White Paper
Multi-Asset Solutions

August 2020

Portfolio Protection — Rethinking the Role of Government Bonds

Jeremy de Pessemier, CFA
Investment Strategist
Investment Strategy and Research, EMEA

Desmond Lawrence
Investment Strategist
Investment Strategy and Research, EMEA

STATE STREET GLOBAL ADVISORS

Contents

03 **Introduction**

04 **Government Bonds — The Traditional Safe Harbour**

07 **Drawbacks of Government Bonds as a Diversifier**

10 **Considerations for the Future — A Scenario-Based Approach**

10 Scenario 1 — Growth Shock with Low Inflation
12 Scenario 2 — Inflation Shock or Sustained Higher Inflation

15 **Conclusion**

Introduction

The traditional 60/40 investment portfolio of equities and bonds has worked well for investors for a long time. For much of the last 15 years, the environment that has afforded this success has been driven by central bank actions such as ultra-low interest rates and quantitative easing.

But in a world where pandemic concerns have upended the economic backdrop and bond yields are increasingly negative, it makes sense that investors should reconsider traditional thinking and question whether they should expand the range of assets that can act as "safe havens" in their portfolios to include gold, inflation-linked bonds and currencies.

In this paper, we look at how government bonds have performed as a diversifying asset and consider how investors might utilise alternative investments to help protect portfolios during periods of upheaval.

Government Bonds — The Traditional Safe Harbour

While the returns of individual assets are never perfectly correlated to one another, high quality government bonds have long been a reliable diversifier for equity risk in multi-asset portfolios.

What is a "Safe Haven" Asset?

At the outset, it is worth defining what constitutes a "safe haven" asset. In the traditional sense, an asset is considered "safe" if it serves as a store of value; i.e., is expected to retain or increase its value during times of uncertainty or market turbulence. Such assets tend to have a low or negative correlation to risky assets.

These assets tend to be liquid and capable of being readily traded without substantially moving prices.

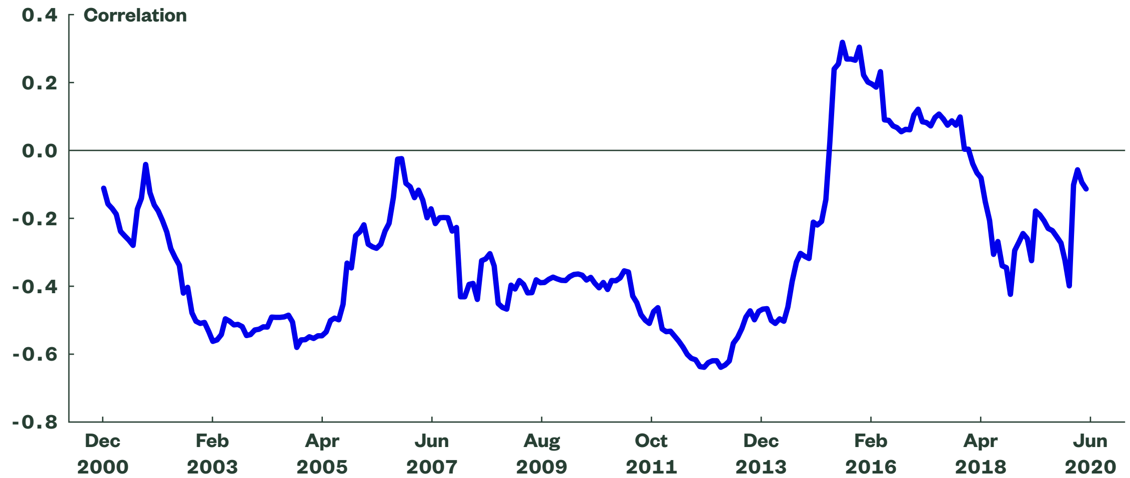
The accepted trade-off for owning a safe haven asset in a portfolio is that investors forego some of the higher expected returns from risky assets, like stocks, in return for a greater degree of capital security.

High Quality Bonds — The Traditional Diversifier

Diversification across assets is important in the construction of resilient portfolios. The returns of individual assets are less than perfectly correlated to one another, meaning that through diversification, an investor receives the benefit of reduced expected risk without necessarily having to sacrifice expected returns.

For many multi-asset investors, high-quality government bonds have been a reliable diversifier for equity risk. As Figure 1 shows, the correlation between eurozone equities and German Bunds has been negative for the bulk of the past two decades.

Figure 1
Rolling 3-year Correlations: German Government Bonds vs. Eurozone Equities



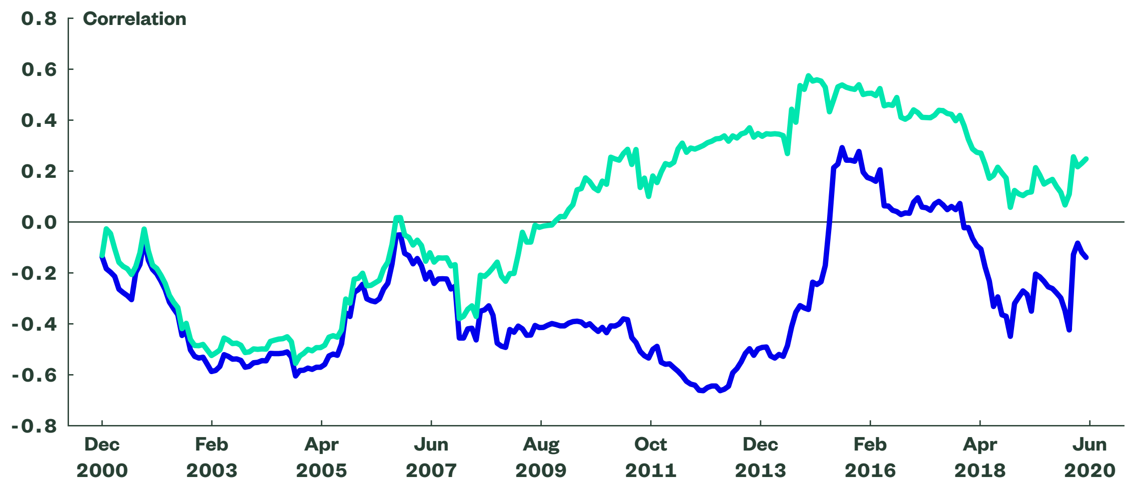
Source: Bloomberg Finance L.P., as at 30 June 2020. Past performance is not a guarantee of future returns. German Bonds = ICE BofA German Govt Bond Index. Eurozone Equities = FTSE Eurozone Index.

Eurozone equities and German government bonds have both generated positive average annual returns over the last 20 years (to June 2020). It may thus seem strange to state that government bonds have helped diversify a portfolio of shares. In fact, while exceptionally loose monetary policy has driven a wide variety of financial asset prices higher in recent years, they have not always risen simultaneously. Market sentiment has moved in waves, with general optimism interspersed with bouts of extreme pessimism as investors questioned central banks' ability to first reignite, and then sustain, economic growth. Through this period, developed market government bonds offered both diversification and excess return as interest rates were suppressed and central bankers adopted a "whatever it takes" mentality.

Not All Government Bonds are Created Equal

The recent COVID-19 health crisis acts as a reminder that not all eurozone government bonds serve as an equally reliable diversifier of risk in balanced portfolios, given country-specific debt and deficit issues. Indeed, while the actions of the European Central Bank (ECB), coupled with apparently stronger resolve amongst EU leaders to tackle the euro area crisis, helped to remove some of the systemic risk that paralysed markets from late 2011 into the autumn of 2012, idiosyncratic risks remain (Figure 2).

Figure 2
Rolling 3-year Correlations: German and Italian Government Bonds vs. Eurozone Equities

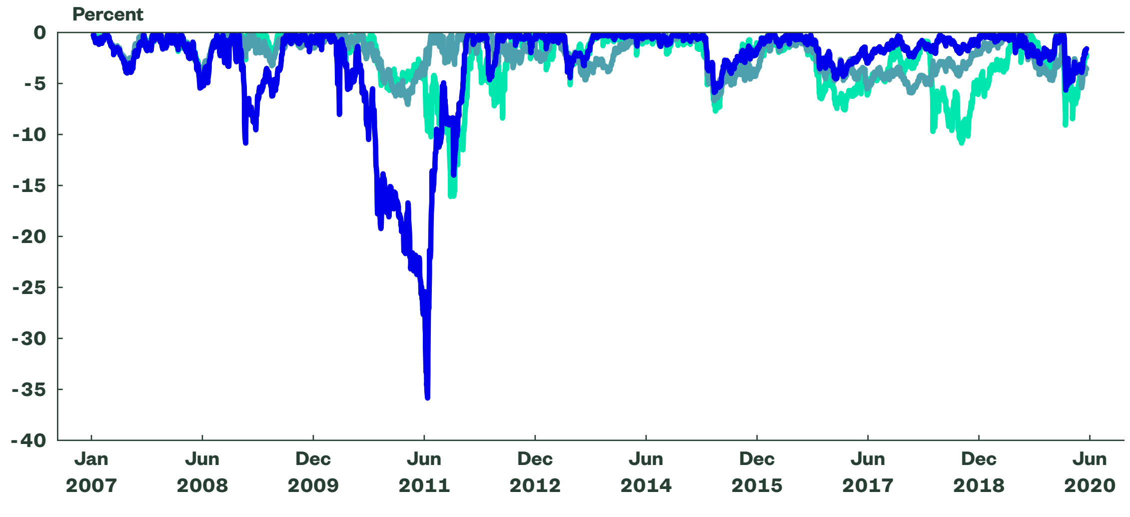


German Gov Bonds vs. Eurozone Equities
Italian Gov Bonds vs. Eurozone Equities

Source: Bloomberg Finance L.P., as at 30 June 2020. Past performance is not a guarantee of future returns. German Bonds = ICE BofA German Govt Bond Index. Italy Bonds = Bloomberg Barclays Italy Govt All Bonds Index. Eurozone Equities = FTSE Eurozone Index.

These country-specific characteristics need to be considered. In general, we would expect peripheral eurozone sovereign yields to remain higher and more volatile than core yields. One way to view such country-specific risk is to consider drawdowns (Figure 3). Investors in Irish and Italian (and other peripheral issuers) government bonds witnessed deep drawdowns during the eurozone debt crisis. Clearly, much has changed since those days, but domestic policy risk has not gone away — investors in Italian sovereign debt got a reminder of this in late 2018 and again in recent months as COVID-19 raised concerns about debt sustainability.

Figure 3
Drawdowns: German Government Bonds vs. Italian and Irish Government Bonds



- Bloomberg Barclays Ireland Gov All Bonds Total Return
- Bloomberg Barclays Italy Gov All Bonds Total Return
- Bloomberg Barclays Germany Gov All Bonds Total Return

Source: Bloomberg Barclays as at 30 June 2020. Past performance is not a guarantee of future returns.

Drawbacks of Government Bonds as a Diversifier

Government bonds have long fulfilled the traditional role of diversification in investment portfolios, offering protection during periods when risk assets have come under pressure. But the relationship has evolved and some drawbacks have become evident.

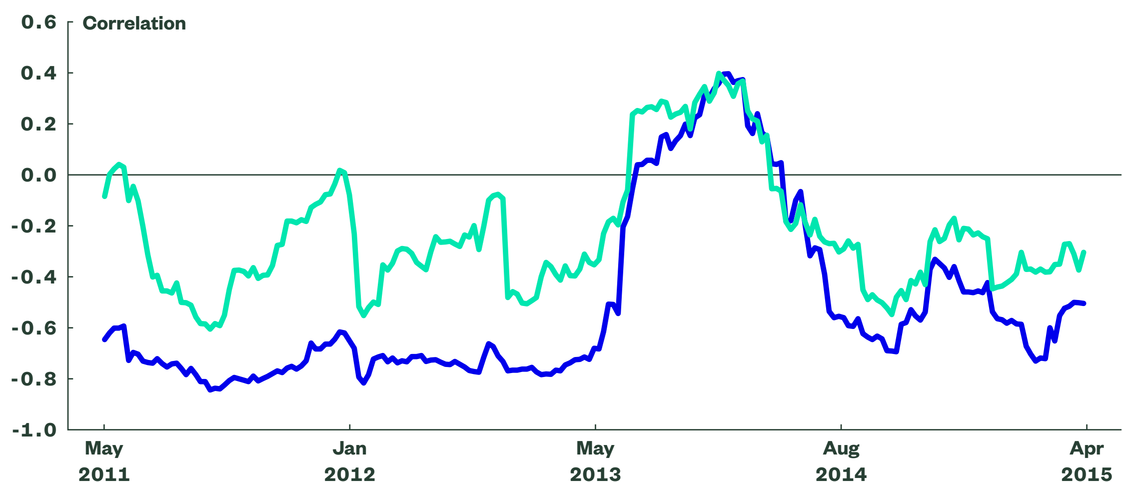
Unstable/Positive Correlations

The danger of relying on bonds as a diversifier became apparent during the 'taper tantrum' in 2013. The Federal Reserve's announcement of future tapering of its quantitative easing policy led to a sharp rise in US Treasury yields, which in turn triggered a steep decline in equity prices.

Figure 4
Equity/Bond Correlation in US and Europe During the Taper Tantrum

Rolling 6-month Correlation (US Market, Weekly Data)

Rolling 6-month Correlation (EU Market, Weekly Data)



Source: Bloomberg Finance L.P. Past performance is not a guarantee of future returns.

Historically, a long position in government bonds would have provided downside protection to a portfolio of risky assets, but in this scenario the opposite happened. Investors were instead left nursing losses on their holdings of both risky and supposedly risk-free assets until the Fed calmed the waters by delaying the start of the taper until the economy was more resilient.

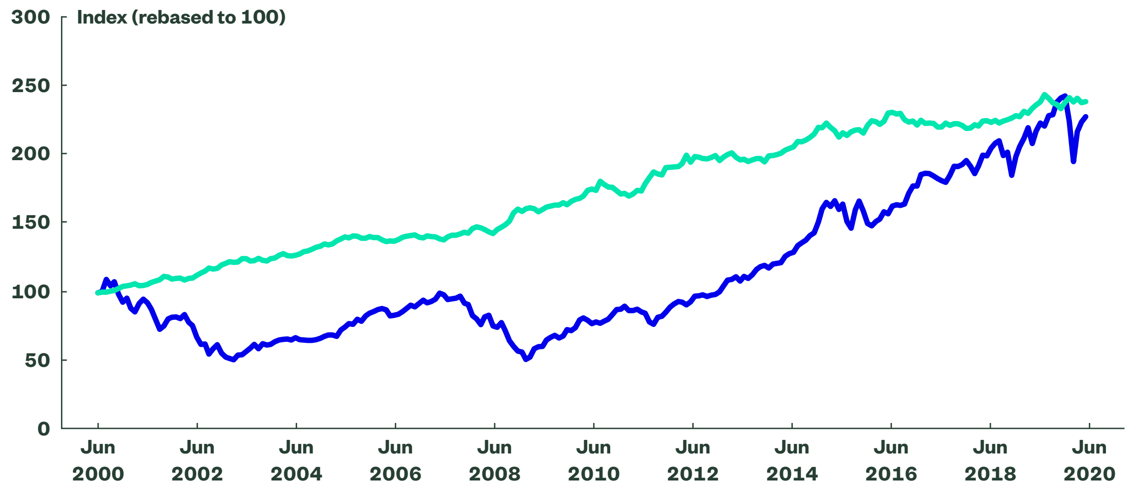
The lesson here is that there is no guarantee that bonds and equities will remain negatively correlated with one another indefinitely. The risk is that holding both equities and bonds leads to a false sense of security that a portfolio is more diversified than it is, as the occasional instability of asset price correlations limits its usefulness.

Low Yields Offer Little Cushion

As already stated, a safe haven asset comes with an opportunity cost — the potential returns foregone by holding it rather than a growth asset. The sheer strength of the bull market in sovereign bonds over the last two decades has somewhat obfuscated this trade-off.

Figure 5

Cumulative Returns — Developed World Equities and German Government Bonds

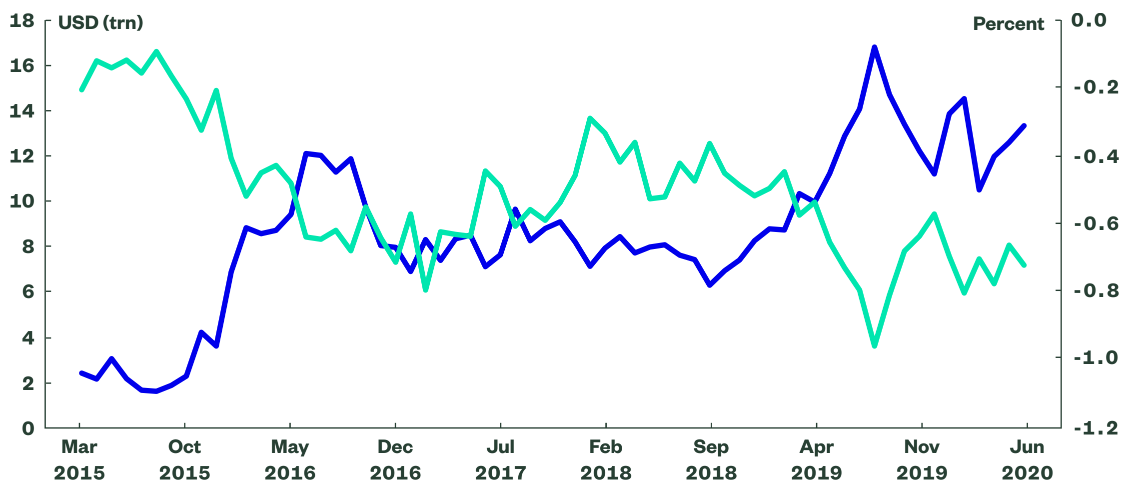


Source: State Street Global Advisors, MSCI, as at 30 June 2020. Past performance is not a guarantee of future returns. German Bonds = ICE BofA German Govt Bond Index. Developed World Equities = FTSE Developed World Index (EUR).

Now that yields are so low, such trade-offs are becoming brutally apparent. With more than $13 trillion of debt offering negative yields as of 30th June 2020, government bonds' long-term ability to function as a "shock absorber" within portfolios has diminished significantly. Indeed, the downside to bond prices is much greater than the upside and for the first time in financial history, some investors are effectively paying to add bonds to a portfolio.

Figure 6

German Gov(<5yr) Yield and Size of Negative Yielding Bond Universe

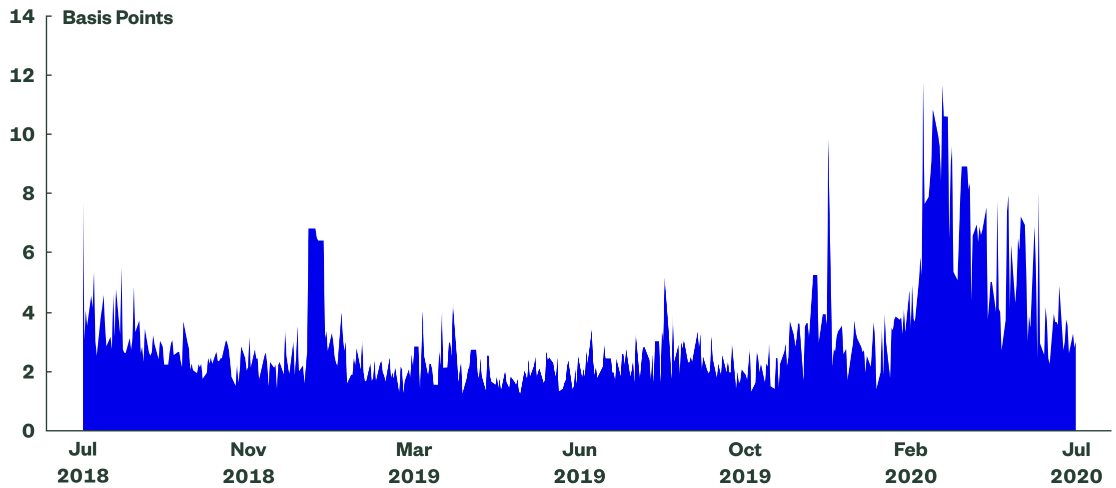


Source: Bloomberg Finance L.P., as at 30 June 2020. Past performance is not a guarantee of future returns.

Liquidity Issues

Another expected characteristic of safe-haven assets is liquidity. While banks have retreated from making markets in corporate bonds because of regulation and capital requirements, market liquidity has become challenged in the government bond space of late. The supply of core eurozone government bonds readily available to market makers is lower today than it was prior to the global financial crisis. To comply with regulations, banks must now store a larger share of high-quality government bonds as collateral against their exposure to derivatives. Meanwhile, the ECB owns well in excess of €500 billion worth of German Bunds — most of them accumulated through bond-buying programs designed to suppress borrowing costs and boost economic growth. As a result, bid-offer spreads can widen significantly through bouts of market stress, as witnessed in March/April during the coronavirus-induced turbulence (Figure 7).

Figure 7
Bid-Offer Price Spread on German 2028 Government Bond



Source: Bloomberg Finance L.P., as at 1 July 2020.

The bid-offer spread on the 10-year German Bund reached nearly four times its long-term average of 3 basis points. Relatively speaking, Bunds remain a true safe haven, but this is a stark reminder that liquidity can get thinner, even in the most liquid markets. This means that it may not be always possible to buy and sell these bonds cheaply and without moving the price.

Such challenges are likely to encourage investors to explore techniques that address equity risk directly. This is especially the case for investors who need to maintain a level of return and liquidity and cannot simply shed equity exposure. While an equity option overlay can offer clear and well-defined protection, it can come at considerable cost in terms of foregone upside, liquidity at longer horizons, market timing risks etc. Systematic exposure management techniques such as Target Volatility Triggers (TVT) and Managed Target Protection (MTP) can offer compelling and cost-effective alternatives. Other investors may wish to maintain nominal equity exposure but change equity sensitivity through Global Defensive Equity or Managed Volatility Equity strategies.

Considerations for the Future — a Scenario-Based Approach

We have thus far outlined the issues that represent a challenge for investors trying to design well-balanced portfolios. They need to be cautious of the risks of relying too heavily on historic correlations that are prone to change. Instead, a scenario-based approach to constructing portfolios, and stress-testing them to see what could happen, might prove more instructive. A more specific and granular approach provides for greater understanding of how sensitive the portfolio is to a rerun of 2008, for example, or a period of prolonged high inflation. We outline two scenarios that may help investors as they consider options to make their investment portfolios more resilient.

Scenario 1 — Growth Shock with Low Inflation

Safe Haven Assets: Government Bonds, Japanese Yen, Swiss Franc and US Dollar.

Government bonds have typically been used as “shock absorbers” in investment portfolios. Since the introduction of the euro, negative growth shocks have consistently been accompanied by a reassertion of lower or negative equity correlations (see correlations pre- and post-global financial crisis (GFC)). This was clearly evident during the global financial crisis when equities plunged while government bonds did very well.

Correlations Pre-GFC (Dec 2004 to Dec 2007)	Eurozone Equities
Eurozone Equities	1.00
German Government Bonds	-0.25
JPYEUR Spot Exchange Rate	-0.32
CHFEUR Spot Exchange Rate	-0.63
USDEUR Spot Exchange Rate	0.27
Gold	0.18

Correlations During and Post-GFC (Dec 2007 to Dec 2012)	Eurozone Equities
Eurozone Equities	1.00
German Government Bonds	-0.50
JPYEUR Spot Exchange Rate	-0.55
CHFEUR Spot Exchange Rate	-0.24
USDEUR Spot Exchange Rate	-0.48
Gold	-0.36

While investors have been unusually well compensated for protecting balanced portfolios by the generous legacy coupons on government bonds, today's meagre or zero coupons often guarantee capital losses if bonds are held to maturity. That said, if central banks continue to be supportive and inflation stays muted, high quality government bonds will remain viable safe haven assets. They will continue to help diversify multi-asset portfolios and offer protection in market downturns by losing less than equities.

Considering other assets traditionally viewed as safe havens in this type of environment, reserve currencies are highly liquid and high-quality instruments that have typically exhibited negative correlation to risk assets in times of stress. The Japanese yen, for example, has often proven to be a good hedge. Japan's net foreign assets (what Japan's residents own abroad minus what they owe to foreigners) are worth about $3tn, or 60% of annual GDP. In a crisis, some of that capital typically comes home, pushing up the yen's value. The Swiss franc and US dollar have similar appeal, as illustrated in the correlations table.

There is downside risk, however. Past form suggests these countries are likely to cap a rise in their currencies by printing more money or by direct market intervention. Indeed, short-term interest rates have been negative for years in Japan, Switzerland and the euro area, in part to deter currency strength.

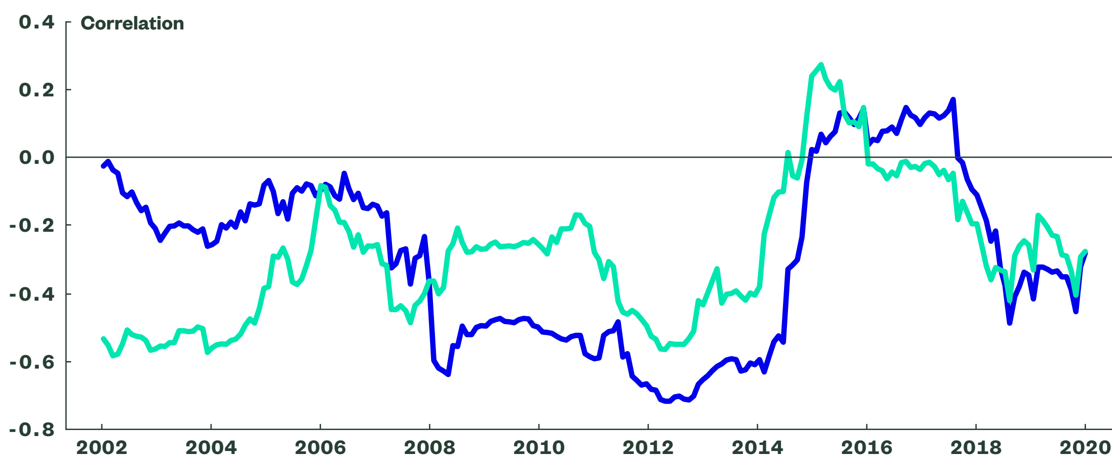
Moreover, global treasury benchmarks tend to provide significant exposure to the US dollar and Japanese yen. While bond investors typically hedge non-base currency exposure due to the higher volatility often associated with foreign currencies, those investors willing and able to expand their risk budget could benefit from an unhedged global treasury exposure that can provide an attractive combination of treasury and currency safe harbours.

Figure 8 highlights a potential misconception in relation to global treasury investing. While a currency-hedged position can help dampen volatility of return, it does not necessarily deliver superior diversification; the average correlation with Eurozone equities is almost identical at -0.3 over the period from December 1999 for both hedged and unhedged global treasury exposures. Moreover, during the GFC and the eurozone debt crisis, the unhedged version provided superior diversification vis-a-vis eurobloc equities. Foreign currency exposure can complement the underlying international term structure exposure — this is perhaps intuitive when one considers the safe haven properties of the USD and JPY from a eurozone investor's perspective.

Figure 8
Rolling 3-year Correlations of Global Treasuries with Eurozone Equities (Dec 2002–Jun 2020)

Global Treasury Unhedged in Euro

Global Treasury Hedged in Euro



Source: Bloomberg Finance L.P., as at 30 June 2020.

Scenario 2 — Inflation Shock or Sustained Higher Inflation

Safe Haven Assets: Inflation-Linked Government Bonds, Gold.

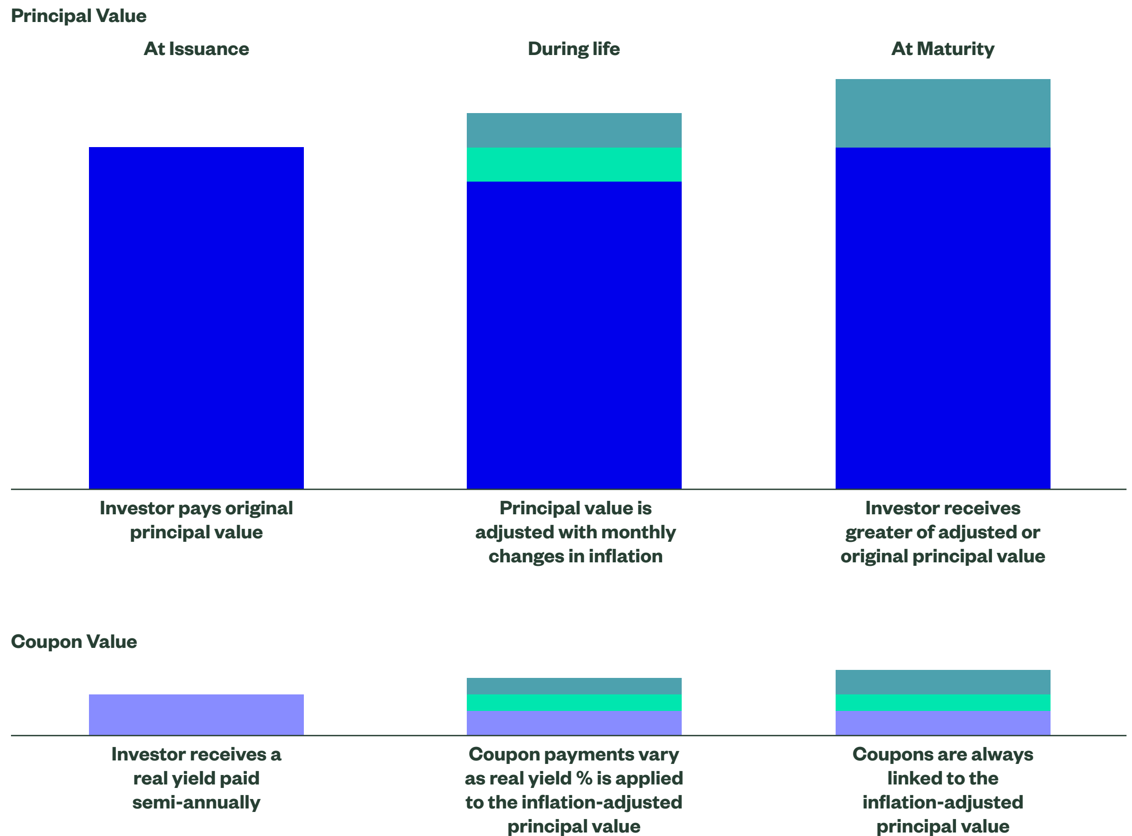
Nominal bonds were favoured as a safe-haven asset during the last twenty years because inflation was subdued and quantitative easing distorted bond markets. But risks invariably exist. What if a policy error occurs or virus-fighting measures choke off production over a prolonged period? Ultimately, ever more extreme monetary and fiscal measures run the risk of triggering inflation. Arguably that could be a desirable outcome for some countries with high debt burdens and poor demographics profiles, as inflation would help reduce the servicing costs and redemption value of the outstanding debt, in real terms. Political expediency and demographic reality are two powerful forces that may, in time, make such a policy highly tempting, if not inevitable, for debtor nations.

With the whole edifice of current asset prices built on the expectation that inflation — and thus interest rates — will stay low, an unexpected rise in inflation ought to be the risk that investors are most determined to guard against. Investors will need to find more creative ways of ensuring their portfolios are sufficiently diversified and protected. High-quality nominal government bonds are among the worst assets to own when inflation strikes, but prudent investors can protect themselves by simply holding more cash or floating rate notes. A logical response by central banks to a surge in inflation would be hikes in short-term interest rates, which in turn would boost the returns on cash and floaters (with a delay).

Inflation-Linked Bonds

In many places, particularly in the eurozone area, cash rates are below current inflation. Hence, a superior way to hedge is to hold inflation-protected securities. By holding such securities to maturity, an investor can receive inflation insurance and be paid a real return — see the charts in Figure 9.

Figure 9
How Inflation-Linked Bonds Work



Source: State Street Global Advisors. For illustrative purposes only.

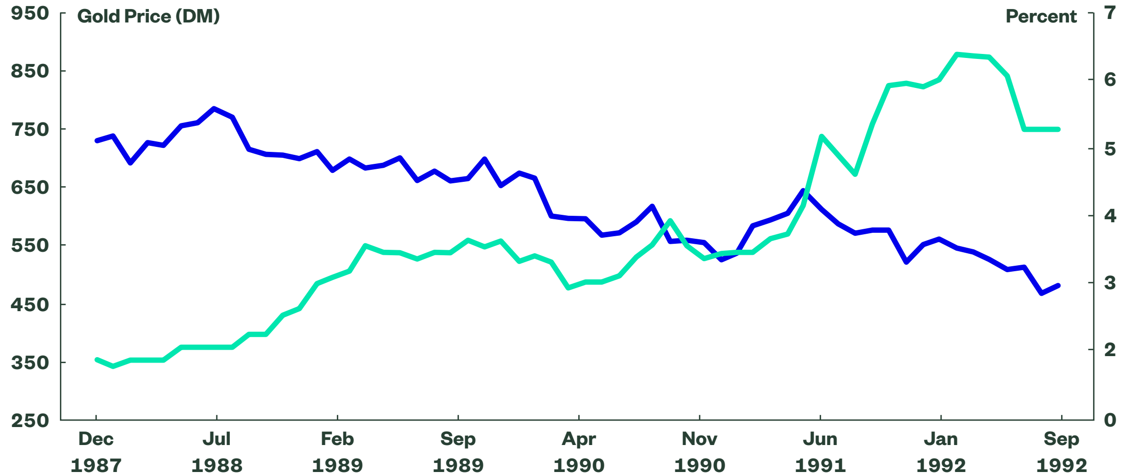
In the event of an inflation shock, the resultant ECB reaction would drive real interest rates higher, which would have a downward effect on the price of inflation-linked bonds. However, that would be more than offset by the combined effect of explicit inflation protection and positive impact of a surge in demand for insurance against higher expected inflation.

Gold

Gold can also be a stabilising asset for portfolios in such an environment. Although gold's historic performance as an inflation hedge has been mixed — for instance, gold prices fell in the late 1980s and early 1990s even as consumer prices were rising — it has been a useful store of value during periods of very high inflation, such as during the 1970s (see Figures 10 and 11).

Figure 10
Gold vs. Inflation in the 1980s and 1990s

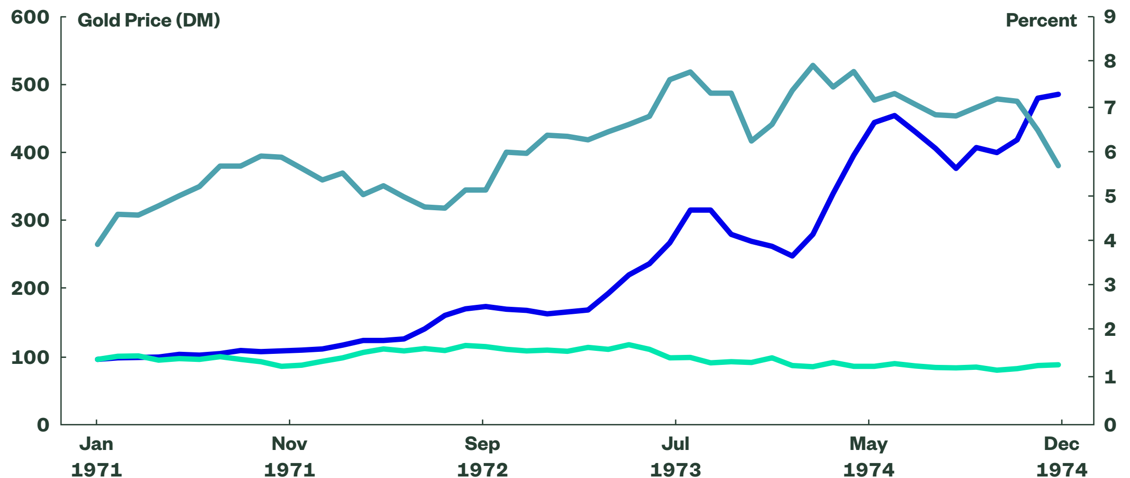
Gold Spot Price (Deutsche Mark)
German Inflation (rhs)



Source: State Street Global Advisors, Bloomberg Finance L.P. Past performance is not a guarantee of future returns.

Figure 11
Gold vs. Inflation in the 1970s

Gold (Deutsche Mark)
German Equities
German Inflation (rhs)



Source: State Street Global Advisors, Bloomberg Finance L.P. Past performance is not a guarantee of future returns.

Moreover, the traditional disadvantages of holding gold — the cost of carry, insurance etc. — evaporate when the alternative is a negative interest rate. With deposit rates turning negative, it becomes increasingly costly to keep money in a bank. Under these circumstances, gold's lack of yield no longer matters.

Gold's ability to mitigate the impact of market upheavals owes much to its distinctive correlation profile with other asset classes. Most of the time, the precious metal tracks bonds slightly more closely than equities, but it is not particularly correlated with either. During times of market stress, however, its relationship with equities turns negative, giving investors useful protection against bouts of risk aversion. This was evident during the COVID-driven equity market sell-off, when gold prices hit seven-year peaks. And even as equity prices rebounded from the steep Q1 sell-off, gold prices maintained that upward trajectory to achieve record highs.

Conclusion

From current levels, a traditional 60/40 equity/bond portfolio will not deliver the type of diversification and returns achieved historically, as the major central banks have lowered interest rates towards zero over the past decade. As a result, asset allocators will have to consider alternatives to high quality government bonds, including cash, gold and currencies. The way these 'safe haven' assets perform is likely to be different from one another. That feature alone should appeal to a certain kind of investor. If the world is indeed radically changed by this health crisis, it may be in ways that are hard to imagine today. And in uncertain times, it makes sense to spread your hedging options.

For investors running balanced portfolios, who are obliged to maintain or increase return targets, there may be little choice other than to retain, or perhaps even raise, their equity exposure despite some stock markets trading at, or beyond, full valuation levels. Such investors may want to look at managing equity risk directly. As outlined in this paper, a spectrum of cost-effective techniques and exposures is available.

About State Street Global Advisors

For four decades, State Street Global Advisors has served the world's governments, institutions and financial advisors. With a rigorous, risk-aware approach built on research, analysis and market-tested experience, we build from a breadth of active and index strategies to create cost-effective solutions. As stewards, we help portfolio companies see that what is fair for people and sustainable for the planet can deliver long-term performance. And, as pioneers in index, ETF, and ESG investing, we are always inventing new ways to invest. As a result, we have become the world's third-largest asset manager with US $3.05 trillion* under our care.

* This figure is presented as of June 30, 2020 and includes approximately $69.52 billion of assets with respect to SPDR products for which State Street Global Advisors Funds Distributors, LLC (SSGA FD) acts solely as the marketing agent. SSGA FD and State Street Global Advisors are affiliated.

ssga.com

Marketing communication. Professional clients only

State Street Global Advisors Worldwide Entities

For a complete list of SSGA entities, please visit:https://ssga.com/us/en/institutional/ic/footer/state-street-global-advisors-worldwideentities

Abu Dhabi: State Street Global Advisors Limited, ADGM Branch, Al Khatem Tower, Suite 42801, Level 28, ADGM Square, Al Maryah Island, P.O Box 76404, Abu Dhabi, United Arab Emirates. Regulated by the ADGM Financial Services Regulatory Authority. T: +971 2 245 9000. **Australia:** State Street Global Advisors, Australia, Limited (ABN 42 003 914 225) is the holder of an Australian Financial Services License (AFSL Number 238276). Registered office: Level 14, 420 George Street, Sydney, NSW 2000, Australia. T: +612 9240-7600. F: +612 9240-7611. **Belgium:** State Street Global Advisors Belgium, Chaussée de La Hulpe 120, 1000 Brussels, Belgium. T: 32 2 663 2036. F: 32 2 672 2077. SSGA Belgium is a branch office of State Street Global Advisors Ireland Limited. State Street Global Advisors Ireland Limited, registered in Ireland with company number 145221, authorised and regulated by the Central Bank of Ireland, and whose registered office is at 78 Sir John Rogerson's Quay, Dublin 2. **Canada:** State Street Global Advisors, Ltd., 1981 McGill College Avenue, Suite 500 , Montreal, Qc, H3A 3A8, T: +514 282 2400 and 30 Adelaide Street East Suite 800, Toronto, Ontario M5C 3G6. T: +647 775 5900. **France:** State Street Global Advisors Ireland Limited, Paris branch is a branch of State Street Global Advisors Ireland Limited, registered in Ireland with company number 145221, authorised and regulated by the Central Bank of Ireland, and whose registered office is at 78 Sir John Rogerson's Quay, Dublin 2. State Street Global Advisors Ireland Limited, Paris Branch, is registered in France with company number RCS Nanterre 832 734 602 and whose office is at Immeuble Défense Plaza, 23-25 rue Delarivière-Lefoullon, 92064 Paris La Défense Cedex, France. T: (+33) 1 44 45 40 00. F: (+33) 1 44 45 41 92. **Germany:** State Street Global Advisors GmbH, Brienner Strasse 59, D-80333 Munich. Authorised and regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht ("BaFin"). Registered with the Register of Commerce Munich HRB 121381. T: +49 (0)89-55878-400. F: +49 (0)89-55878-440. **Hong Kong:** State Street Global Advisors Asia Limited, 68/F, Two International Finance Centre, 8 Finance Street, Central, Hong Kong. T: +852 2103-0288. F: +852 2103-0200. **Ireland:** State Street Global Advisors Ireland Limited is regulated by the Central Bank of Ireland. Registered office address 78 Sir John Rogerson's Quay, Dublin 2. Registered Number: 145221. T: +353 (0)1 776 3000. F: +353 (0)1 776 3300. **Italy:** State Street Global Advisors Ireland Limited, Milan Branch (Sede Secondaria di Milano) is a branch of State Street Global Advisors Ireland Limited, registered in Ireland

with company number 145221, authorised and regulated by the Central Bank of Ireland, and whose registered office is at 78 Sir John Rogerson's Quay, Dublin 2. State Street Global Advisors Ireland Limited, Milan Branch (Sede Secondaria di Milano), is registered in Italy with company number 10495250960 - R.E.A. 2535585 and VAT number 10495250960 and whose office is at Via Ferrante Aporti, 10 - 20125 Milano, Italy. T: +39 02 32066 100. F: +39 02 32066 155. **Japan:** State Street Global Advisors (Japan) Co., Ltd., Toranomon Hills Mori Tower 25F 1-23-1 Toranomon, Minato-ku, Tokyo 105-6325 Japan. T: +81-3-4530-7380. Financial Instruments Business Operator, Kanto Local Financial Bureau (Kinsho #345), Membership: Japan Investment Advisers Association, The Investment Trust Association, Japan, Japan Securities Dealers' Association. **Netherlands:** State Street Global Advisors Netherlands, Apollo Building, 7th floor Herikerbergweg 29 1101 CN Amsterdam, Netherlands. Telephone: 31 20 7181701. SSGA Netherlands is a branch office of State Street Global Advisors Ireland Limited, registered in Ireland with company number 145221, authorised and regulated by the Central Bank of Ireland, and whose registered office is at 78 Sir John Rogerson's Quay, Dublin 2. **Singapore:** State Street Global Advisors Singapore Limited, 168, Robinson Road, #33-01 Capital Tower, Singapore 068912 (Company Reg. No: 200002719D, regulated by the Monetary Authority of Singapore). T: +65 6826-7555. F: +65 6826-7501. **Switzerland:** State Street Global Advisors AG, Beethovenstr. 19, CH-8027 Zurich. Authorised and regulated by the Eidgenössische Finanzmarktaufsicht ("FINMA"). Registered with the Register of Commerce Zurich CHE-105.078.458. T: +41 (0)44 245 70 00. F: +41 (0)44 245 70 16. **United Kingdom:** State Street Global Advisors Limited. Authorised and regulated by the Financial Conduct Authority. Registered in England. Registered No. 2509928. VAT No. 5776591 81. Registered office: 20 Churchill Place, Canary Wharf, London, E14 5HJ. T: 020 3395 6000. F: 020 3395 6350. **United States:** State Street Global Advisors, One Iron Street, Boston, MA 02210-1641. T: +1 617 786 3000.

There is no representation or warranty as to the current accuracy, reliability or completeness of, nor liability for, decisions based on such information and it should not be relied on as such.

Past performance is not a reliable indicator of future performance. Index returns are unmanaged and do not reflect the deduction of any fees or expenses.

Diversification does not ensure a profit or guarantee against loss.

Investing involves risk including the risk of loss of principal. The views expressed in this material are the views of Desmond Lawrence and Jeremy de Pessemier through the period ended 31 July 2020 and are subject to change based on market and other conditions.

This document contains certain statements that may be deemed forward-looking statements. Please note that any such statements are not guarantees of any future performance and actual results or developments may differ materially from those projected.

The information provided does not constitute investment advice and it should not be relied on as such. It should not be considered a solicitation to buy or an offer to sell a security. It does not take into account any investor's particular investment objectives, strategies, tax status or investment horizon. You should consult your tax and financial advisor.

The targets and estimates are based on certain assumptions and there is no guarantee that the estimates will be achieved. Investing involves risk including the risk of loss of principal.

The information contained in this communication is not a research recommendation or 'investment research' and is classified as a 'Marketing Communication' in accordance with the Markets in Financial Instruments Directive (2014/65/EU) or applicable Swiss regulation. This means that this marketing communication (a) has not been prepared in accordance with legal requirements designed to promote the independence of investment research (b) is not subject to any prohibition on dealing ahead of the dissemination of investment research.

This communication is directed at professional clients (this includes eligible counterparties as defined by the appropriate EU regulator) who are deemed both knowledgeable and experienced in matters relating to investments.

The products and services to which this communication relates are only available to such persons and persons of any other description (including retail clients) should not rely on this communication.

Bonds generally present less short-term risk and volatility than stocks, but contain interest rate risk (as interest rates raise, bond prices usually fall); issuer default risk; issuer credit risk; liquidity risk; and inflation risk. These effects are usually pronounced for longer-term securities.

Any fixed income security sold or redeemed prior to maturity may be subject to a substantial gain or loss.

Investing in foreign domiciled securities may involve risk of capital loss from unfavorable fluctuation in currency values, withholding taxes, from differences in generally accepted accounting principles or from economic or political instability in other nations. Emerging or developing markets may be more volatile and less liquid than investing in developed markets and may involve exposure to economic structures that are generally less diverse and mature and to political systems which have less stability than those of more developed countries.

Equity securities may fluctuate in value in response to the activities of individual companies and general market and economic conditions.

Investing in commodities entail significant risk and is not appropriate for all investors. Commodities investing entail significant risk as commodity prices can be extremely volatile due to wide range of factors. A few such factors include overall market movements, real or perceived inflationary trends, commodity index volatility, international, economic and political changes, change in interest and currency exchange rates.

The trademarks and service marks referenced herein are the property of their respective owners. Third party data providers make no warranties or representations of any kind relating to the accuracy, completeness or timeliness of the data and have no liability for damages of any kind relating to the use of such data.

The whole or any part of this work may not be reproduced, copied or transmitted or any of its contents disclosed to third parties without SSGA's express written consent.

© 2020 State Street Corporation.
All Rights Reserved.
ID277159-3198062.1.1.GBL.INST 0820
Exp. Date: 31/08/2021