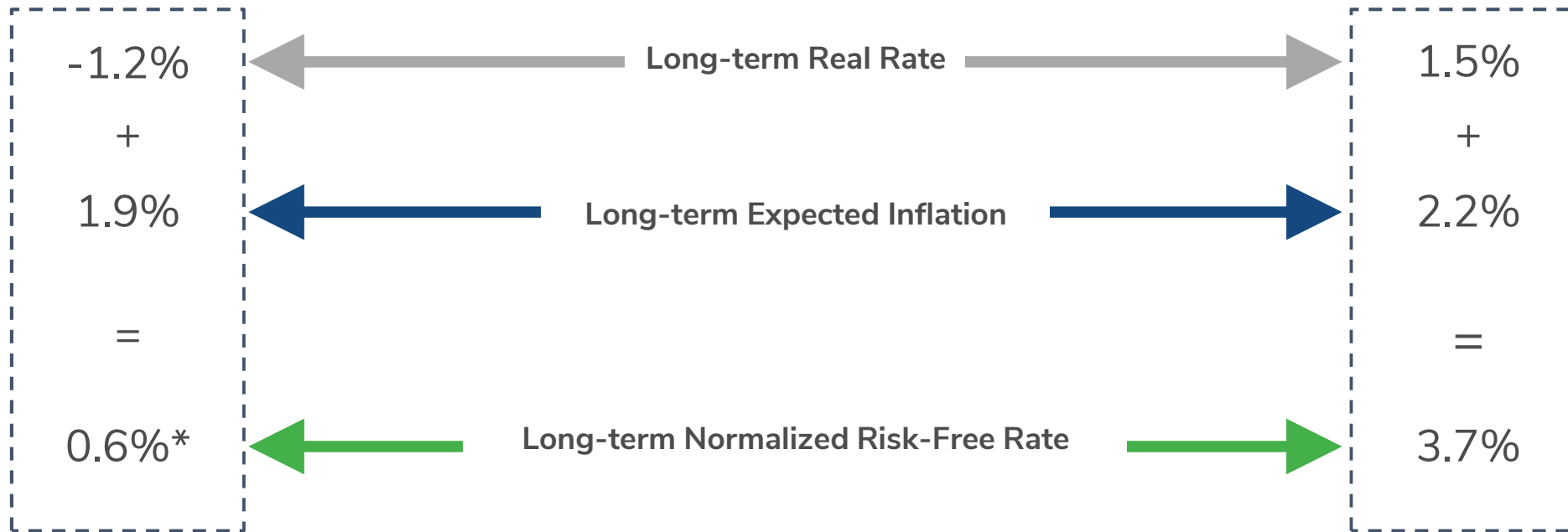


Source: LSEG's Refinitiv. Based on expected target rate (i.e. probability adjusted) as of close of trading day.

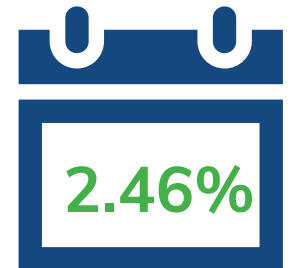
Risk-Free Rate Normalization – Germany



As of Mid-September 2024 (approximately)



What is the spot 15-year yield as of 23 Sep 2024?



- **Fisher Equation:** Midpoint = 2.2% / Median = 2.6%
- **LT Average:** 10-Year Trailing Average of 15-Year Bund Yield = 0.9%

Concluded Normalized $R_f = 2.5\%$

* Differences due to rounding.

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

U.S. Equity Risk Premium

The Kroll Recommended ERP is a Two-Step Process

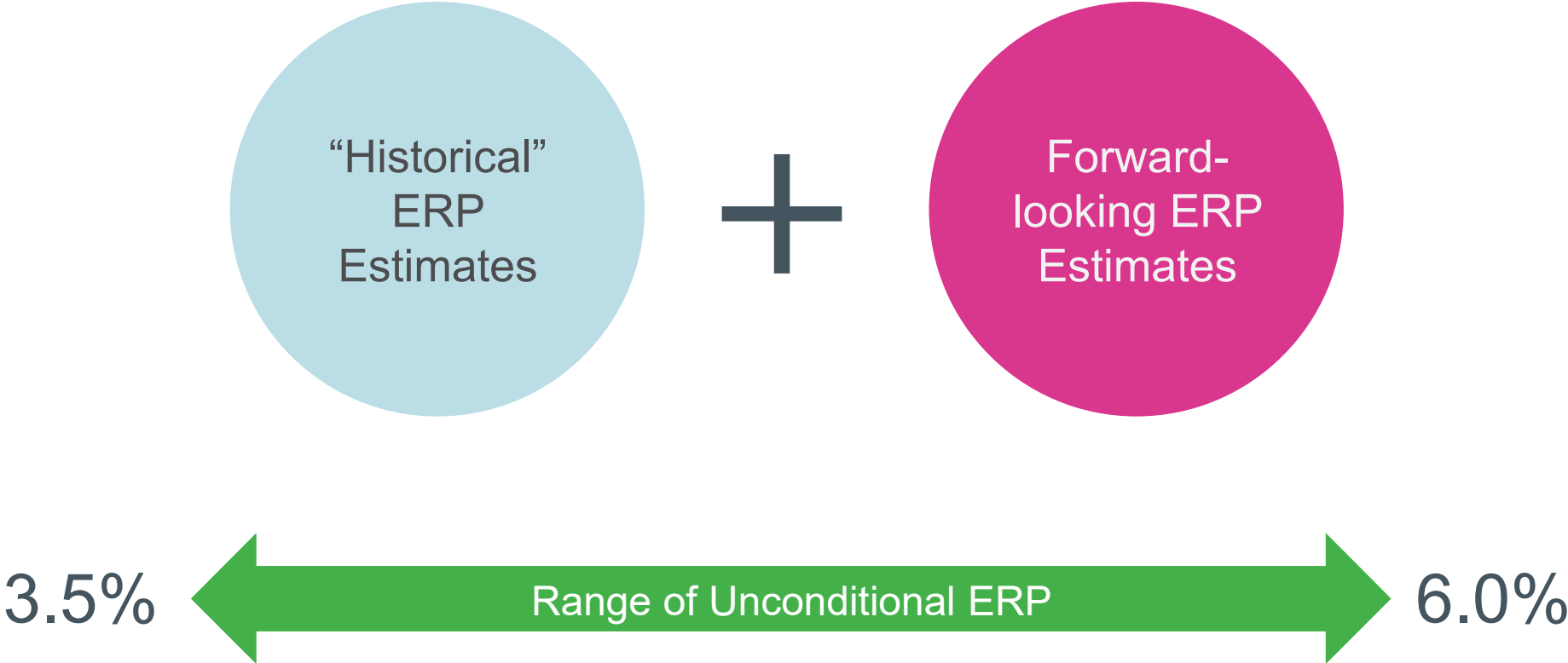
STEP 1: What is a reasonable range of unconditional ERP that can be expected over an entire business cycle?

“What is the range?”

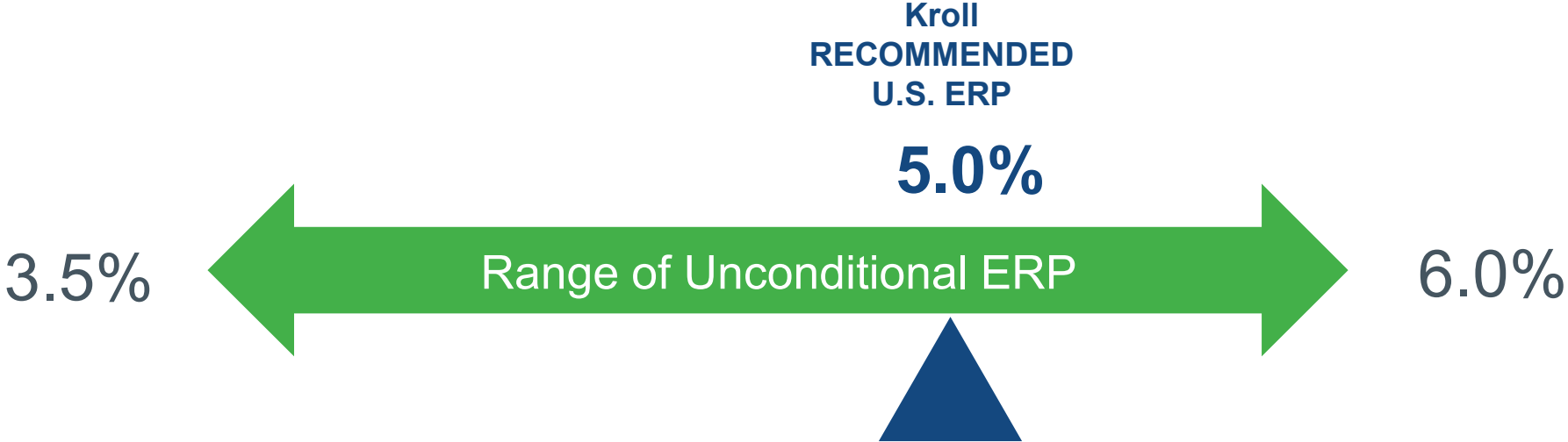
STEP 2: Research has shown that ERP is cyclical during the business cycle. We use the term conditional ERP to mean the ERP that reflects current market conditions.

“Where are we in the range?”

Kroll Considers Multiple Models to Estimate U.S. ERP



Kroll Considers Multiple Models to Estimate U.S. ERP



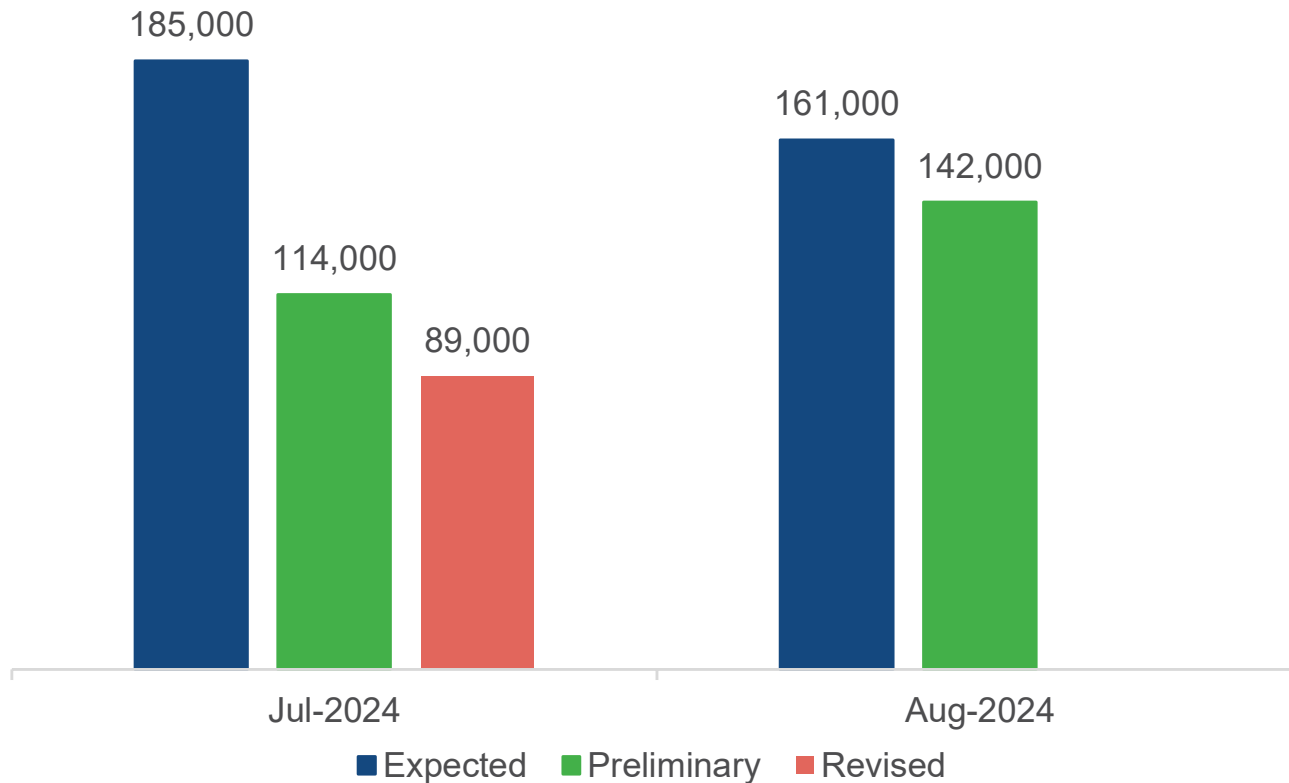
Factors Considered in ERP Recommendation – Summary Table

Changes from June 5, 2024 to September 18, 2024

	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	▲	▲

Job Creation is Cooling Down

And Unemployment is Climbing, But Still Low by Historical Standards



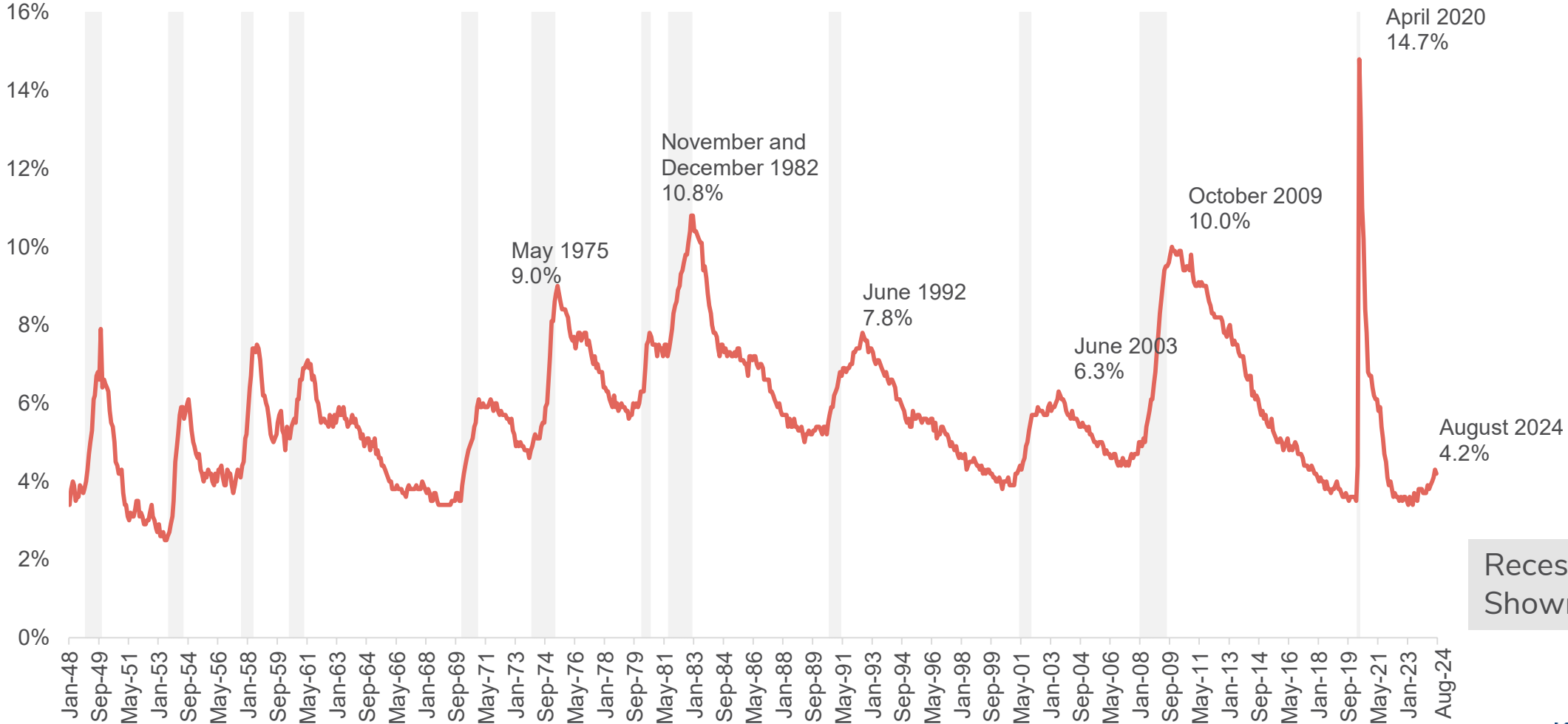
	July	August
Unemployment Rate	4.3%	4.2%
Change from Prior Month	↑ 0.2%	↓ -0.1%

Sources: Non-farm payrolls by Bureau of Labor Statistics; CNBC "Job growth totals 114,000 in July, much less than expected, as unemployment rate rises to 4.3%" August 2, 2024; CNBC "August payrolls grew by a less-than-expected 142,000, but unemployment rate ticked down to 4.2%", September 6, 2024.

Long-term View on Unemployment

Unemployment Remains Low but Ticking Up...

January 1948 – August 2024

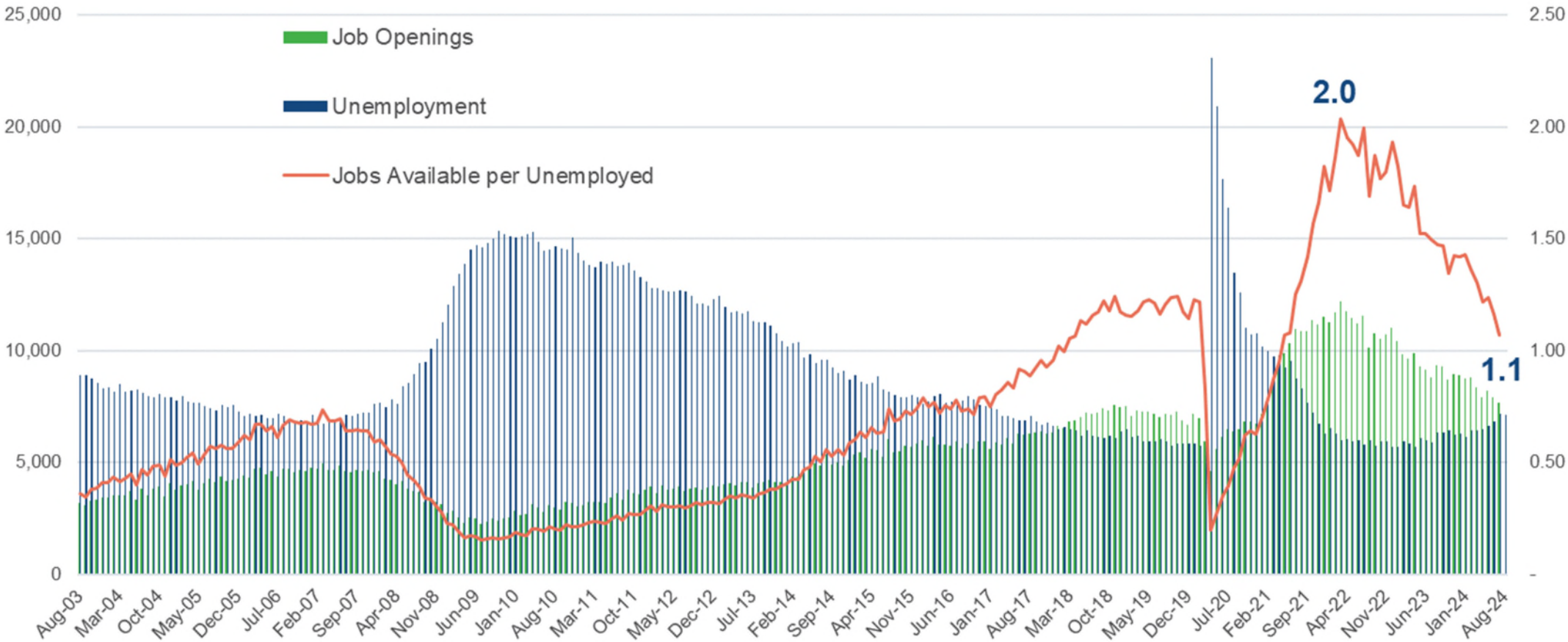


Recessions
Shown In Gray

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

U.S. Job Openings vs Number of Unemployed (thousands)

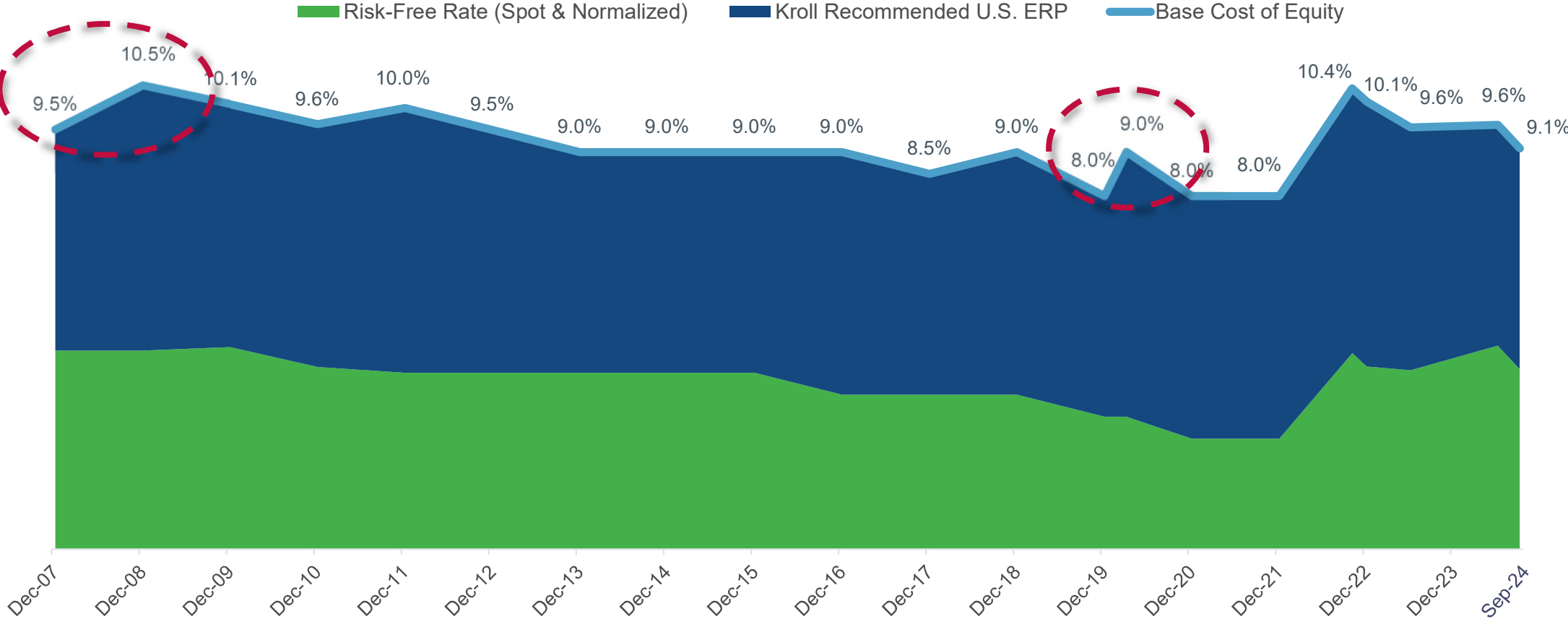
July 2003 – August 2024



Source: U.S. Bureau of Labor Statistics

Current U.S. Risk-free Rate (Normalized or Spot) and ERP Recommendations

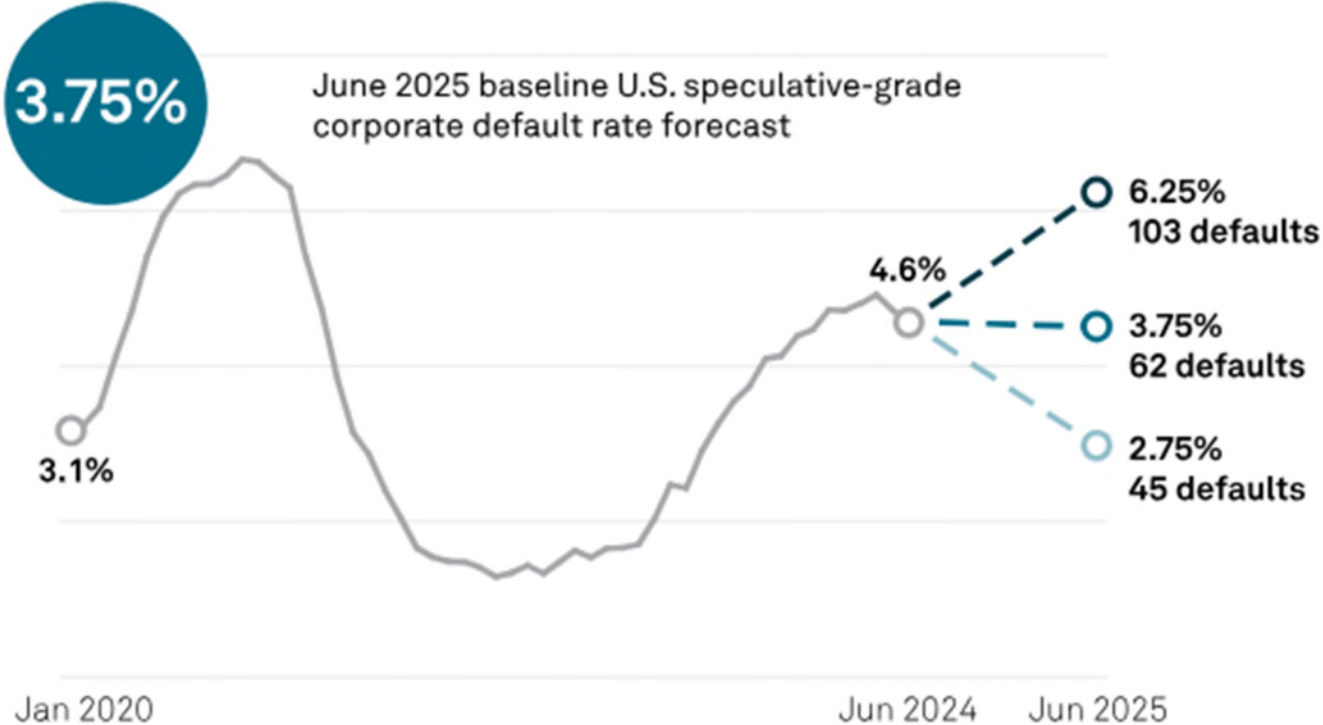
As of September 18, 2024



Cost of Debt

S&P Global Ratings Expects Corporate Defaults on High-Yield Debt to Stay High, But Stabilize

U.S. speculative-grade default rate expected to fall slightly to 3.75% by June 2025



As of June 2024, S&P Global Ratings rated 1,644 U.S. speculative-grade corporate issuers.

Pessimistic scenario: Economic growth slows to a crawl or even into recession. While our economists don't expect this, recent market volatility sparked by weaker economic data has demonstrated heightened vulnerability for rapid spread widening and primary market freezes.

Base scenario: We still expect the default rate to decline over the next 12 months given near-term liquidity relief, still resilient second-quarter earnings, and consumer spending holding up. However, the slower descents of inflation and interest rates remain challenges, as we expect economic activity to slow to a soft landing.

Optimistic scenario: Interest rates would fall faster than anticipated if a similar descent in inflation leads the way. This would need to offset the slowdown in growth that we expect in the coming quarters--although growth could also always surprise to the upside, as it has in the last year or more.

Data as of June 30, 2024. Sources: S&P Global Ratings Credit Research & Insights and S&P Global Market Intelligence's CreditPro®. Copyright © 2024 by Standard & Poor's Financial Services LLC. All rights reserved.

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

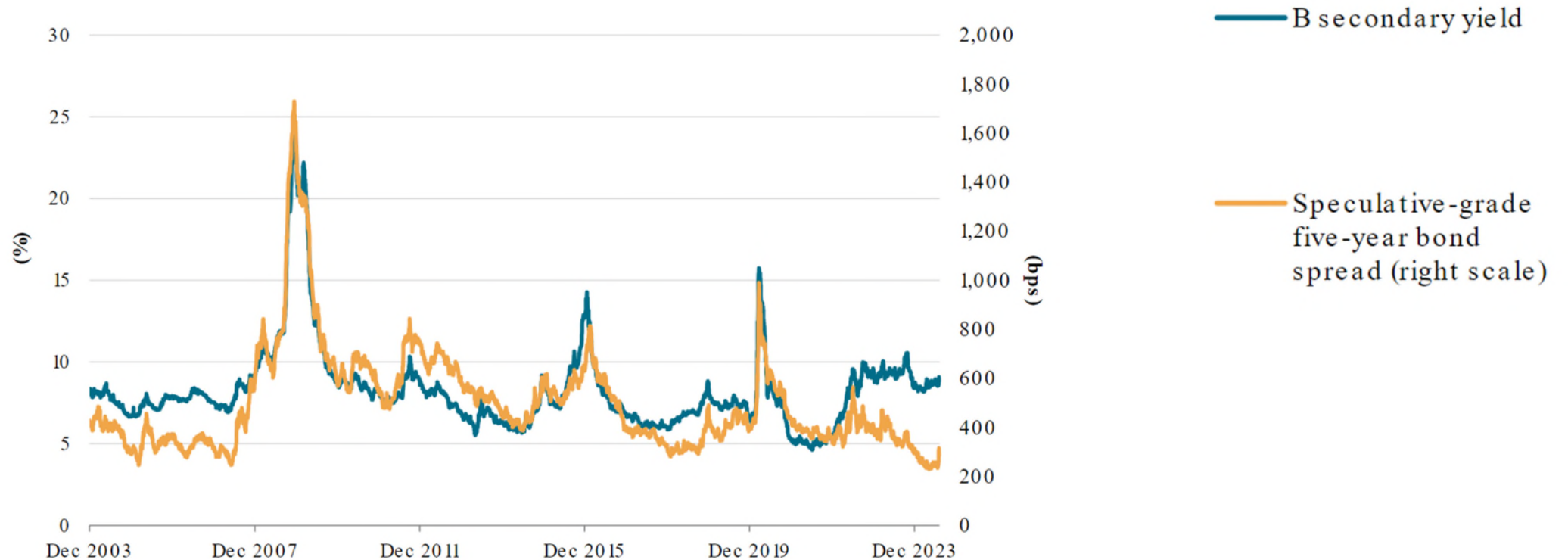
December 2007 – September 18, 2024



Source: Federal Reserve Bank of St. Louis. Based on the effective yields between of the ICE BofA U.S. Corporate Index and the ICE BofA U.S. High Yield Index.

Large Disconnect Between Credit Spreads and Yields on High-Yield (Speculative) Debt

Spreads and yields see their largest relative divergence in 2024



bps--Basis points. Source: S&P Global Ratings Credit Research & Insights.
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Eurozone Equity Risk Premium

Summary Table of Factors – Eurozone

Changes from December 31, 2023 to September 18, 2024

	Factor	Change	Effect on ERP
Financial Markets	European Equity Markets	▲	▼
	Implied Equity Market Volatility	▲	▲
	Corporate Credit Spreads	▼	▼
	Dividend Discount Model Implied ERP	◀▶	◀▶
	Default Spread Model	▼	▼
Economic Indicators	Historical & Projected Real GDP Growth	◀▶	◀▶
	Unemployment	◀▶	◀▶
	Consumer Sentiment	▲	▼
	Business Confidence	◀▶	◀▶
	Sovereign Credit Ratings	◀▶	◀▶
	Economic Policy Uncertainty (EPU) Index	▼	▼

Conditional ERP – Quantitative Models

MODELS

- Default Spread Model *
- Dividend Discount Model (DDM) – Bottom-Up **
- Dividend Discount Model (DDM) – Top Down (Median)

* The Default Spread Model is based on the premise that the long-term average ERP (the unconditional ERP) is constant and deviations from that average over an economic cycle can be measured by reference to deviations from the long-term average of the default spread between corporate bonds rated in the Baa category by Moody's versus those in the Aaa rating category. For more details see: Jagannathan, Ravi, and Wang, Zhenyu, "The Conditional CAPM and the Cross -Section of Expected Returns," The Journal of Finance, Volume 51, Issue 1, March 1996: 3-53.

** Bottom-Up Dividend Discount Model is based on the methodology outlined in: Pástor, Luboš, Meenakshi Sinha, and Bhaskaran Swaminathan. "Estimating the intertemporal risk-return tradeoff using the implied cost of capital." The Journal of Finance 63, no. 6 (2008): 2859-2897.

Dividend Discount Model (DDM) – Top Down

Defining the Models: Variation of Models Inputs

MODELS	Projected EPS – Year 1	Payout Ratio – Year 1	Payout Ratio – Other Years
1	Next 12 Months	Last 12 months	Interpolated to $\left(1 - \frac{LTG}{ROE(12m)}\right)$
2	Next 12 Months	Last 12 months	Constant
3	Next 12 Months	10-year historical average	Constant
4	Next 12 Months	10-year historical average	Interpolated to $\left(1 - \frac{LTG}{ROE(10\text{-year avg.})}\right)$
5	Historical Inflation Adjusted EPS (10 years)	10-year historical average	Constant

ROE = Return on Equity

LTG= Long Term Growth Rate= $(1 + \text{Long Term Real GDP Growth Forecast}) \times (1 + \text{Long Term Inflation Forecast}) - 1$

Sources of data:

- Earnings projections based on LSEG’s Refinitiv I/B/E/S Estimates
- Payout Ratios and ROE are calculated based on data obtained from LSEG’s Refinitiv DataStream database

Long-term Projected Real GDP Growth – Germany

Estimates as of Mid-September 2024 (approximately)



SOURCE	Long-Term Average (%)
Consensus Economics	0.8
Economist Intelligence Unit	0.8
IHS Markit (S&P Global Market Intelligence)	1.2
International Monetary Fund (IMF)	0.9
Oxford Economics	1.1
PwC	1.1
Median ►	1.0%
0.8% – 1.2%	

Range of Real GDP Growth Estimates

Long-term Inflation Expectations – Germany

Estimates as of Mid-September 2024 (approximately)



SOURCE	Long-Term Average (%)
Consensus Economics	2.2
Economist Intelligence Unit	2.1
IHS Markit (S&P Global Market Intelligence)	2.1
International Monetary Fund (IMF)	2.1
Oxford Economics	1.9
PwC	2.0
Range of Inflation Estimates	1.9% – 2.2%

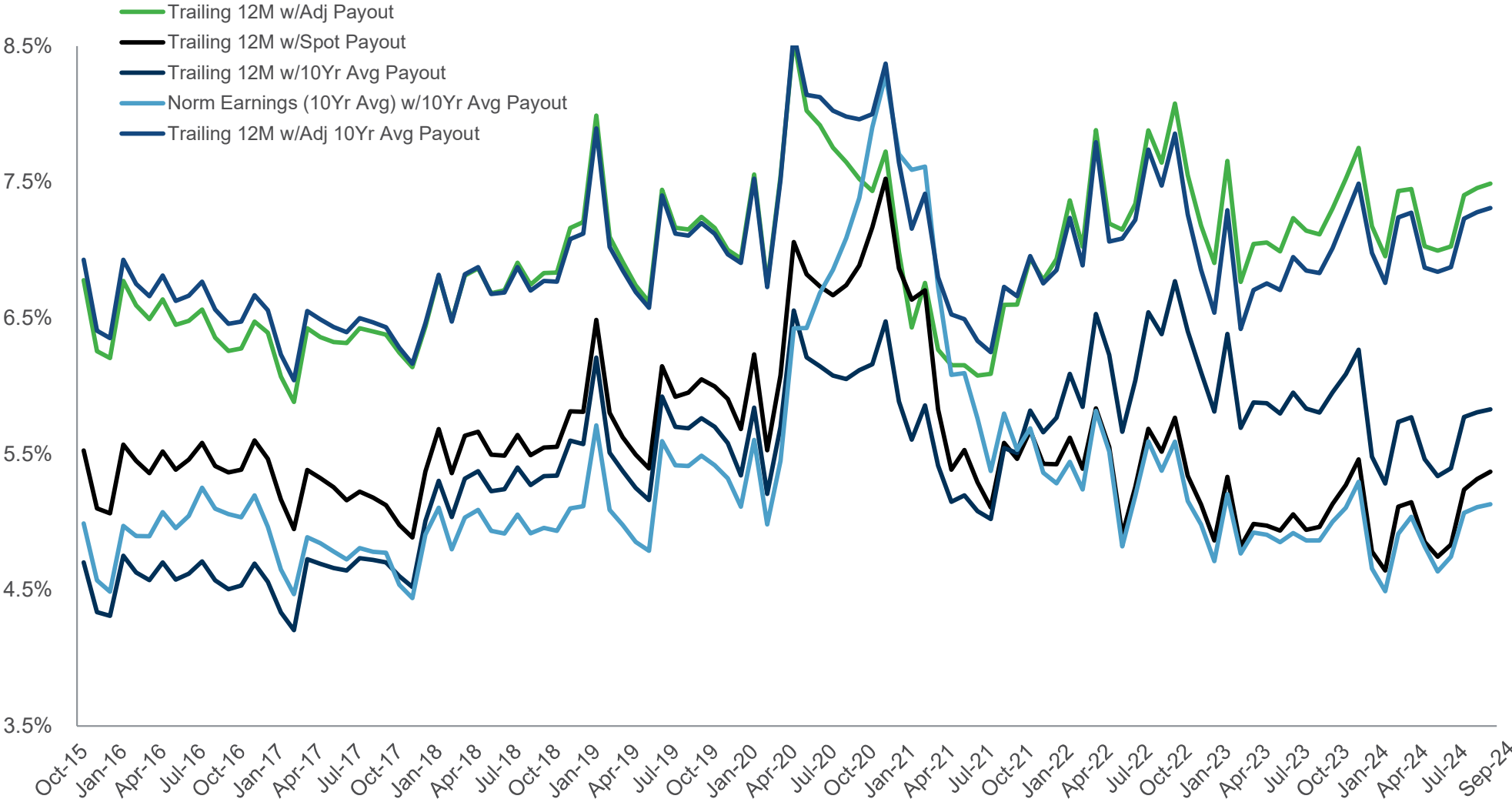
2.1% ← Median

$$\text{Long Term Growth Rate (Median)} = (1 + \text{Long Term Real GDP Growth Forecast}) \times (1 + \text{Long Term Inflation Forecast}) - 1$$

$$= (1 + 1.0\%) \times (1 + 2.1\%) - 1 = 3.1\%$$

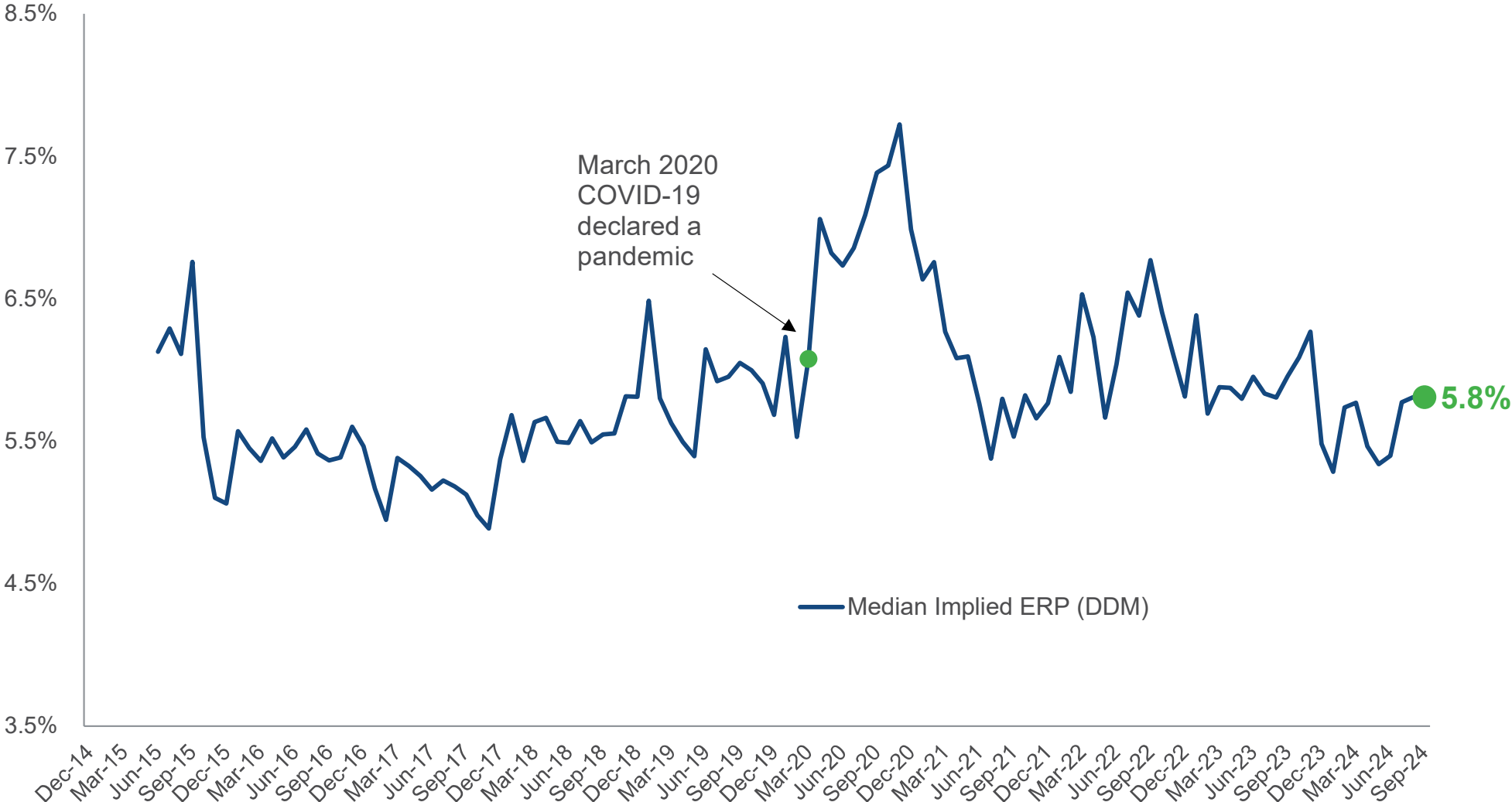
Top Down DDM Implied ERP – All Model Specifications

October 2015 – September 18, 2024



Top Down DDM Implied ERP – Median

December 2014 – September 18, 2024



Kroll Recommended Eurozone Equity Risk Premium

German Investor Perspective applied to EUR-Denominated Projections *



	December 31, 2019	March 31, 2020	December 31, 2022	December 31, 2023	September 18, 2024 **
Normalized Risk-Free Rate – Germany	2.0%	2.0%	3.0%	3.0%	2.5%
Eurozone Equity Risk Premium Recommendation	4.5% to 5.0%	5.5% to 6.0%	5.5% to 6.0%	5.5% to 6.0%	5.5% to 6.0%
Base Cost of Equity	6.5% to 7.0%	7.5% to 8.0%	8.5% to 9.0%	8.5% to 9.0%	8.0% to 8.5%

* Some countries may have regulations or guidelines that preclude the use of normalized risk-free rates. The Kroll approach does not supersede such local guidance. In Germany, for instance, the IDW (Institute of German Chartered Accountants) created a committee (FAUB) whose function is to issue guidance regarding (company) valuation topics. Under FAUB guidance, when estimating cost of capital using CAPM, a spot risk-free rate (Svensson method) should be used, while the ERP will change over time to reflect changes in the risk aversion.

** Based on current economic and financial market conditions, we continue to believe that a 5.5% ERP (i.e., toward the lower end of the range) is more appropriate when developing EUR-denominated discount rates as of February 8, 2024, and thereafter, until further guidance is issued.

Inferred ERP: Using the Kroll Eurozone Recommended ERP Against a Spot German Risk-free Rate

As of September 18, 2024

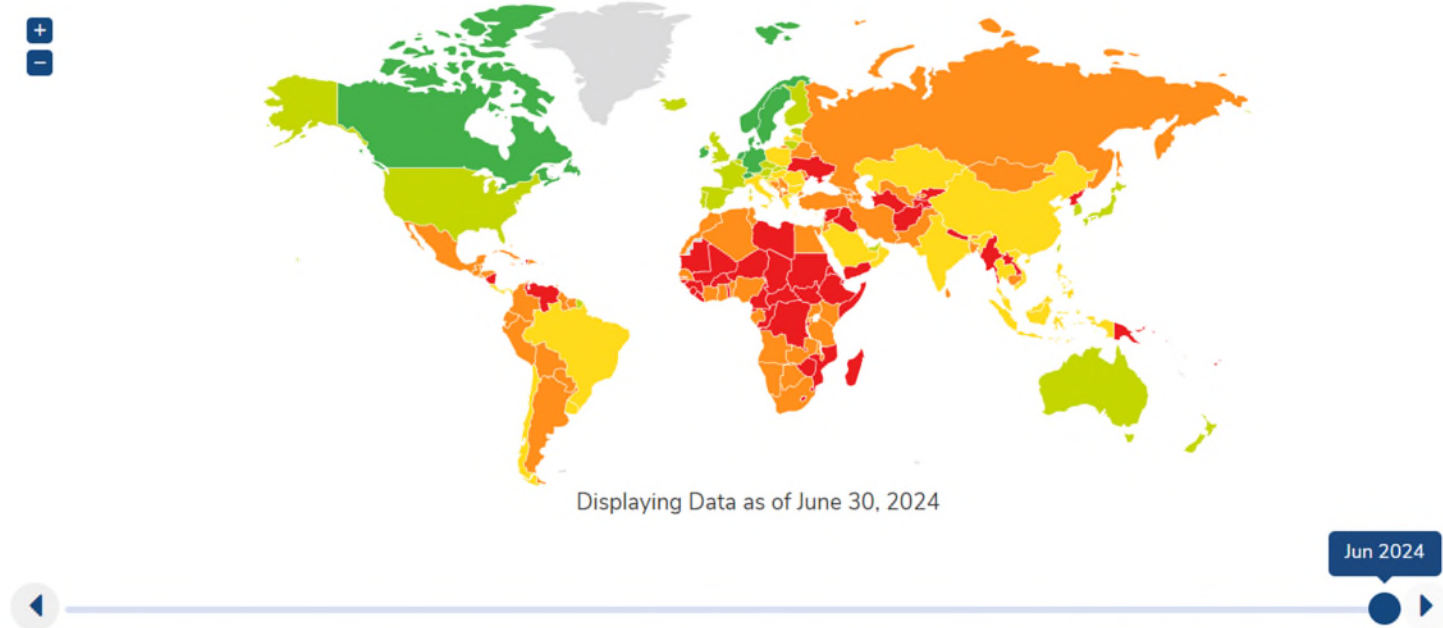
	Kroll Eurozone Recommended ERP		German Normalized Risk-free Rate		15-Year German Government Spot Yield *		Inferred Eurozone ERP
Low Range	5.5%	+	2.5%	-	2.4%	=	5.6%
High Range	6.0%	+	2.5%	-	2.4%	=	6.1%

* Source: Deutsche Bundesbank

Country Risk

Global Heat Map - Country Risk

Our global heat map illustrates risk across all countries, as well as a summary of country risk data by region from our three country risk models. Hover over the map to get a risk rating by country, slide the bar to see how by country risk changes over the time, or [click here](#) to get full country risk premia data by country in the International Cost of Capital Module.



- Very High Risk
- High Risk
- Medium Risk
- Low Risk
- Very Low Risk
- Data not Available

*Ranking of risk based on each country's country risk index score. Starting in March 2023, scores are sourced from BMI, a Fitch Solutions Company. For more information on BMI, visit: <https://www.fitchsolutions.com/products/country-risk>.

Prior to March 2023, scores were sourced from Euromoney Country Risk (ECR). To the extent a country did not have an ECR score but had a sovereign credit rating issued by one of the main rating agencies (Standard & Poor's, Moody's, Fitch), a similar methodology to ECR's was used to assign the risk level. Euromoney has discontinued its ECR product. For more information on Euromoney, visit: <https://www.euromoney.com/>.

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 Cost of Capital Module.

Median Country Risk Premium (CRP) and Relative Volatility (RV) Factors in USD by Region*

Region	CYS	CCR	RV
North America	0.0%	0.0%	1.0
Latin America and Caribbean	3.4%	3.7%	1.6
Europe	0.9%	0.8%	1.1
Africa	7.8%	5.9%	1.4
Middle East	2.0%	2.6%	1.1
Asia-Pacific	3.0%	4.0%	1.1

CYS = Country Yield Spread Model

CCR = Country Credit Rating Model

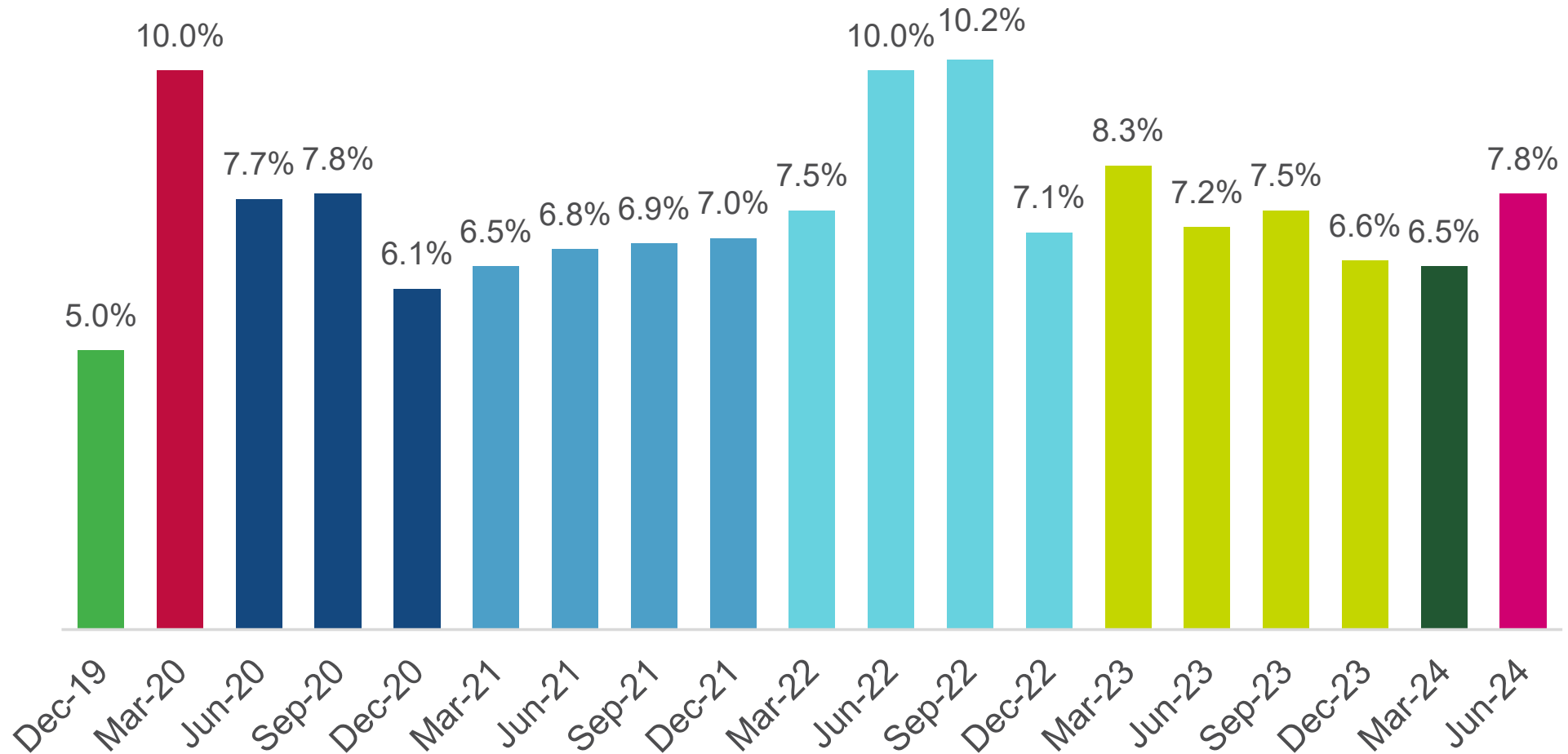
RV = Relative Volatility Model

Country Risk Premia Pre-and Post COVID-19

Country Yield Spread Model from a United States (USD) investor perspective*



Africa



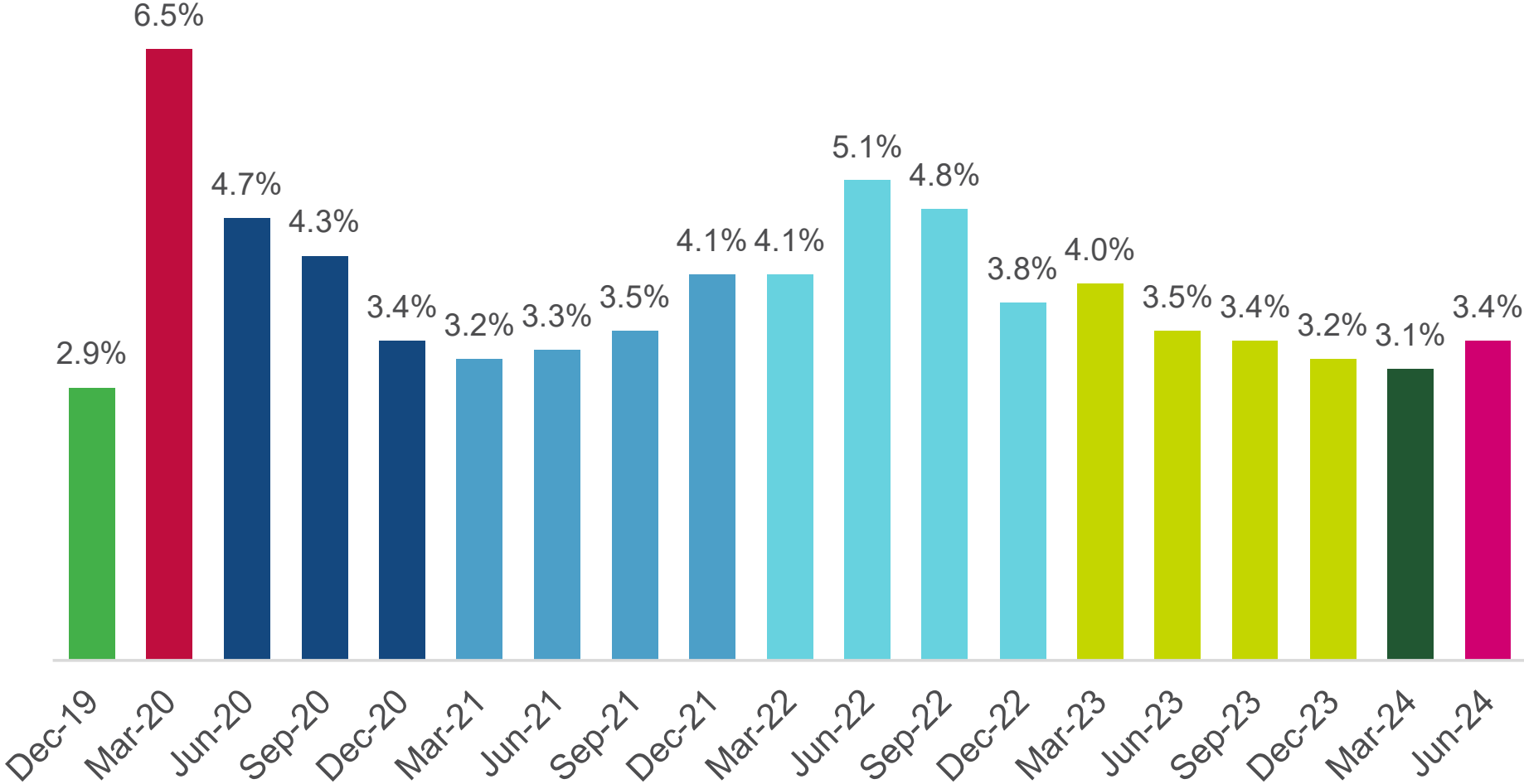
* Based on the median country risk premia within geographic region.

Country Risk Premia Pre-and Post COVID-19

Country Yield Spread Model from a United States (USD) investor perspective*



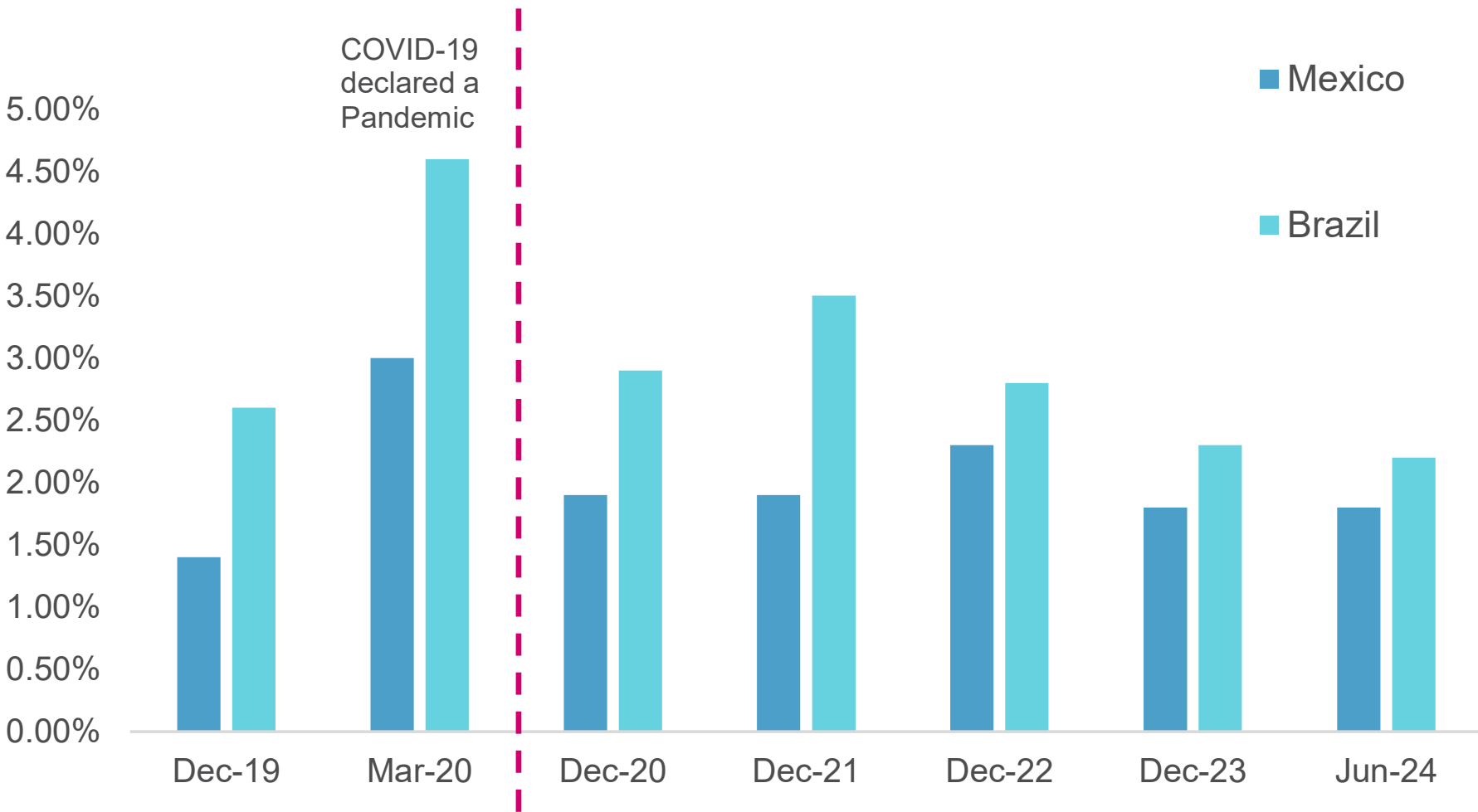
Latin America & Caribbean



* Based on the median country risk premia within geographic region.

Country Risk Premium Before and After COVID-19 (\$USD)

Country Yield Spread Model from a USD investor perspective. Data as of June 30, 2024



Country Risk Premium Before and After COVID-19 (€EUR)

Country Yield Spread Model from a EUR investor perspective. Data as of June 30, 2024



Takeaways of Today's Presentation

Record high inflation had a significant impact on key value drivers:

- Projected Growth Rates and operating margins
- Discount Rates

Interest rates of safe-haven countries have risen to levels last seen prior to the 2008-2009 Global Financial Crisis, due to Central Banks actions in their attempt to tame inflationary pressures. Long-term risk-free rates have now come down from their peaks.

Cost of debt for investment-grade interest-bearing debt is at similar levels as at the height of Covid-19, but high-yield (speculative grade) debt is not signaling distress.

Equity Risk Premium is cyclical

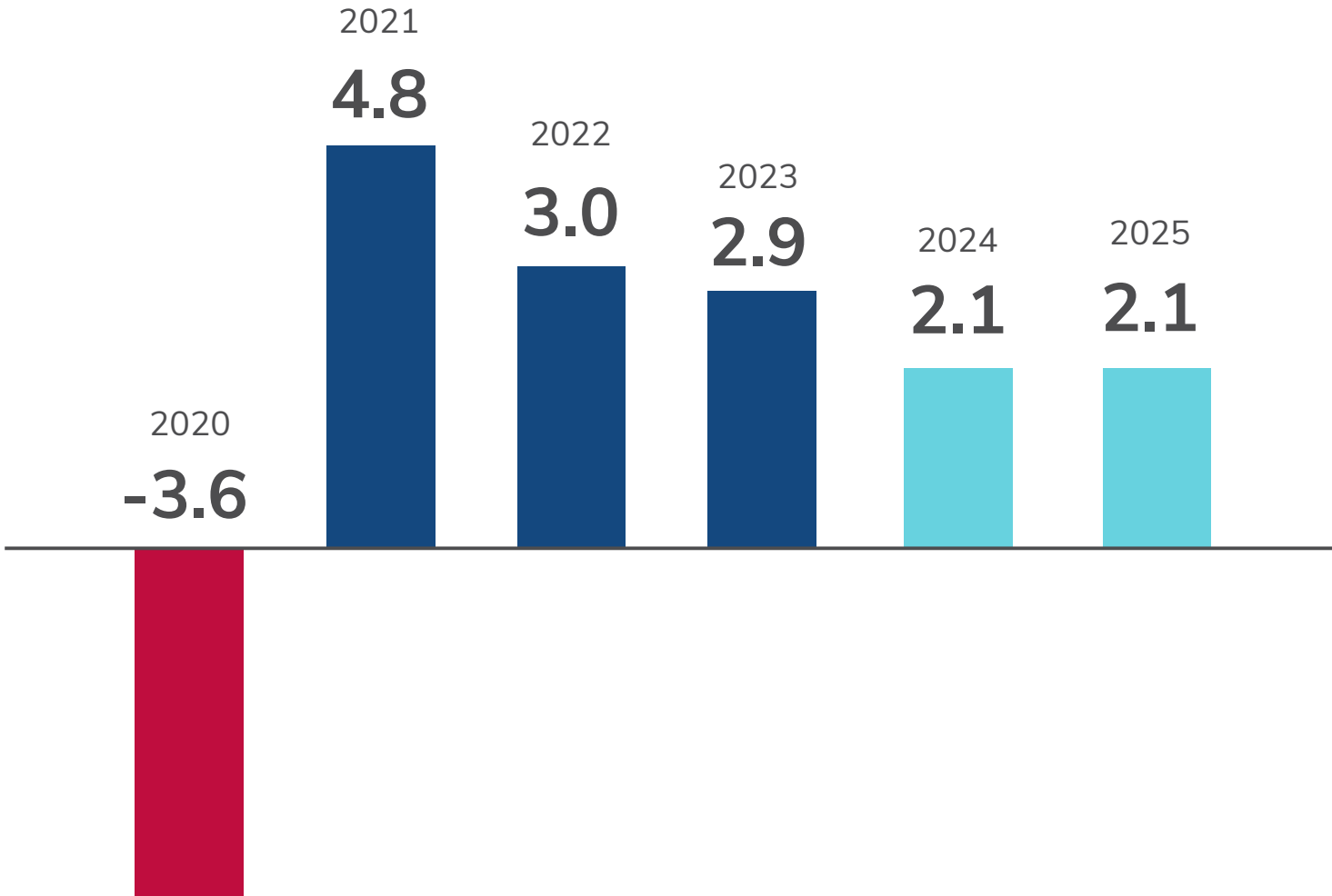
- Historical measures are countercyclical and used without further adjustments may lead to the wrong conclusion.

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

Extra Resources

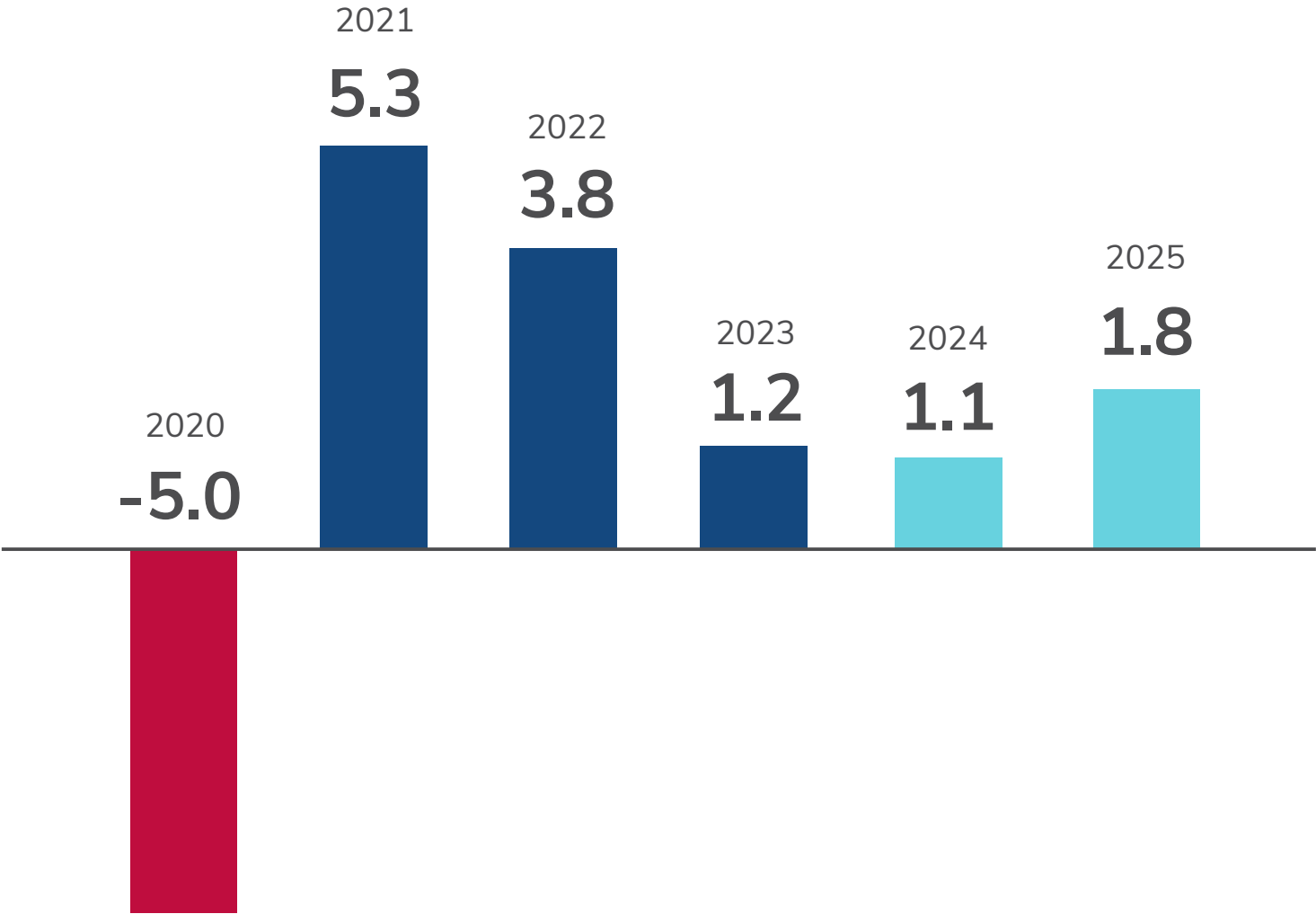
Real GDP Growth (%) Estimates by Region: Brazil

Data as of September 20, 2024



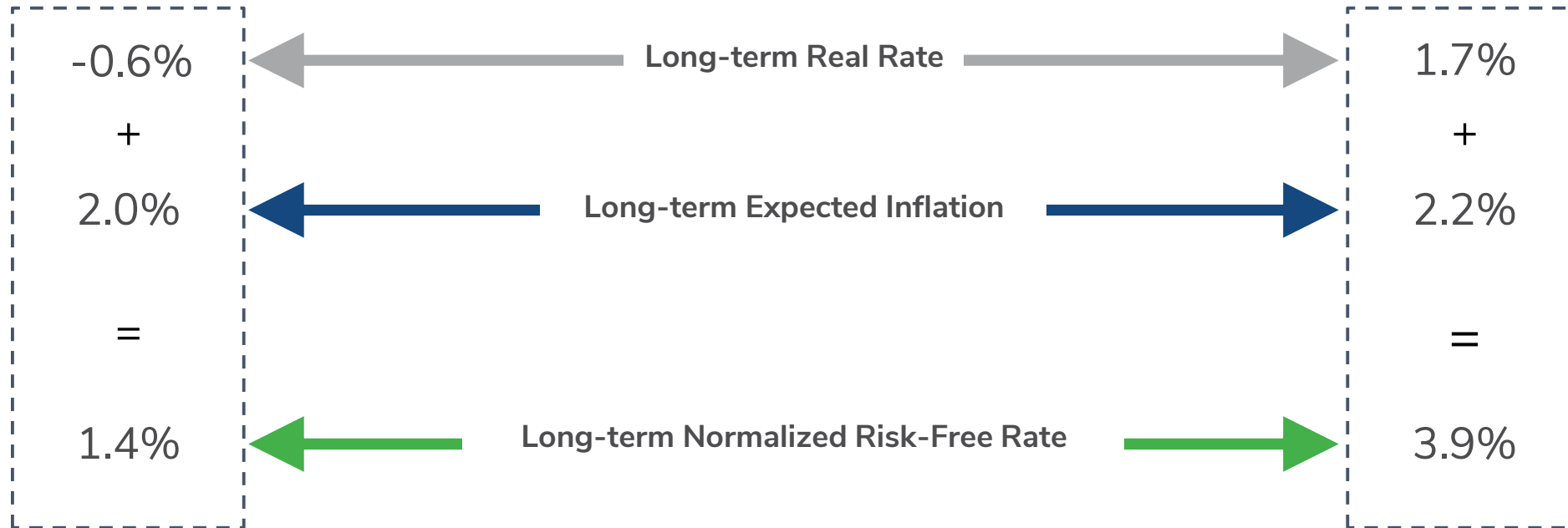
Real GDP Growth (%) Estimates by Region: Canada

Data as of September 20, 2024



Risk-Free Rate Normalization – Canada

As of Mid-September 2024



- **Fisher Equation:** Midpoint = 2.6% / Median = 3.0%
- **LT Average:** 10-Year Trailing Average of Canada Benchmark Bond Yields – Long Term = 2.3%

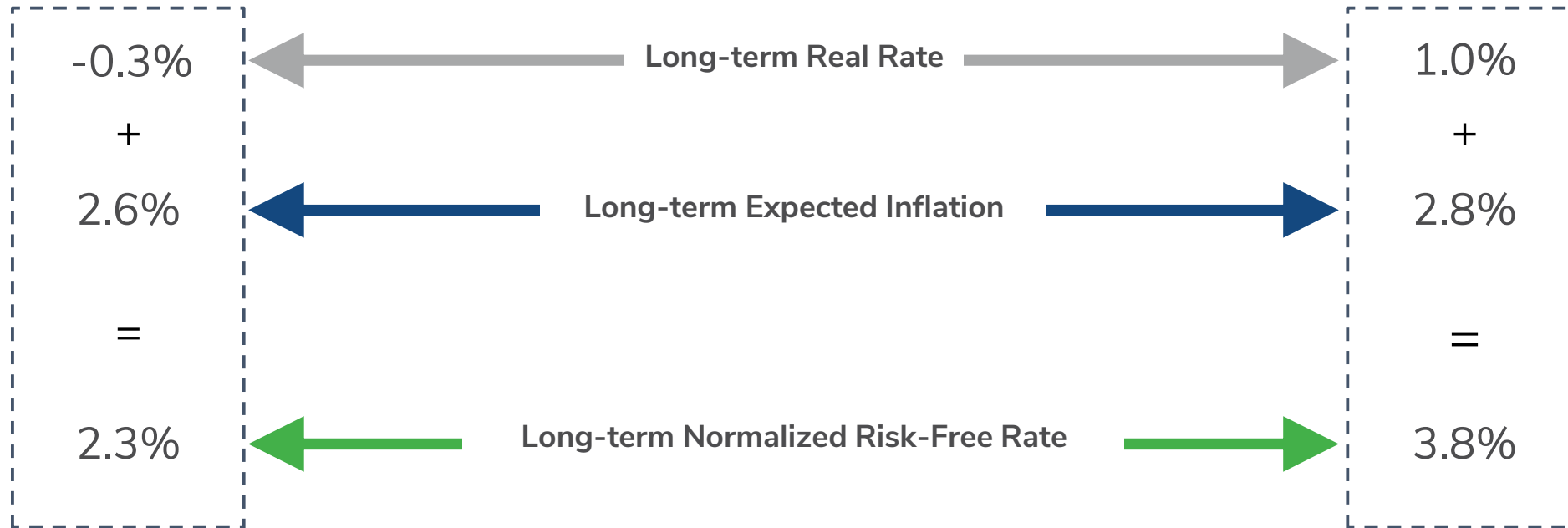
Concluded Normalized $R_f = 3.5\%$

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

Risk-Free Rate Normalization – Australia



As of Mid-September 2024



- **Fisher Equation:** Midpoint = 3.1% / Median = 3.5%
- **LT Average:** 10-Year Trailing Average of 10-Year Australia Government Securities = 2.5%

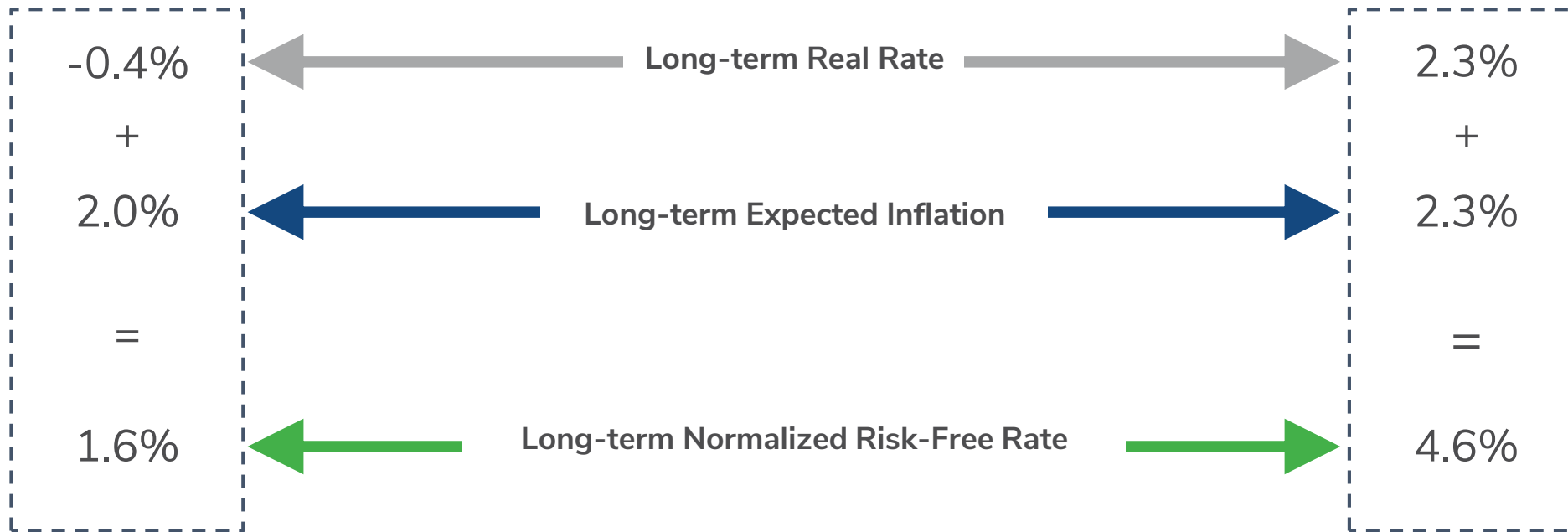
Concluded Normalized R_f = 3.5%

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

Risk-Free Rate Normalization – United Kingdom



As of Mid-September 2024



What is the spot 20-year yield as of 23 Sep 2024?



*Source: Bank of England

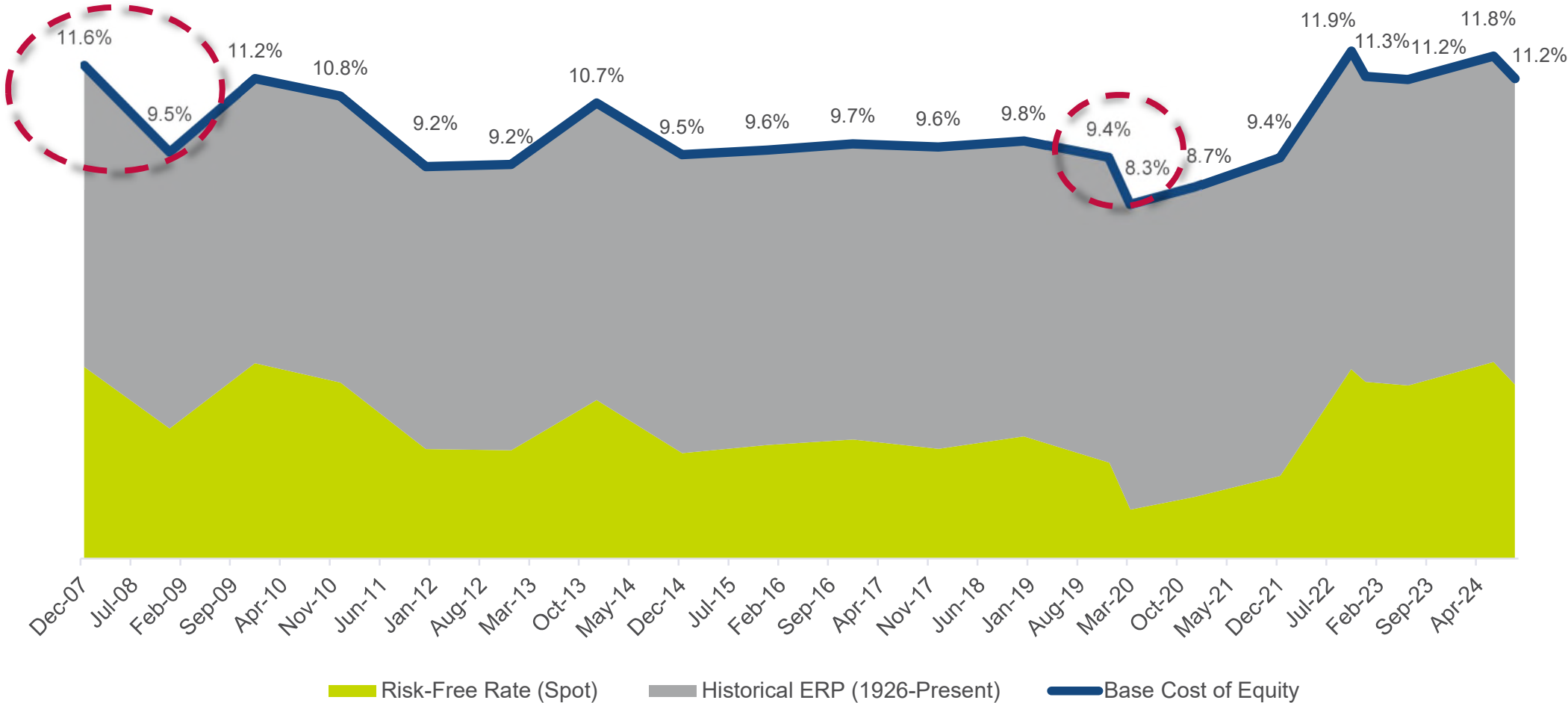
- **Fisher Equation:** Midpoint = 3.1% / Median = 2.9%
- **LT Average:** 10-Year Trailing Average of 20-Year U.K. Government Yield = 2.2%

Concluded Normalized $R_f = 4.0\%$

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

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

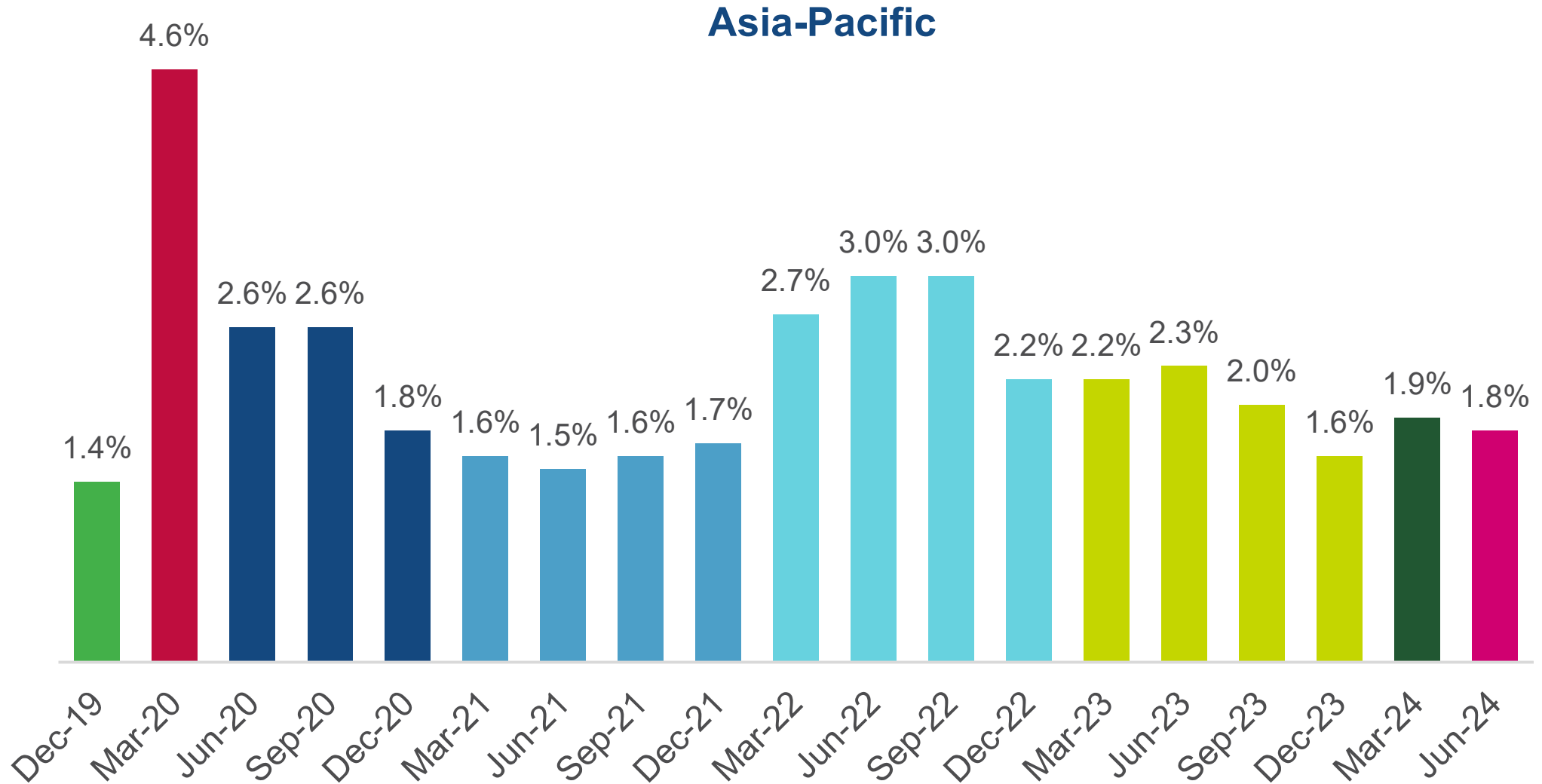
December 31, 2007 – September 18, 2024



* 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.

Country Risk Premia Pre-and Post COVID-19

By Geographic Region



Cost of Capital Thought Leadership 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.

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 best-in-class, all-in-one solution, the Cost of Capital Navigator digital platform is built upon decades of valuation data and relies on established cost of capital theory and methodologies.



The U.S. and International Cost of Capital Modules provide everything you need for U.S.- and International-centric cost of capital calculations all in one place.

[Learn more](#)

ESG and Global Investor Returns Study



We examined the relationship between historical returns of over 13,000 publicly traded companies across a variety of geographies and industries and their ESG ratings to determine the correlation of ESG ratings to company performance.

[Learn more](#)

Key Cost of Capital Recommendations

as of July 31, 2024

Kroll regularly reviews fluctuations in the global economic and financial market conditions. These reviews warrant a periodic reassessment of the equity risk premium (ERP) and the accompanying risk-free rate and key inputs used to calculate the cost of equity capital in the context of the Capital Asset Pricing Model (CAPM) and other models used to develop discount rates.

	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 2.5% or Spot†	Higher of 4.0% or Spot‡	Higher of 3.5% or Spot‡	Higher of 3.5% or Spot#
Equity Risk Premium	5.0%	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 2.5%. This guidance is effective when developing EUR-denominated discount rates as of March 31, 2024, and thereafter. The Kroll Recommended Eurozone ERP remains in the range of 5.5% to 6.0%, based on current economic and financial market conditions, and we believe that a 5.5% ERP (i.e., towards the lower end of the range) is more appropriate when developing EUR-denominated discount rates as of February 5, 2024, 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 Inputs dataset within the Cost of Capital Navigator.

Webinars and Conferences



With deep technical expertise, our team continually presents in live webinars, conferences and workshops on how cost of capital and valuations are being impacted by the latest trends in the global economy and financial markets, industry developments, and much more.

Cost of Capital Infographic, Country Risk Heatmap and Other Innovative 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

58.5%

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

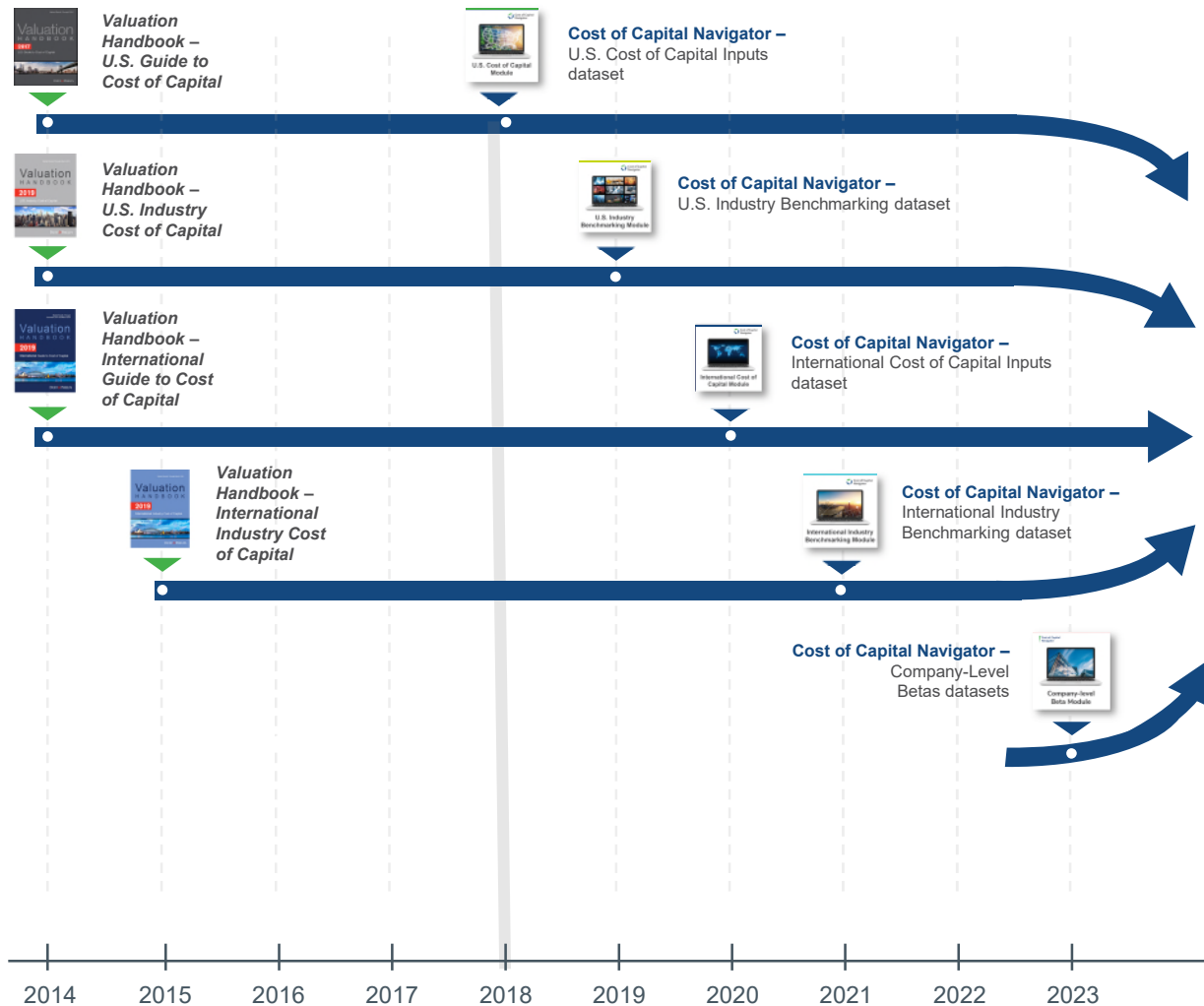


[View full report.](#)

**Based on polling during our September 2023 webinar, Higher for Longer? Cost of Capital in the Current Environment of ~600 external live participants.

A Brief History

Cost of Capital Navigator Datasets



The Cost of Capital Navigator includes two subscription products:

- U.S. Cost of Capital Module
- International Cost of Capital Module



Includes all historical data for these datasets:

- U.S. Cost of Capital Inputs
- U.S. Industry Benchmarking
- U.S. Company-Level Betas



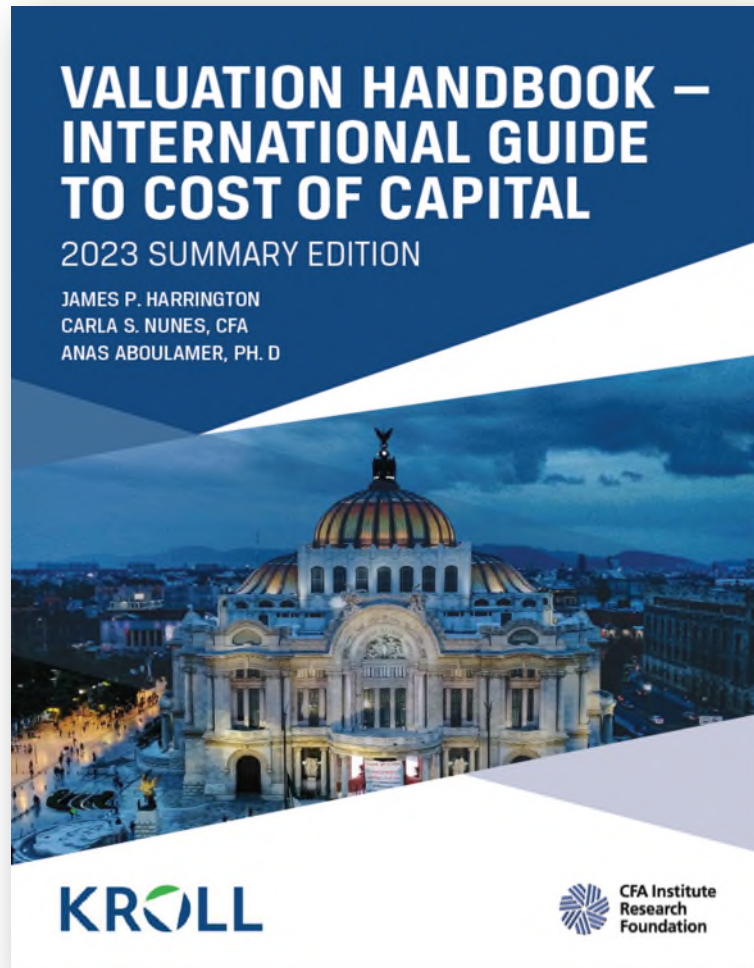
Includes all historical data for these datasets:

- International Cost of Capital Inputs
- International Industry Benchmarking
- International Company-Level Betas

[Learn More](#)

Valuation Handbook – International Guide to Cost of Capital

2023 Summary Edition



- Discusses various models to estimate international cost of capital, and analyzes their strengths and weaknesses
- Provides an overview of international equity risk premia sources:
 - Includes in-depth analysis on ERP and related concepts for:
 - ❖ Canada
 - ❖ Australia
- Describes the methodology for three models to adjust for country risk, along with examples on to apply these models
- Discusses the European Size Study commissioned from Prof. Erik Peek



To learn more about the Cost of Capital Navigator,
or Kroll's Cost of Capital practice, visit:

[Kroll.com/CostofCapitalNavigator](https://kroll.com/CostofCapitalNavigator)



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