



May 10, 2022

## **Client Alert:**

**Kroll U.S. Normalized Risk-Free Rate  
Increased from 2.5% to 3.0%,  
Effective April 7, 2022**

## Executive Summary

Kroll regularly reviews fluctuations in global economic and financial market conditions that may warrant changes to our equity risk premium (ERP) and accompanying risk-free rate recommendations. The risk-free rate and ERP are 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.

Based on market conditions prevailing at the end of March 2022, **Kroll increased the U.S. normalized risk-free rate from 2.5% to 3.0%, when developing USD-denominated discount rates as of April 7, 2022 and thereafter**, until further guidance is issued. This rate is to be used with Kroll's Recommended U.S. ERP of 5.5%, implying a base U.S. cost of equity capital of 8.5% (= 3.0% + 5.5%). However, given how fast U.S. inflation expectations are rising, the current guidance could be changed again in the near future.

## Background

In 2020, the outbreak of the novel coronavirus (a.k.a., COVID-19) generated an unprecedented reaction in both global financial markets and the real economy. Back then, based on declining real interest rate and growth estimates for the U.S. economy, we lowered the U.S. normalized risk-free rate from 3.0% to 2.5%, when developing discount rates as of June 30, 2020, until further guidance was issued.

In December 2021, despite some uncertainty regarding the impact of the omicron variant of COVID-19, the global economy appeared to be on a strong path to recovery, although with some unevenness across regions. Major central banks were considering some level of normalization of monetary policy, both by slowing down (or stopping altogether) quantitative easing (QE) measures and by raising policy interest rates, particularly as inflationary pressures proved to be more than transitory in many countries. On January 3, 2022, the S&P 500 index achieved a new record high, while two days later the STOXX® Europe 600 reached its own record high. At that time, we began discussing when and under which circumstances it might be appropriate to lower our recommended ERPs for the U.S. and the Eurozone.<sup>1</sup>

Since then, economic and financial market conditions have changed markedly. Starting in mid-January 2022, as inflation continued to surprise with increasingly higher-than-expected readings (to levels not seen in 30 to 40 years in some countries), global equity markets have become more volatile. Investors tried to ascertain the magnitude and speed at which central banks would raise interest rates, which could lead to a potential decrease in the value of companies in various industries due to an increase in discount rates. In addition, tensions between Russia and Ukraine – which had been rising to new levels since late 2021 – culminated in Russia's invasion of Ukraine on February 24, 2022. Country risk measures for these two countries have surged, but the increase in risk has extended to other markets and indicators.

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<sup>1</sup> The term 'equity risk premium' may be known as 'market risk premium' or 'equity market risk premium' in different geographies, but they all refer to the same concept. In this document we use 'equity risk premium' or ERP.

The remainder of this Client Alert will focus on the following topics and how they formed the basis for our new recommendation issued on April 7, 2022.<sup>2</sup>

1. Global Interest Rate Trends
2. U.S. Risk-Free Rate and Inflation – Recent Trends and Challenges
3. Methods of Estimating a Normalized Risk-free Rate
4. Conclusion

## Global Interest Rate Trends

From the onset of the 2008 Global Financial Crisis, major economies have seen a significant downward trend in nominal interest rates. Since then, valuation analysts have reexamined whether the “spot” risk-free rate is still a reliable building block upon which to base their cost of equity capital estimates. The 2008 Global Financial Crisis challenged long-accepted practices and highlighted potential problems of using the spot yield-to-maturity on a safe government security as the risk-free rate, without any further adjustments.

Material distortions to spot government debt yields can occur during periods characterized by significant flight-to-quality investment flows or by central bank monetary policies that entail significant intervention in sovereign debt securities markets and/or the implementation of negative interest rate policies. These actions may: (i) distort long-term yields by reducing term premiums that no longer reflect market expectations of long-term inflation, and (ii) potentially drive short-term real yields to negative levels (i.e., below 0.0%), which will no longer reflect the time value of money, and imply that the real rate of growth for the overall economy is expected to be negative for an extended period.

Since the 2008 Global Financial Crisis, major central banks in developed markets – including, but not limited to the Federal Reserve Bank (Fed) in the U.S., the European Central Bank (ECB) in the Eurozone, and the Bank of Japan (BOJ) – struggled to bring consumer price inflation up to their respective target levels (typically around 2%). Central banks’ measures of inflation tend to focus on a less-volatile indicator called “core” inflation, which excludes food and energy prices. In the aftermath of the 2008 Global Financial Crisis and the ensuing Euro Sovereign Debt Crisis – in an attempt drive inflation up to target levels and to support economic recovery – central banks kept their policy interest rates at near 0%, or even at negative levels, as in the case of the ECB and Bank of Japan. They also implemented unconventional QE policies that led to a massive increase in central bank balance sheets due to large-scale purchases of assets, which comprised government securities, mortgage-backed securities (MBS), and agency debt, while in some cases it even included corporate debt and equity instruments (see Exhibit 1).

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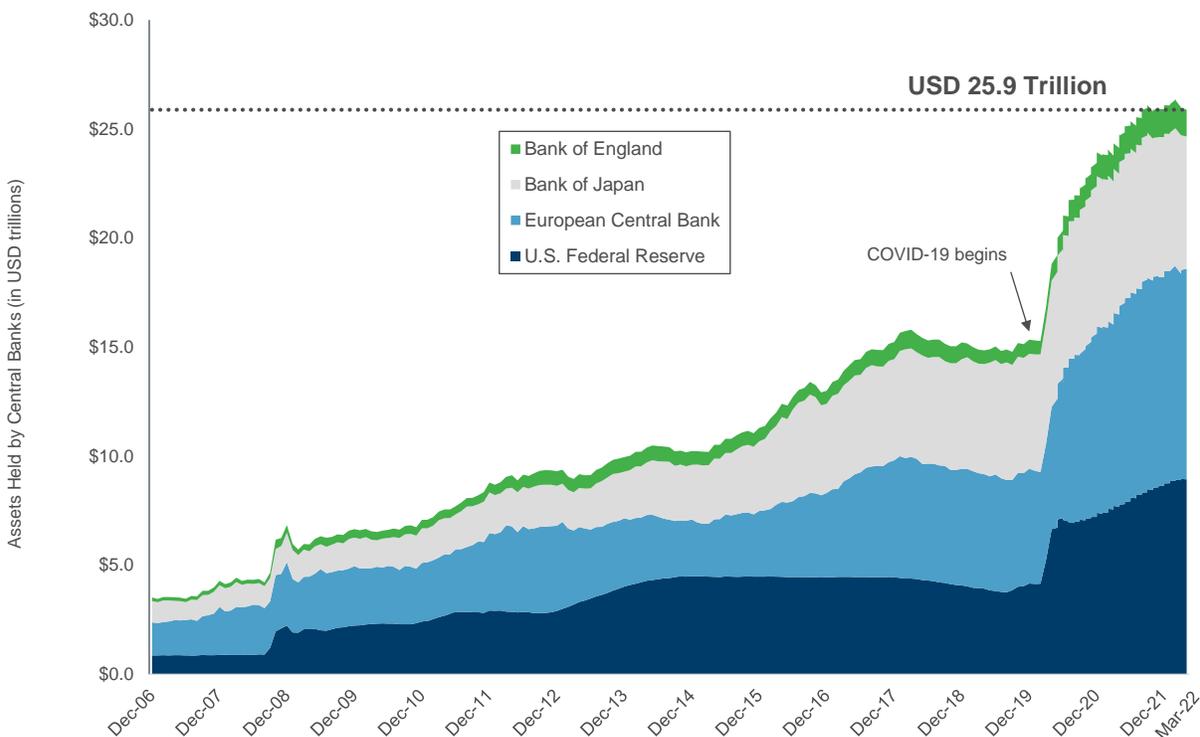
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<sup>2</sup> Data and Information for this Client Alert was collected through April 7, 2022.

In 2020, another major shock shook global financial markets. The World Health Organization (WHO) announced on March 11, 2020 that it was changing its classification of COVID-19 to a “pandemic”.<sup>3</sup> COVID-19 led to the largest global recession since World War II. In response, major central banks implemented QE and other crisis-related monetary policy measures last employed in the aftermath of the 2008 Global Financial Crisis, as well as some new and untested measures. Some central banks introduced QE policies for the first time in their history (e.g., Australia, Canada).

**Exhibit 1: Total Assets Held by Major Central Banks: Federal Reserve, European Central Bank, Bank of Japan, and Bank of England (In U.S. Dollars)**

December 31, 2006 – End of March 2022



Source of underlying data: Bank of England, FRED (Federal Reserve Bank of St. Louis). Analysis performed by Kroll.

In a period of approximately two years, the balance sheets of the Fed, ECB and the Bank of England grew at their fastest pace in history. Between February 29, 2020 and the end of March 2022, the size of the Fed balance sheet more than doubled (from \$4.2 trillion to \$8.9 trillion), while both the ECB and the Bank of England saw their respective balance sheets nearly double (approximately) in size (from \$5.1 trillion to \$9.7 trillion and \$0.6 trillion \$1.2 trillion, respectively).<sup>4</sup> Prior to the pandemic, the Bank of Japan had the largest balance sheet of the four major central banks (approximately \$5.5 trillion), but afterwards both the Fed and the ECB surpassed the Bank of Japan in balance sheet size (see Exhibit 1).<sup>5</sup>

<sup>3</sup> To simplify comparisons, when using monthly data in this document, dates up to and including February 29, 2020 are defined as “pre-pandemic”, and March 1, 2020 is used as the beginning of the pandemic.

<sup>4</sup> Dates are as close to the end of March 2022 as possible.

<sup>5</sup> As of February 29, 2020, the Fed, ECB, BOJ, and Bank of England had balance sheets of \$4.2, \$5.1, \$5.4, and \$0.6 trillion, respectively. As of the end of March 2022, the Fed, ECB, BOJ, and Bank of England had balance sheets of \$8.9, \$9.7, \$6.1, and \$1.2 trillion, respectively.

The sizable increases in these central banks' balance sheets, along with various flight-to-quality episodes, continued to exert a downward pressure on global long-term interest rates through early 2020 (see Exhibit 2). At the onset of the pandemic, 10-year government bond yields reached record lows in 2020 in the U.S., Canada, and U.K., driven initially by flights to quality, but remained low as a result of the unprecedented level of QE measures.<sup>6</sup>

**Exhibit 2:** Yields on 10-Year Government Bonds Issued by the U.S., Canada, U.K., Germany, and Japan  
December 31, 2007 – March 31, 2022



Source of underlying data: Capital IQ.

More recently, as inflation pressures crept up, we observed a rise in government bond yields of major developed countries (with the exception of Japan), although they are still relatively low by historical standards and, arguably, not fully reflective of higher inflation expectations. Japan is a unique case, as the country has suffered from deflationary pressures for decades. In 2016, the Bank of Japan announced a novel policy called “Quantitative and Qualitative Monetary Easing (QQE) with Yield Curve Control”, which entailed targeting the nominal yield of 10-year Japanese government bonds to around 0.0%. Since then, the Japanese 10-year yield has hovered around 0.0%, as shown in Exhibit 2.

<sup>6</sup> German government debt as measured by month-end 10-year Bund data also declined and made local lows in 2020 (from -0.21% on December 31, 2019 to -0.65% on October 31, 2020), but the all-time low for the 10-year Bund as measured by month-end data was reached prior to the COVID-19 pandemic on August 31, 2019 (-0.74%).

## U.S. Risk-Free Rate and Inflation – Recent Trends and Challenges

Immediately after the outbreak of COVID-19, inflation dropped close to 0% in the U.S. and in other major economies, as global demand for many categories of goods and services dropped abruptly.<sup>7</sup> However, as economies began to recover from the pandemic, a combination of factors has led to a surge in inflation in 2021 through the present. Initially, the Fed attributed the increase in U.S. inflation to temporary factors, primarily driven by the low-price base of 2020 that resulted from the pandemic-related recession. However, inflation proved to be more than transitory in the United States. Factors such as increased consumer demand for goods and services (driven in part by pent-up demand coupled with unprecedented levels of government fiscal stimulus), labor shortages, and global supply chain bottlenecks stemming from COVID-19 have all contributed to upward pricing pressures. More recently, both the U.S. consumer price index (CPI) inflation and the core inflation have reached near 40-year highs (see Exhibit 3).

**Exhibit 3: 12-Month Percentage Change in U.S. CPI Inflation vs. U.S. Core Inflation**

January 1982 – February 2022\*



Source of underlying data: U.S. Bureau of Labor Statistics. CPI for All Urban Consumers (CPI-U), not-seasonally adjusted series. \*March 2022 data was unavailable when we issued our guidance effective April 7, 2022. Subsequently, the March 2022 CPI inflation and core inflation were published, reaching even higher levels of 8.5% and 6.5%, respectively.

What is different about the latest bout of inflation is that price increases are broad-based and not limited to volatile items such as food and energy. Despite the relatively wide fluctuations in U.S. CPI inflation observed after the 2008 Global Financial Crisis, U.S. core inflation generally hovered around the Fed's 2.0% target. That is no longer the case since mid-2021.<sup>8</sup>

This trend is not unique to the United States. Recent inflation figures for Canada, the U.K. and the Eurozone are also at multi-decade highs, although still below the levels observed in the U.S.

<sup>7</sup> For example, in the U.S. the 12-month rolling inflation rate decreased from 2.3% at the end of February 2020 to 0.12% by the end of May 2020.

<sup>8</sup> The personal consumption expenditures (PCE) price index is the Fed's preferred measure of inflation. However, the upward trends have been similar for PCE, CPI and core inflation measures.

For example, in Canada consumer prices increased 5.7% year-over-year as of February 2022, the largest gain in over 30 years.<sup>9</sup> Similarly, in the U.K. CPI inflation rose by 6.2% in February 2022, the highest 12-month inflation rate in the U.K.'s Office of National Statistics (ONS) series, which began in January 1997, and the highest rate in 30 years using an historic modeled series.<sup>10</sup>

In the Eurozone, statistics only begin in 1997, just prior to the creation of the euro on January 1, 1999. Consumer price inflation in both the Eurozone and the European Union (EU) is measured using the Harmonized Index of Consumer Prices (HICP), which differs from indications using a national CPI index.<sup>11</sup> The objective of using a “harmonized” methodology is to ensure that data from all the countries in the EU can be compared with each other. Harmonized inflation for the Eurozone reached 5.9% in February 2022, the highest on record.<sup>12</sup> Preliminary (flash) estimates for March 2022 pointed to an even-higher record of 7.5%.<sup>13</sup> Notably, Germany – the largest economy in the Eurozone – saw February harmonized inflation rise to 5.5%, but March preliminary estimates suggest a surge to 7.6%. Also, according to Germany's Federal Statistical Office (Destatis), German's preliminary inflation estimates for March 2022 reached 7.3% using a CPI-based measure, which would be a 40-year high, if confirmed.<sup>14</sup>

The recent Russia-Ukraine conflict has placed further pressure on an already-strained global supply chain. Severe economic sanctions imposed against Russia and the economic destruction in Ukraine have contributed to a significant rise in the prices of oil, gas and other commodities such as precious metals (e.g., palladium, platinum, silver, gold), base metals (e.g., aluminum, nickel) and agricultural products (e.g., fertilizer, wheat). Ukraine and especially Russia are large producers of some of these commodities and the current conflict is further exacerbating global supply chain shortages and adding to inflationary pressures. In the short run, the conflict may have a bigger impact on inflation in Europe than in the U.S.

**The recent Russia-Ukraine conflict has placed further pressure on an already-strained global supply chain.**

<sup>9</sup> Source: Statistics Canada, “Consumer Price Index, February 2022”, released on March 16, 2022 and accessible here: <https://www150.statcan.gc.ca/n1/daily-quotidien/220316/dq220316a-eng.htm>. The last time Canada consumer prices increased 5.7% or more on a year-over-year basis was August 1991 (6.0%). After the writing of this alert, the Canadian CPI rose to an even higher 6.7% as of March 2022.

<sup>10</sup> Source: Office for National Statistics, “Consumer price inflation, UK: February 2022”, released on March 23, 2022 and accessible here: <https://www.ons.gov.uk/economy/inflationandpriceindices/bulletins/consumerpriceinflation/february2022>. The March 2022 CPI, which was released after the writing of this alert, climbed to 7.0%.

<sup>11</sup> For more information, visit: <https://ec.europa.eu/eurostat/web/hicp/faq>.

<sup>12</sup> Source: Eurostat database, “prc\_hicp\_manr” series, last updated on April 4, 2022. Accessible here: <https://ec.europa.eu/eurostat/web/hicp/data/database>.

<sup>13</sup> Preliminary indications may change when final figures are available. Source: Eurostat, “Flash estimate - March 2022 – Euro area annual inflation up to 7.5%”, released on April 1, 2022 and accessible here: <https://ec.europa.eu/eurostat/documents/2995521/14442438/2-01042022-AP-EN.pdf/ba153bc6-c1aa-f6e5-785b-21c83f5319e5>.

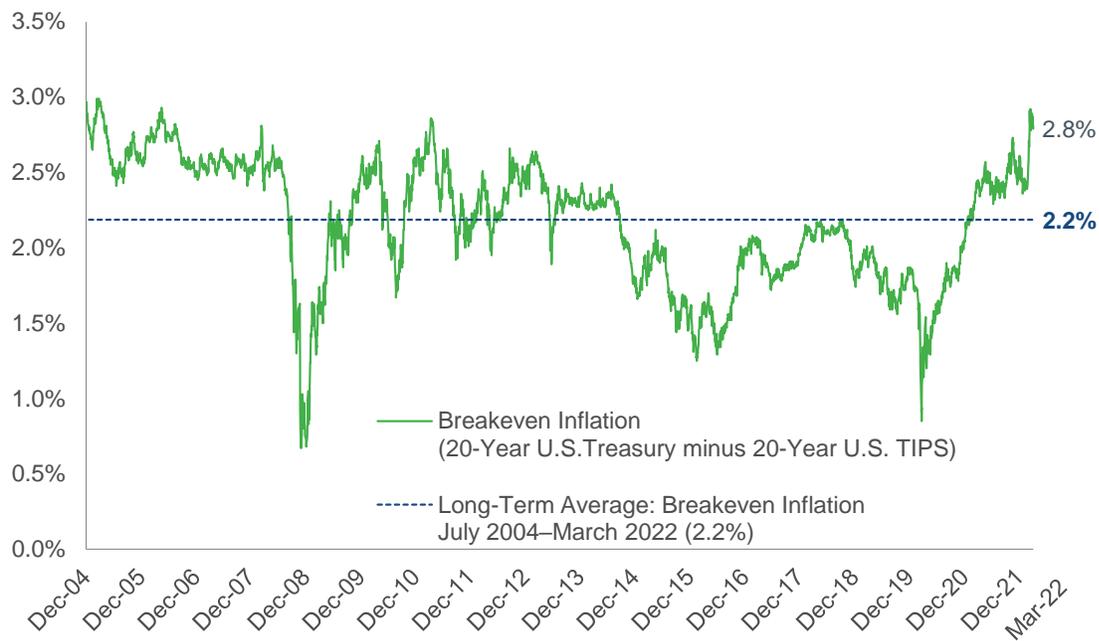
<sup>14</sup> Source: Destatis Statistisches Bundesamt, “Expected inflation rate for March 2022: +7.3%”, released on March 30, 2022 and accessible here: [https://www.destatis.de/EN/Press/2022/03/PE22\\_137\\_611.html;jsessionid=FBAA821B9AED84449DC0763F90341B29.live](https://www.destatis.de/EN/Press/2022/03/PE22_137_611.html;jsessionid=FBAA821B9AED84449DC0763F90341B29.live) 721. Also, see “German inflation rises more than expected in March”, Reuters, March 30, 2022, <https://www.reuters.com/world/europe/german-inflation-rises-more-than-expected-march-2022-03-30/>.

The question is whether these recent trends will change economists' and market participants' views on long-term inflation expectations. Until recently, long-term U.S. inflation expectations remained anchored at just above 2.0%. Exhibit 4 shows the 20-year "breakeven inflation", which is defined as the expected inflation implicit in the difference between nominal and inflation-indexed (i.e., real) yields for 20-year U.S. government bonds.<sup>15</sup> This may be seen as a possible measure of investor expectations for long-term inflation.

Using a breakeven inflation measure at the end of March 2022 implied an annualized average expected U.S. inflation of approximately 2.8% over the next 20 years, which is higher than long-term expected inflation from economic projections discussed in the next section.

**Exhibit 4:** Daily Breakeven Inflation Implied from 20-Year (Nominal) U.S. Treasury Constant-Maturity Bond Yields and 20-Year Treasury Inflation-Protected Securities (TIPS) Yields

July 2004 – March 2022



Source of underlying data: Federal Reserve.

<sup>15</sup> Breakeven inflation is a measure of market expected inflation calculated as the difference between nominal and inflation-indexed government securities. It is sometimes referred to as market implied inflation or market expected inflation.

There are some shortcomings in using breakeven inflation as a proxy for long-term inflation expectations.<sup>16</sup> Changes (sometimes significant) in breakeven inflation rates are not uncommon in times of crises. This phenomenon was observed in the U.S. in the aftermath of the 2008 Global Financial Crisis and at the onset of COVID-19 outbreak in March 2020, where the 20-year breakeven inflation reached lows of 0.7% and 0.9%, respectively. In addition, several academic studies have pointed out that the breakeven inflation is an imperfect measure of expected inflation because it ignores the presence of inflation risk premia in nominal yields (which can be negative or positive) and illiquidity premia common in inflation-indexed bonds. Inflation risks and illiquidity premia vary over time.<sup>17</sup> Nonetheless, it is informative that market-based inflation expectations rose gradually since the low in March 2020 – at the height of the COVID-19 crisis – and were back to the long-term average of 2.2% in January 2021. Since Russia’s invasion of Ukraine on February 24, 2022, market expectations of U.S. long-term inflation have accelerated.

## Methods of Estimating a Normalized Risk-free Rate

**During periods in which risk-free rates appear to be abnormally low due to flight-to-quality or massive central bank monetary interventions, valuation analysts may want to consider normalizing the risk-free rate.**

By “normalization” we mean estimating a risk-free rate that more likely reflects the sustainable average return on long-term bonds issued by governments considered “safe” (typically, those rated AAA by major rating agencies).

Estimating a normalized risk-free rate can be accomplished in a number of ways, including (i) simple averaging, and (ii) various “build-up” methods.

**The first method** of estimating a normalized risk-free rate entails calculating averages of yields to maturity on long-term government securities over various periods. This method’s implied assumption is that government bond yields revert to a longer-term mean.

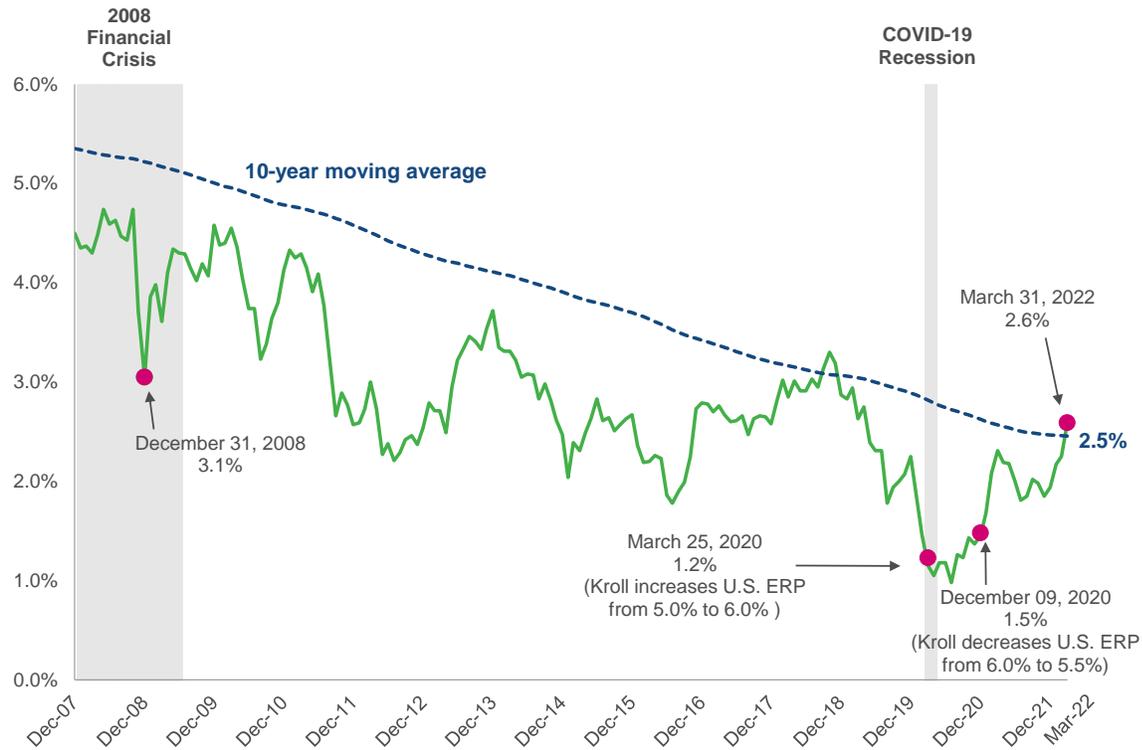
Exhibit 5 illustrates how the 20-year U.S. Treasury yield – a typical proxy for the risk-free rate in U.S. dollars – and its 10-year trailing (moving) average have evolved from December 2007 through March 2022. During this period, the 20-year yield surpassed its 10-year moving average only twice: briefly in September 2018, and then again in March 2022.

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<sup>16</sup> Refer to the following research highlighting the shortcomings of using breakeven inflation as an indication of long-term inflation: Bauer, Michael D., and Glenn D. Rudebusch (2015), “Optimal Policy and Market-Based Expectations”, FRBSF Economic Letter 2015-12 (April 13); and Christensen, Jens H.E. and Jose A. Lopez (2016), “Differing Views on Long-Term Inflation Expectations”, FRBSF Economic Letter 2016-11 (April 4).

<sup>17</sup> For an overview of this concept and a summary of academic literature addressing this issue, see for example Church, Jonathan, “Inflation expectations and inflation realities: a comparison of the Treasury Breakeven Inflation curve and the Consumer Price Index before, during, and after the Great Recession”, BLS Monthly Labor Review, December 2019, available here: <https://www.bls.gov/opub/mlr/2019/article/pdf/inflation-expectations-and-inflation-realities.pdf>. Or review a more formal research paper by the same author: “Market-Based Inflation Expectations and Inflation Realities: A Comparison of the Treasury Breakeven Inflation (TBI) Rate Curve and the Consumer Price Index before, during, and after the Great Recession”, BLS Working Paper 511, February 2019, available here: <https://www.bls.gov/osmr/research-papers/2019/pdf/ec190010.pdf>.

**Exhibit 5: Spot and 10-Year Moving Average of Yields on U.S. 20-Year U.S. Government Bonds**  
 December 31, 2007 – March 31, 2022



Source of underlying data: Capital IQ, NBER.

The late 2018 and the current environment share some common traits. Back in September 2018, the fact that the spot yield rose above its 10-year moving average was initially a sign that investors expected long-term interest rates to start moving upwards, closer to historical levels. As background, after a nearly 10-year period with only one interest rate hike (December 2015), the Fed had finally embarked on a path of monetary policy normalization: between December 2016 and December 2018, the Fed raised the target range for its benchmark short-term interest rate (the federal funds rate) eight times, to arrive at a target range between 2.25% and 2.50%.<sup>18</sup> In addition, the Fed had begun unwinding its portfolio of U.S. Treasuries, MBS, and agency debt. This gradual unwinding process, known as “quantitative tightening” (or “QT”) began in October 2017.<sup>19</sup>

<sup>18</sup> The Fed kept a zero-interest-rate policy (dubbed “ZIRP” in the financial press) for seven years, from December 2008 until December 2015. For a history on Fed interest rate rates, visit: <https://www.federalreserve.gov/monetarypolicy/openmarket.htm>.

<sup>19</sup> For a timeline of the QT program, refer to Engemann, Kristie M, “What Is Quantitative Tightening?”, July 17, 2019, Open Vault Blog, Federal Reserve Bank of St. Louis. Available here: <https://www.stlouisfed.org/open-vault/2019/july/what-is-quantitative-tightening>.

However, shortly after equity markets had peaked in September 2018, the 20-year yield started to decline again, ending the year at 2.9% – below its 10-year moving average (at the time) of approximately 3.1%. With the Fed’s rise of its benchmark policy rate and consequent upward pressure on short term rates, the spread between short and long-term rates started to compress. This flattening of the yield curve stoked renewed fears that it could potentially be a signal or precursor to a U.S. recession. Equity markets reacted badly, and the S&P 500 index ended 2018 with a negative 6.2% price return. The Fed reversed course on its path to normalization and later in 2019 decreased its benchmark policy rate three times. In addition, the Fed halted the QT of its balance sheet in August 2019, earlier than previously announced. When the Fed began implementing its QT run-off, the total assets on its balance sheet were around \$4.5 trillion in size (see Exhibit 1). Between October of 2017 and August 2019, the Fed only managed to decrease its balance sheet to \$3.8 trillion, before it ended its QT program.

For the second time since the 2008 Global Financial Crisis, the Fed is embarking in the process of normalizing its monetary policy by raising its benchmark policy rate and by reducing the size of its balance sheet, which stood at nearly \$9.0 trillion at the end of March 2022. The significant difference from 2018 is the impact that the 40-year high inflation levels will have on the pace and path of normalization. For the 12 months ending December 2018, CPI inflation was 1.9% compared to 7.9% in February 2022, which gives the Fed a lot less room to maneuver.

Inflation has continued to surprise on the upside, which has led to a significant shift in monetary policy stance since December 2021. In early 2022, some Fed officials began speaking publicly about the need to be more aggressive in normalizing the interest rate policy, in response to unexpectedly high inflation readings. On January 12, 2022, James Bullard, President of the Federal Reserve Bank of St. Louis, indicated in an interview that a more hawkish path for monetary policy was needed relative to his recent expectations, meaning that more interest rates were needed and faster than previously projected.<sup>20</sup> At the end of its January 25–26 meeting, the Federal Open Market Committee (FOMC) stated that a rate hike in March was likely (with more were expected to come) and announced the end of QE expansion of its balance sheet (due to high inflation).<sup>21</sup> Since then, other Fed officials have followed suit with progressively more hawkish statements. For perspective, Exhibit 6 shows (i) the median personal consumer expenditures (PCE) inflation projected for 2022, (ii) projected number of rises for the federal funds rate in 2022, and (iii) Fed balance sheet policy, as provided at the FOMC meetings of December 2021 and March 2022. As of December 2021, FOMC members generally expected four 0.25% rate rises in 2022 and that the target federal funds rate would reach 0.9% by the end of 2022. By March 2022 FOMC members had significantly changed their

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<sup>20</sup> Derby, Michael, “Fed’s Bullard: Four Interest Rate Rises in 2022 Now Appear Likely”, January 12, 2022, The Wall Street Journal. Accessible here: <https://www.wsj.com/articles/fed-s-bullard-four-interest-rate-rises-in-2022-now-appear-likely-11642017785>.

<sup>21</sup> The Fed has the responsibility for setting monetary policy in the United States. To do so, the Fed controls the three tools of monetary policy: open market operations, the discount rate, and reserve requirements. The Board of Governors of the Federal Reserve System is responsible for setting the discount rate and reserve requirements, while the FOMC is the committee charged under U.S. law with overseeing the nation’s open market operations (i.e., the Fed’s buying and selling of U.S. Treasury securities). To learn more about the FOMC, visit: <https://www.federalreserve.gov/monetarypolicy/fomc.htm>.

outlook, and generally expected eight 0.25% rate rises in 2022, with the year-end 2020 target federal funds rate reaching 1.9%, a full 100 basis points (b.p.) above the median expectations just three months earlier.

**Exhibit 6:** FOMC Projected 2022 PCE Inflation, Projected Number of Federal Funds Rate Hikes in 2022, and Balance Sheet Impact of QE vs QT Announcements

December 2021 vs. March 2022 Meeting

FOMC Meeting	Projected 2022 PCE Inflation (Median)	Number of 0.25% Rate Rises in 2022 (Median) *	QE/QT Announcements – Balance Sheet Impact
December 14-15, 2021 <sup>22</sup>	2.6%	4	<b>Quantitative Easing</b> <sup>23</sup> <ul style="list-style-type: none"> <li>Monthly purchases to decelerate beginning in January 2022 to:               <ul style="list-style-type: none"> <li>U.S. Treasury securities = \$40 billion</li> <li>Agency debt / MBS = \$20 billion</li> </ul> </li> <li>Increases in the Fed's balance sheet holdings likely to cease by mid-March, a few months sooner than had been anticipated at the previous FOMC meeting</li> </ul>
March 15-16, 2022 <sup>24</sup>	4.3%	8	<b>Quantitative Tightening</b> <sup>25</sup> <ul style="list-style-type: none"> <li>Fed will begin reducing holdings of U.S. Treasury securities and agency debt / MBS, at a pace to be announced in a coming meeting.</li> <li>FOMC meeting participants agreed that a more rapid pace of balance sheet runoff is appropriate relative to the QT program implemented in 2017–2019.</li> </ul>

\* Number of rate rises could be smaller, should the Fed decide to increase rates by larger increments at each meeting (e.g., 0.50%).

While there have been several economists and analysts predicting that the Fed's current accelerated plans to raise rates will lead to a recession (or to a period of 'stagflation', where the economy experiences sluggish or no growth, accompanied by high inflation), the central bank seems to have little choice if it wants to bring inflation under control.

<sup>22</sup> Source: "Summary of Economic Projections", December 15, 2022, released as part of the December 14-15, 2022 FOMC meeting. Economic projections are based on individual assumptions provided by Fed members and Federal Reserve Bank presidents.

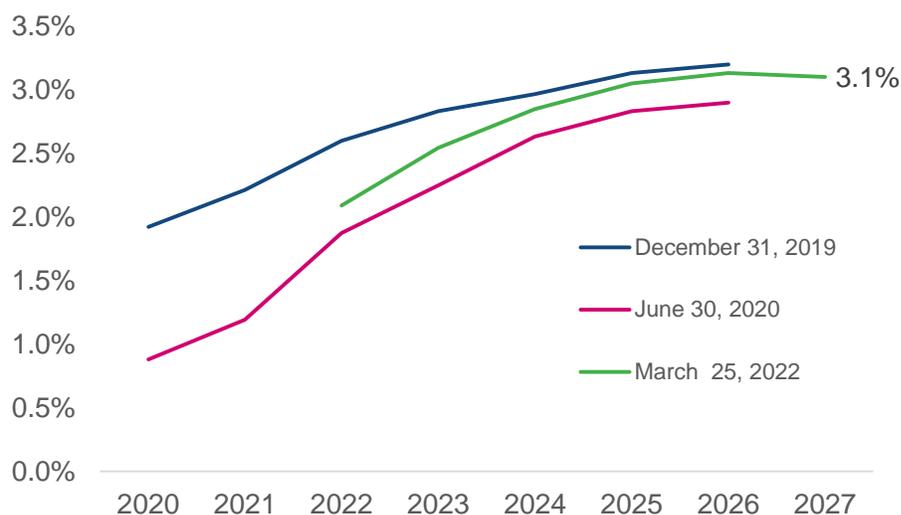
<sup>23</sup> "Minutes of the Federal Open Market Committee", December 14-15, 2021. Available here: <https://www.federalreserve.gov/monetarypolicy/fomcminutes20211215.htm>.

<sup>24</sup> Source: "Summary of Economic Projections", March 16, 2022, released as part of the March 15-16, 2022 FOMC meeting. Economic projections are based on individual assumptions provided by Fed members and Federal Reserve Bank presidents. Available here: <https://www.federalreserve.gov/monetarypolicy/files/fomcprojtab120220316.pdf>.

<sup>25</sup> "Minutes of the Federal Open Market Committee", March 15-16, 2022. Available here: <https://www.federalreserve.gov/monetarypolicy/fomcminutes20220316.htm>.

Economists and professional forecasters have revised their expectations for long-term yields accordingly. Exhibit 7 displays how year-end consensus expectations for the 10-year U.S. Treasury yield have shifted from pre-COVID (in December 2019, shown by the dark blue line), through the height of the pandemic when we lowered our U.S. normalized risk-free rate (in June 2020, shown by the magenta line), until March 2022 (in the green line). In March 2022, the average expectations for the 10-year Treasury yield reached 3.1% in 2027. Historically, the 20-year U.S Treasury yield has (on average) exceeded the 10-year yield. Economists call this difference a term premium. Based on the latest consensus forecasts in Exhibit 7, this would imply that by 2027 the 20-year would be expected to exceed 3.1%.

**Exhibit 7:** Comparison of (Average) Projected 10-Year U.S. Government Bond Yields  
December 2019, June 2020, and March 2022



Sources of Underlying Data: Blue Chip Economic Indicators, Blue Chip Financial Forecasters, Consensus Economics, Livingston Survey, and Survey of Professional Forecasters.

If we use a long-term moving average for the yield on 20-year U.S. Treasury bonds to estimate the normalized risk-free rate as of March 31, 2022, the trailing (or moving) 10-year average was 2.5% (see Exhibit 5). In contrast, the corresponding spot yield on March 31, 2022 was 2.6%. However, based on the developments described above, this method likely underestimates the future 20-year yield. Taking the average over the last 10 years is a simple way of “normalizing” the risk-free rate. An issue with using historical averages, though, is selecting an appropriate comparison period that can be used as a reasonable proxy for the future.

**The second method** of estimating a normalized risk-free rate entails using a simple build-up method, where the components of the risk-free rate are estimated and then added together. Conceptually, the risk-free rate (in nominal terms) can be (loosely) illustrated as the return on the following two components:

$$\text{Risk-Free Rate} = \text{Real Rate} + \text{Expected Inflation}$$

Academic researchers and economic analysts have proposed a number of explanations for the secular (i.e., not cyclical or temporary) decline in global real interest rates, which they argue precedes the onset of the 2008 Global Financial Crisis. The following are some of the most-often-cited factors:

- Lower global long-run output and productivity growth
- Shifting demographics (aging population leading to slower labor force expansion)
- Global “savings glut”
- Safe asset shortage (increased demand for safe-haven assets, accompanied by a declining supply)

More recently, some economists and analysts have posited that the post-pandemic recovery may have reversed some of these trends, at least temporarily (e.g., there is less support for a global savings glut explanation). Whether this will have an ultimate impact on reversing the downward trends in real rates remains to be seen.

In Exhibit 8, we display the spot 20-year U.S. Treasury yield and its long-term (10-year) trailing average as of March 31, 2022. We also summarize long-term real rate estimates and inflation expectations for the United States at the end of March 2022, based on data assembled from a variety of sources. Both methods were used to arrive at our concluded normalized U.S. risk-free rate as of March 31, 2022.

**Exhibit 8:** Long-Term, Spot and Normalized Risk-Free Rates for the United States as of March 31, 2022

<b>Method 1: Long-Term Average</b>		
<u>20-Year U.S. Government Securities:</u> <sup>26</sup>		
- Spot Rate		2.6%
- Long-Term (10-year) Trailing Average Yield		2.5%
<b>Method 2: Fisher Equation</b>		
	<b>Range</b>	<b>Median</b>
Estimated Long-term Real Risk-Free Rate <sup>27</sup>	-1.1% to 2.0%	0.6%
Expected Long-term Inflation <sup>28</sup>	1.9% to 3.0%	2.5%
<b>Range of Estimates</b>	<b>0.9% to 5.0%</b>	<b>NMF</b>
<b>Midpoint</b>	<b>2.9%</b>	<b>3.1%</b>
<b>Concluded Normalized Risk-free Rate</b>		<b>3.0%</b>

<sup>26</sup> Source of underlying data: Capital IQ.

<sup>27</sup> For a list of the academic paper references used to arrive at the real rate estimates, please click [here](#).

<sup>28</sup> Source of underlying data: Blue Chip Economic Indicators (March 10, 2022); Blue Chip Financial Forecasts (March 1, 2022 and December 1, 2021); "Consensus Forecasts – Surveys of International Economic Forecasts", Consensus Economics (Survey Dates: October 11, 2021 and March 14, 2022); "Comparative World Overview Tables", IHS Markit (March 15, 2022); "The Livingston Survey", Federal Reserve Bank of Philadelphia (December 17, 2022); "Country Economic Forecast – United States", Oxford Economics (March 9, 2022); "Survey of Professional Forecasters – First Quarter 2022", Federal Reserve Bank of Philadelphia (February 11, 2022), Federal Reserve Bank of Cleveland (March 2022); "Aruoba Term Structure of Inflation Expectations", Federal Reserve Bank of Philadelphia (March 2022); the University of Michigan Inflation Expectations (March 2022).

The U.S. long-term inflation expectations (using Method 2) represent a higher range relative to prior Kroll analyses. In particular, the median long-term inflation expectation is now a full 50 b.p. higher at 2.5% compared to the median of 2.0% estimated back in June 2020 when we lowered our U.S. normalized risk-free rate. Based on recent market evidence of a higher long-term inflation expectations for the U.S., **we increased our concluded U.S. normalized risk-free rate from 2.5% to 3.0% for valuation dates as of April 7, 2022 and thereafter**, until further guidance is issued. This rate is to be used with a Recommended U.S. ERP of 5.5%, implying a base U.S. cost of equity capital of 8.5% (= 3.0% + 5.5%). However, given how fast U.S. inflation expectations are rising, the current guidance could be changed again in the near future.

We performed a similar analysis (Methods 1 and 2) to arrive at normalized risk-free rates as of March 31, 2022 for Canada, Germany and the U.K., but long-term expected inflation for these countries has not moved upwards sufficiently to support an increase in their respective normalized risk-free rates at this time. As result, we have reaffirmed the normalized risk-free rates for Germany at 1.5%, and for the U.K. and Canada at 2.5% as of April 7, 2022 and thereafter, until further guidance is issued. However, longer-term impacts of the Russia-Ukraine war and the continued global supply bottlenecks and labor shortages on prices may cause long-term inflation projections for these countries to increase. At that point, which could be in the near future, we would revise our normalized risk-free rate for these countries. We will closely monitor developments in this area.

## Conclusion

There are several risk factors and sources of uncertainty that may impact the shape of the global economic recovery and the pattern of behavior by financial markets over the next few months:

- Geopolitical risks
- Resurgence of COVID-19 cases
- Inflationary pressures
- Global supply chain disruptions
- Labor shortages
- Rising interest rates
- Unwinding of fiscal stimulus to deal with government deficits created by COVID-19

Based on market conditions prevailing at the end of March 2022, we found sufficient support for an **increase of the U.S. normalized risk-free rate from 2.5% to 3.0%, when developing USD-denominated discount rates as of April 7, 2022 and thereafter, until further guidance is issued. This rate is to be used with a reaffirmed Kroll Recommended U.S. ERP of 5.5%, implying a base U.S. cost of equity capital of 8.5% (= 3.0% + 5.5%).** However, given how fast U.S. inflation expectations are rising and how financial markets are behaving, the current guidance could be changed again in the near future.



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