To shorten or not to shorten (duration)

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Introduction

Against a backdrop of rising interest rates in many developed economies, many investors are switching their asset allocation to shorten duration within significant parts of their fixed income allocation.

In this short note, we study the impacts of implementing this decision across an investor's fixed income allocation. We consider four main areas:

- The expectation of interest rates moves versus reality
- The difficulty in predicting interest rate moves
- The role of fixed income within a broadly diversified portfolio
- Does short duration offer lower volatility?

Defining interest rates, yield and duration

An interest rate, in the context of buying a fixed interest bond, is the annual rate of return an investor receives for lending money to the issuer of the bond. This interest is typically fixed for life. Like a normal loan, the longer an investor lends the money, the higher the interest rate (or yield) received by the lender. The terms 'interest rate' and 'yield' are very similar, but in the context of bonds, yield considers both the interest rate a bond offers as well as capital appreciation or depreciation as the bond approaches maturity – as such it is more commonly used.

The expectation versus reality

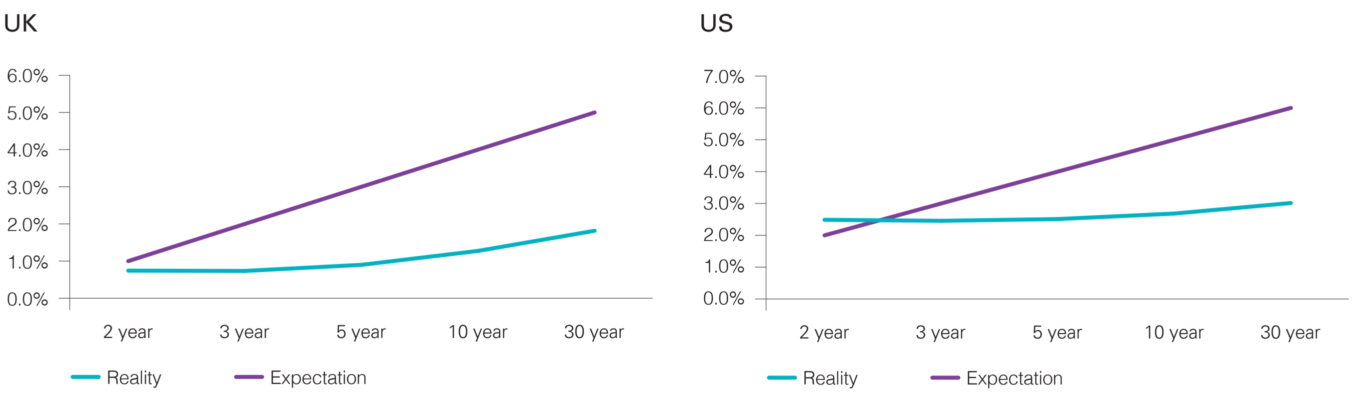
The typical expectation for yields is that the longer a company or a government borrows money from the market the higher the yield. However, as the yield curve is an expectation of future interest rate rises, expectation and reality can be very different.

Duration is a measure of the sensitivity of the price or value of a bond to a change in yields. This is typically measured in years; for example, if a bond has a duration of five years, its price will rise (or fall) by approximately 5% if yields fall (or rise) by 1%.

Why have investors chosen to shorten duration?

After the financial crisis, accommodative monetary policy by central banks via the reduction of interest rates and quantitative easing led yields to fall to stimulate the economy. When yields fell, most of the fixed income market performed positively. As monetary policy begins to unwind, it could lead to a rise in yields – as seen in the US and UK. This had led to some investors moving all of their fixed income allocations to short duration to protect against the decrease in value that is associated with a rise in interest rates.

Figure 1: Yield curve expectations versus reality in the UK and the US



Source: Bloomberg as at 31 December 2018. Expectation is hypothetical.

A few caveats to duration

Duration typically assumes a parallel move in interest rates, as we saw, the example on the previous page looks at the impact of duration on one singular bond. But where you have more than one bond, the impact of a rise (or fall) in interest rates is not as simple. For example, if an investor holds two different bonds, one with a 5-year duration and one with a 3-year duration (both in equal measure) the average duration of that bond exposure will be 4 years. If interest rates rise by 1%, the assumption is that both bonds will be impacted the same and that the lending rate for loaning money for 3 and 5 years respectively will change by equal amounts. However, this rarely occurs in practice.

Another consideration is being able to time markets. The vast majority of the bond market is priced/valued on a daily basis. As such, it is a reasonable expectation that the price of a bond today reflects the expectations of future changes in interest rates. If an investor chooses to reduce duration in their portfolio they are indirectly taking a view (that is different to the market) on where they believe interest rates will go.

The role of fixed income within a broadly diversified portfolio

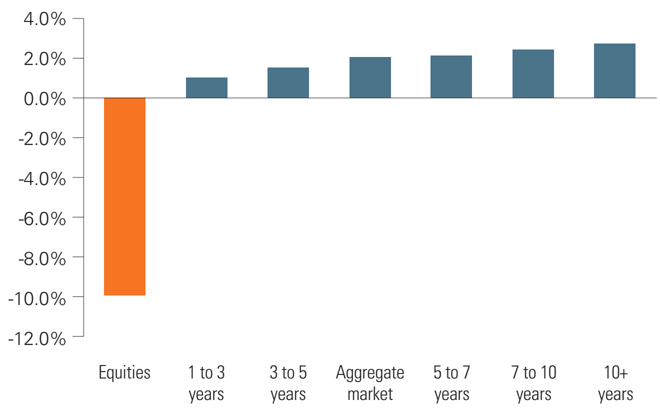
Within a broadly diversified portfolio, fixed income has a role to play. This role – fundamentally – is to be a risk ballast, to provide diversification against higher-risk assets such as equities and to provide income, thus increasing portfolio stability.

Bonds are able to do this as the duration element within a bond causes the value of a bond to be inversely correlated to risk assets, such as equities. For example, as market growth increases, individuals will typically have more disposable income to spend on purchases. This typically leads to higher corporate profits and inflation. As this occurs, equities will tend to increase in value (as they are an ownership stake in a company) and central banks will typically hike interest rates to manage inflation. The reverse can also apply.

As interest rates and yields rise, bond prices typically fall. This causes bonds to act as a diversifier within a portfolio. Because of this, when reducing duration within a bond allocation, an investor is also increasing the risk of their whole portfolio by removing this diversification benefit. Furthermore, bonds can act as a shock absorber in distressed situations.

Figure 2 considers the median quarterly return during the worst quartile of global equity performance. Here you can see that long duration bonds can be a lot more effective than short duration bonds in providing diversification and acting as a shock absorber.

Figure 2: 15-year median quarterly return during the worst quartile of global equity performance

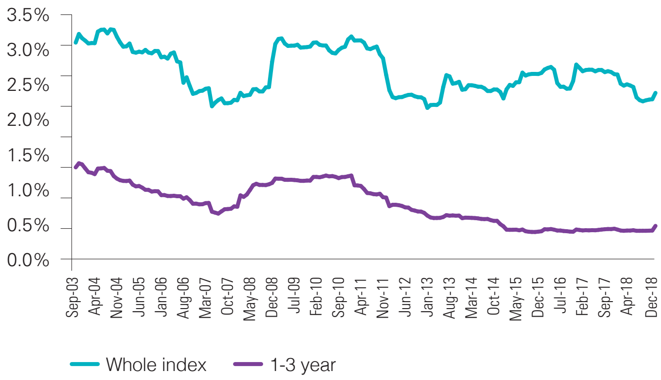


Past performance is not a reliable indicator of future returns. Source: Vanguard calculations, using data from DataStream and Barclays as at December 2018. Based on total returns and USD-hedged where appropriate. All data in USD.

Does short duration offer lower volatility?

Short duration bonds typically have lower volatility compared to long duration bonds or an entire all-maturity bond index. However, within a multi-asset portfolio, short duration bonds are less effective in reducing the overall risk of a portfolio. This is due to the loss of diversification within the whole portfolio (**Figure 4**).

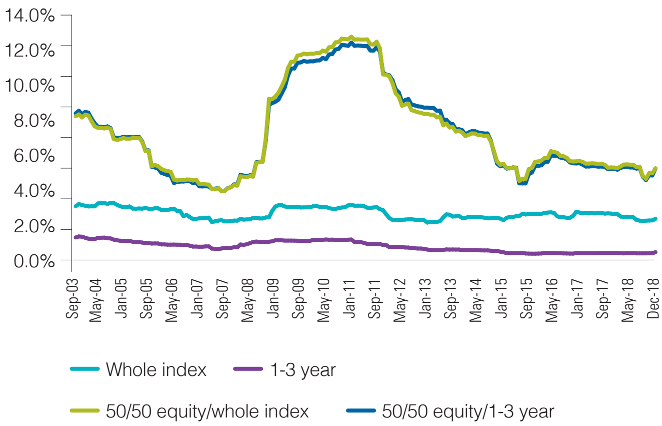
Figure 3: Rolling annualised volatility for broadly diversified fixed income indices



Past performance is not a reliable indicator of future returns. Source: Vanguard calculations, using data from Barclays Live and Macrobond.

Note: Bloomberg Barclays Global Aggregate Bond Index and Bloomberg Barclays Global Aggregate 1– 3 Year Bond Index; volatility is rolling 36-month standard deviation, annualised. Based on total returns and USD-hedged where appropriate. All data in USD.

Figure 4: Rolling annualised volatility for broadly diversified fixed income and equity indices



Past performance is not a reliable indicator of future returns. Source: Vanguard calculations, using data from Barclays Live and Macrobond.

Note: MSCI ACWI IMI Equity Index, Bloomberg Barclays Global Aggregate Bond Index and Bloomberg Barclays Global Aggregate 1–3 Year Bond Index, volatility is rolling 36-month standard deviation, annualised.

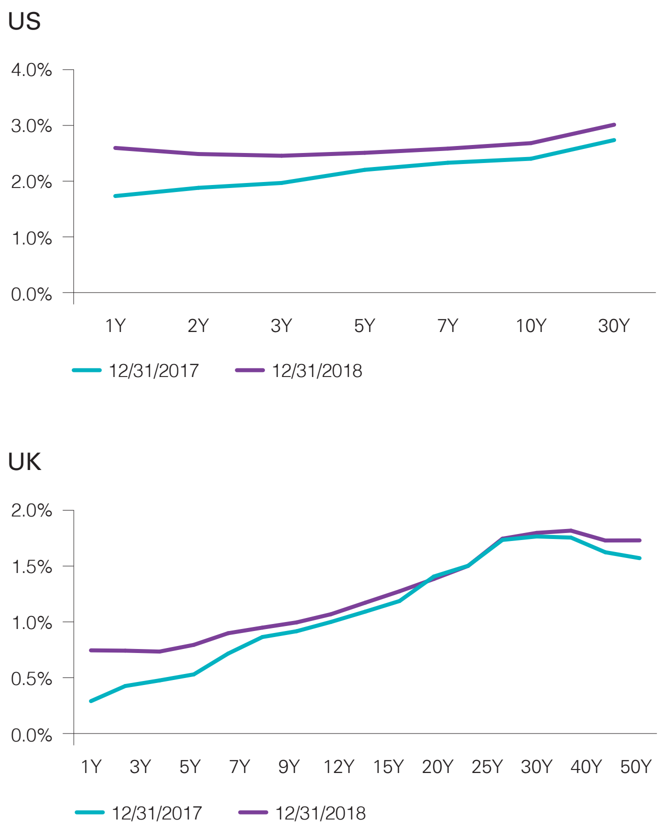
Furthermore, in a multi-asset portfolio with 50% equity and 50% bonds, Vanguard Investment Strategy Group analysis shows that the overall volatility remains broadly the same. Additionally, investors are also losing out on improved yields offered by longer duration bonds.

What has been the movement in US and UK interest rates in 2018?

During 2018, the US Federal Reserve raised its benchmark interest rate four times, while the Bank of England increased its base rate once. Additionally, the European Central Bank signalled that it would end its quantitative easing programme by the end of the year. This led many investors – especially in the US and UK – to shorten duration in anticipation of a further rise in interest rates and effectively taking an indirect view on the direction of interest rates.

The below shows the US and UK yield curve as at the end of 2017 and 2018.

Figure 5: Annual change in yields in the US and the UK



Source: Vanguard and Bloomberg Barclays.

However as US and UK growth slowed, shorter maturity bond yields increased more than the longer maturity bond yields, indicating a flattening yield curve. In this scenario, investors that shortened duration possibly gave up the return that could have been earned if they kept longer duration bonds within their portfolios.

Additionally, investors that also had an equity allocation within their portfolio experienced an even more challenging time in the last quarter of 2018 (**Figure 6).** These investors not only lost returns in equity positions but also didn't benefit from the positive return from longer duration bonds, which is typical in a stressed market scenario.

Figure 6: Fixed income and equity asset class returns

	US Treasuries		UK Gilts		Equities	
	1-3 year	Whole index	1-3 year	Whole index	S&P 500	FTSE 100
Dec 2018	0.6%	2.0%	0.1%	2.4%	-9.3%	-3.5%
Q4 2018	0.8%	2.1%	0.4%	2.1%	-14.2%	-9.6%

Past performance is not a reliable indicator of future results.
Source: Vanguard and Bloomberg Barclays. GBP hedged.

Vanguard appreciates that investors have a number of choices when considering an investment fund. This includes both index and active, as well as short and longer duration funds. Vanguard encourages investors to work with their advisers to clearly understand the risks being taken in their portfolios, to ensure that these are in line with their long term objectives.

What should investors be thinking about?

Depending on investors' long-term objectives they should consider the role they want their fixed income allocation to play within a broadly diversified portfolio. If the objective is for fixed income to act as a risk ballast then shortening duration across all of their fixed income allocation may not meet this objective.

In summary

Fixed income in a broader portfolio acts as a risk ballast – it provides diversification and income and contributes to overall portfolio stability. This is driven by having a degree of duration within an investor's fixed income allocation.

Investors need to remember the two reasons they invested in bonds in the first place: stable returns and risk reduction. These two features are why bonds play a vital role in a balanced portfolio regardless of any concerns about rates or yields.

Ultimately, investors should be mindful of the role they want their fixed income to play and also consider the diversification benefits to other areas of their portfolio.

Fixed income at Vanguard

At Vanguard, we have a broad range of mutual and exchange traded funds for fixed income investors to choose from, covering government and corporate bonds through to inflation-linked and SRI bonds. The funds table highlights our range of UCITS-compliant funds. They offer daily liquidity and all the benefits associated with a UCITS structure.

Our Fixed Income Group has more than 30 years of experience and takes a team-based approach to investment management, avoiding a star manager system. Each portfolio manager is cross trained and can carry out investment management responsibilities across all relevant portfolios. This approach ensures fund management continuity and consistency over the long term.

The team is made up of over 180 investment professionals, including portfolio managers, traders, strategists and credit research analysts, and manages more than USD 1 trillion in assets globally, split roughly 65%/35% between passive and active. Being a global team based in London (UK), Malvern (US), Scottsdale (US) and Melbourne (Australia), allows Vanguard to manage funds across all time zones. The team also have access to the more-than-50-person strong Investment Strategy Group and can draw upon their research for macroeconomic insights.

Vanguard's fixed income mutual fund range[1]

Fund Name	Fund umbrella	Benchmark	Currency	Pound sterling -OCF[2]	Investor share class – OCF[3]	Institutional share class – OCF[4]	Institutional Plus share class – OCF[5]	Structure
Active global								
Vanguard Global Credit Bond Fund[6]	Vanguard Investment Series plc	Bloomberg Barclays Global Aggregarate Credit Index	GBP (Hedged), USD (Hedged), EUR (Hedged)	0.35%	0.35%	0.30%		Irish UCITS VCC
Fixed income: Global								
Vanguard Global Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays Global Aggregate Float Adjusted Bond Index	GBP (Hedged), CHF (Hedged), USD (Hedged), EUR (Hedged)	0.15%	0.20%	0.15%	0.10%	Irish UCITS VCC
Vanguard Global Corporate Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays Global Aggregate Float Adjusted Corporate Index	GBP (Hedged), USD (Hedged)		0.25%	0.20%	0.12%	Irish UCITS VCC
Vanguard Global Short-Term Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays Global Aggregate 1–5Y ex US MBS Float Adjusted Bond Index	GBP (Hedged), CHF (Hedged), USD (Hedged), EUR (Hedged)	0.15%	0.20%	0.15%	0.10%	Irish UCITS VCC
Vanguard Global Short-Term Corporate Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays Global Aggregate Corporate 1-5 Year Float Adjusted Index	GBP (Hedged), USD (Hedged)		0.25%	0.20%	0.12%	Irish UCITS VCC
Fixed income: Inflation								
Vanguard U.K. Inflation-Linked Gilt Index Fund	Vanguard Investment Funds ICVC	Bloomberg Barclays U.K. Government Inflation-Linked Float Adjusted Bond Index	GBP	0.15%			0.06%	UK OEIC
Vanguard Eurozone Inflation-Linked Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays Global Inflation-Linked: Eurozone – Euro CPI Index	EUR		0.25%	0.20%	0.10%	Irish UCITS VCC
Fixed income: Government								
Vanguard U.K. Long Duration Gilt Index Fund	Vanguard Investment Funds ICVC	Bloomberg Barclays U.K. Government 15+ Years Float Adjusted Bond Index	GBP	0.15%			0.10%	UK OEIC
Vanguard U.K. Government Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays U.K. Government Float Adjusted Bond Index	GBP	0.15%			0.06%	Irish UCITS VCC
Vanguard Euro Government Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays Euro Government Float Adjusted Bond Index	GBP (Hedged), USD, EUR	0.25%	0.25%	0.20%	0.10%	Irish UCITS VCC
Vanguard U.S. Government Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays U.S. Government Float Adjusted Bond Index	GBP (Hedged), USD, EUR	0.25%	0.25%	0.20%	0.10%	Irish UCITS VCC
Vanguard Japan Government Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays Japan Government Float Adjusted Bond Index	GBP (Hedged), USD, JPY, EUR	0.25%	0.25%	0.20%	0.10%	Irish UCITS VCC
Vanguard 20+ Year Euro Treasury Index Fund	Vanguard Investment Series plc	Bloomberg Barclays Euro Treasury 20+ Year Bond Index	EUR			0.25%	0.15%	Irish UCITS VCC
Fixed income: Investment grade								
Vanguard U.K. Short-Term Investment Grade Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays GBP Non-Government 1–5 Year 200MM Float Adjusted Bond Index	GBP	0.15%			0.05%	Irish UCITS VCC
Vanguard U.K. Investment Grade Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays GBP Non-Government Float Adjusted Bond Index	GBP	0.15%			0.06%	Irish UCITS VCC
Vanguard Euro Investment Grade Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays EUR Non-Government Float Adjusted Bond Index	GBP (Hedged), EUR	0.30%	0.30%	0.25%	0.15%	Irish UCITS VCC
Vanguard U.S. Investment Grade Credit Index Fund	Vanguard Investment Series plc	Bloomberg Barclays Global Aggregate USD Credit Float Adjusted Bond Index	GBP (Hedged), CHF, USD, EUR	0.30%	0.30%	0.25%	0.10%	Irish UCITS VCC
Fixed income: SRI								
Vanguard SRI Euro Investment Grade Bond Index Fund	Vanguard Investment Series plc	Bloomberg Barclays EUR Non-Government Float Adjusted Bond Index	EUR			0.25%	0.15%	Irish UCITS VCC
		Benchmark	**Currency**			**OCF**	**Additional costs**	**Structure**
Fixed income UCITS ETFs								
Vanguard U.K. Gilt UCITS ETF	Vanguard Funds plc	Bloomberg Barclays Sterling Gilt Float Adjusted Index	GBP, EUR			0.12%	—[7]	UCITS ETF
Vanguard EUR Corporate Bond UCITS ETF	Vanguard Funds plc	Bloomberg Barclays Euro Aggregate: Corporates Index	GBP, EUR, CHF			0.12%	—[7]	UCITS ETF
Vanguard EUR Eurozone Government Bond UCITS ETF	Vanguard Funds plc	Bloomberg Barclays Euro Aggregate: Treasury Index	GBP, EUR, CHF			0.12%	—[7]	UCITS ETF
Vanguard USD Corporate Bond UCITS ETF	Vanguard Funds plc	Bloomberg Barclays Global Aggregate Corporate – United States Dollar Index	GBP, USD, EUR, CHF			0.12%	—[7]	UCITS ETF
Vanguard USD Treasury Bond UCITS ETF	Vanguard Funds plc	Bloomberg Barclays Global Aggregate US Treasury Float Adjusted Index	GBP, USD, EUR, CHF			0.12%	—[7]	UCITS ETF
Vanguard USD Emerging Markets Government Bond UCITS ETF	Vanguard Funds plc	Bloomberg Barclays EM USD Sovereign + Quasi-Sov Index	GBP, USD, EUR, CHF			0.25%	—[7]	UCITS ETF
Vanguard USD Corporate 1-3 year Bond UCITS ETF	Vanguard Funds plc	Bloomberg Barclays Global Aggregate Corporate – United States Dollar Index 1-3 Year	GBP, USD, EUR, CHF			0.15%	—[7]	UCITS ETF

Source: The Vanguard Group, Inc., as at 3 March 2019

1 Refer to website https://global.vanguard.com for a list of available share classes. Accumulation and or income share classes are available for the majority of funds.

2 Pound sterling shares. Minimum initial investment will be GBP 100,000. Current as at 3 March 2019

3 Investor shares. Minimum initial investment will be USD 100,000, EUR 100,000, GBP 100,000, CHF 100,000, JPY 10Million. Current as at 3 March 2019

4 Institutional shares. Minimum initial investment will be USD 5 million, EUR 5 million, GBP 5 Million, CHF 5 Million, JPY 500 Million. Current as at 3 March 2019

5 Institutional Plus shares. Minimum initial investment will be USD 200 million, EUR 200 million, GBP 200 Million, CHF 200 million, JPY 20 billion. Current as at 3 March 2019

6 The Fund(s) are actively managed and do not intend to track or replicate the performance of the benchmark. Benchmark data is for reference only.

7 ETF shares can be bought or sold only through a broker. Investing in ETFs entails stockbroker commission and a bid- offer spread which should be considered fully before investing.

8 For full list of ETFs, share classes, tickers and exchange listings refer to website https://global.vanguard.com

Note: The Ongoing Charges Figure (OCF) covers administration, audit, depository, legal, registration and regulatory expenses incurred in respect of the Funds.

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The fund(s) may invest in financial derivative instruments that could increase or reduce exposure to underlying assets and result in greater fluctuations of the fund's Net Asset Value. Some derivatives give rise to increased potential for loss where the fund's counterparty defaults in meeting its payment obligations.

Some funds invest in emerging markets which can be more volatile than more established markets. As a result the value of your investment may rise or fall.

Some funds invest in securities which are denominated in different currencies. Movements in currency exchange rates can affect the return of investments.

Funds investing in fixed interest securities carry the risk of default on repayment and erosion of the capital value of your investment and the level of income may fluctuate. Movements in interest rates are likely to affect the capital value of fixed interest securities. Corporate bonds may provide higher yields but as such may carry greater credit risk increasing the risk of default on repayment and erosion of the capital value of your investment. The level of income may fluctuate and movements in interest rates are likely to affect the capital value of bonds.

Investments in smaller companies may be more volatile than investments in well-established blue chip companies.

ETF shares can be bought or sold only through a broker. Investing in ETFs entails stockbroker commission and a bid- offer spread which should be considered fully before investing.

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For further information on the funds' investment policy, please refer to the Key Investor Information Document (KIID). The KIID and the Prospectus for the funds is available from Vanguard via our website https://global.vanguard.com/

The Central Bank of Ireland has granted authorisation for the Vanguard Eurozone Inflation Linked Bond Index Fund, Vanguard Japan Government Bond Index Fund, Vanguard UK Government Bond Index Fund, Vanguard U.K. Gilt UCITS ETF, Vanguard US Government Bond Index Fund and Vanguard USD Treasury Bond UCITS ETF to invest up to 100% of net assets in different Transferable Securities and Money Market Instruments issued or guaranteed by any EU Member State, its local authorities, non-EU Member States or public international bodies of which one or more EU Member States are members. As at 31 December 2018, the Vanguard Eurozone Inflation Linked Bond Index Fund invests more than 35.8% of its scheme property in transferable securities and money market instruments issued or guaranteed by Italy; the Vanguard Japan Government Bond Index Fund invests more than 35% of its scheme property in transferable securities and money market instruments issued or guaranteed by Japan; the Vanguard UK Government Bond Index Fund invests more than 35% of its scheme property in transferable securities and money market instruments issued or guaranteed by the UK, the Vanguard U.K. Gilt UCITS ETF invests more than 35% of its scheme property in transferable securities and money market instruments issued or guaranteed by the UK and the Vanguard U.S. Government Bond Index Fund and Vanguard USD Treasury Bond UCITS ETF invests more than 35% of its scheme property in transferable securities and money market instruments issued or guaranteed by the US.

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