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Fixed Income: Back to Basics

Author: Amanda Stitt, Portfolio Specialist



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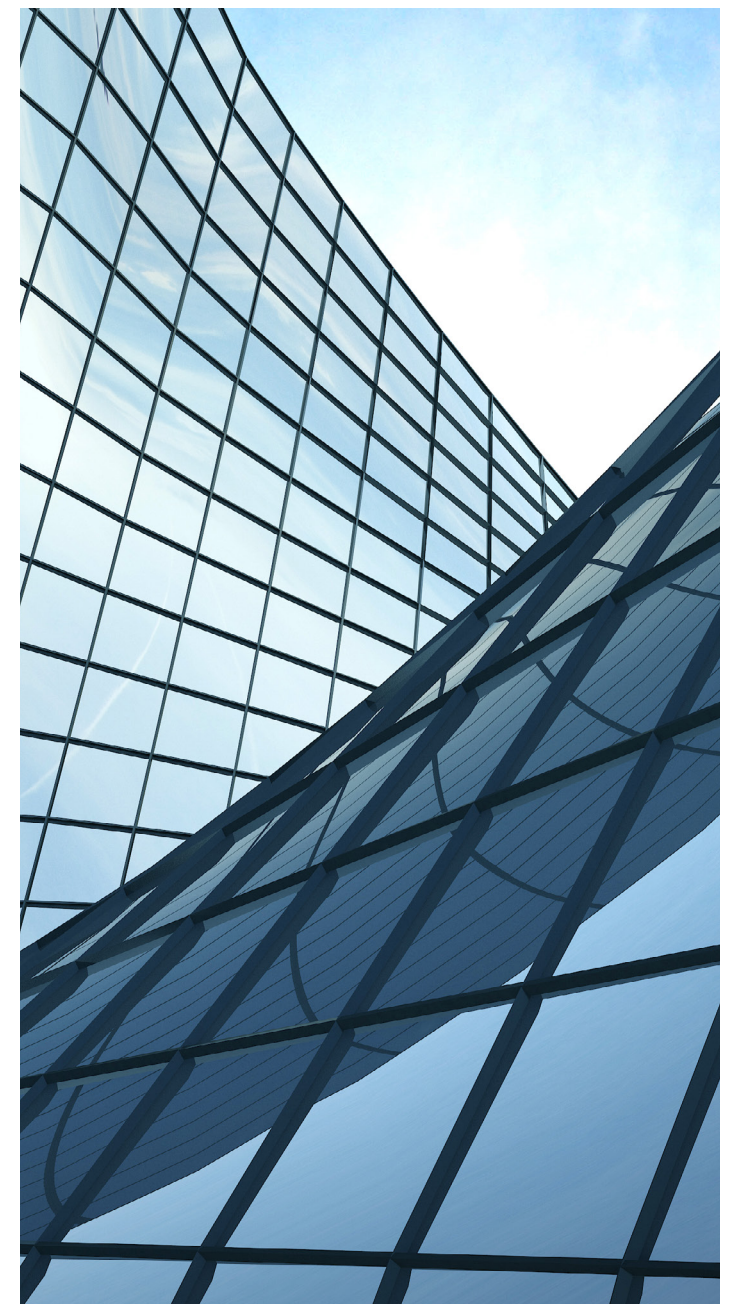
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Introduction

Fixed income remains the world's biggest and most complex market and our aim is to help you navigate this asset class with confidence and clarity.

In this manual, we go back to basics - we explain how fixed income securities work and how they can fit into your portfolio.



Bond Terminology and Mechanics

Bond

Obligation assumed by the issuer to return principal and pay stated amount of interest to the investor at pre-determined time periods (analogous with a loan).

Principal

The amount on which the issuer pays interest, and which has to be repaid upon maturity.

Maturity

- The length of time until a bond's principal is to be repaid
- Maturity is not the same as duration

Coupon

- Interest rate paid on a bond's face value (i.e. a coupon rate of 4% on a \$1,000 face value annual payout bond is \$40 per year)
- The greater the perceived risk in the issuer, the higher the coupon needs to be in order to entice investors to "lend" money

Bond Terminology

Example: US Treasury 1.75% October 2022



Price/Yield Relationship

- **Price:** The present value of the bond's expected future stream of cash flows; as interest rates rise, the price of a bond falls—and vice versa
- **Yield:** Rate of return actually earned on the bond if held to maturity. Based on (1) the price paid for the bond, and (2) the income received in the form of periodic coupon payments

Price

- Unlike equities, bonds are not traded on a transparent market exchange.
 - Bonds are traded in the Over-the-Counter (OTC) market comprised of a network of dealers that typically maintain inventories of bonds and continuously stand ready to quote prices for buys and sells of a given issue.
 - Dealers maintain supplies of both new-issue securities and previously issued securities

Yield

Yield to Maturity:

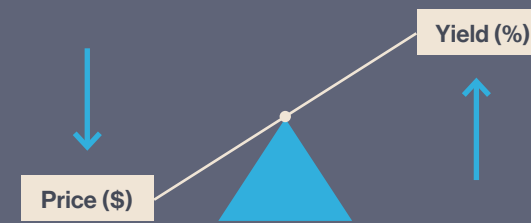
- Includes the coupon payments on the bond and the gains received from price gains/losses at maturity.
- Said another way, equates the present value of the cash flows to the market price
- Commonly referenced as simply "Yield"

Yield to Worst:

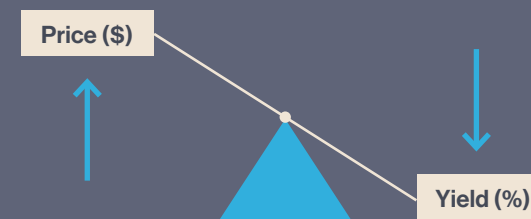
- Calculated on all possible call dates; assumes that prepayment occurs if the bond has call provisions and the issuer can offer a lower coupon rate
- Helps investors manage risk; shows what income requirements will still be met even in the worst scenarios
- Rate of return actually earned on the bond if held to maturity
- Based on the price paid for the bond, and the income received in the form of periodic coupon payments
- Many different "yields" are quoted for a bond

Bond Prices and Yields have an inverse relationship

As interest rates rise, prices on outstanding issues fall...

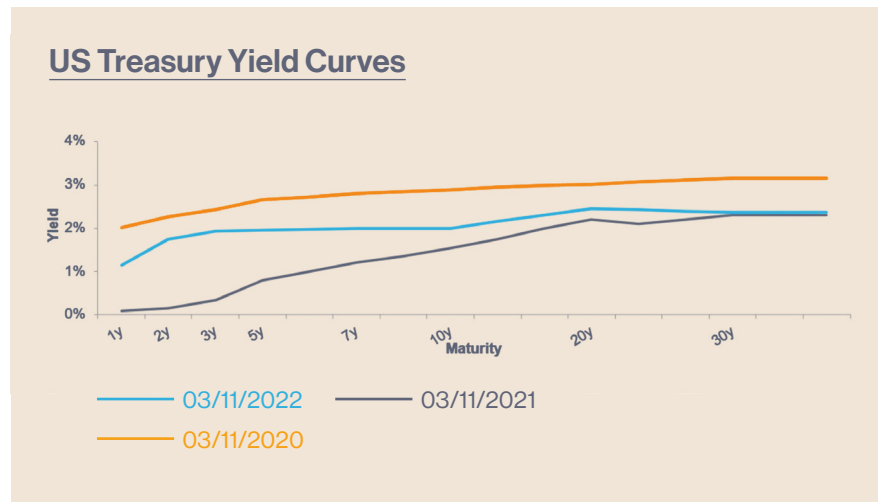


... as interest rates fall, prices on outstanding issues rise...



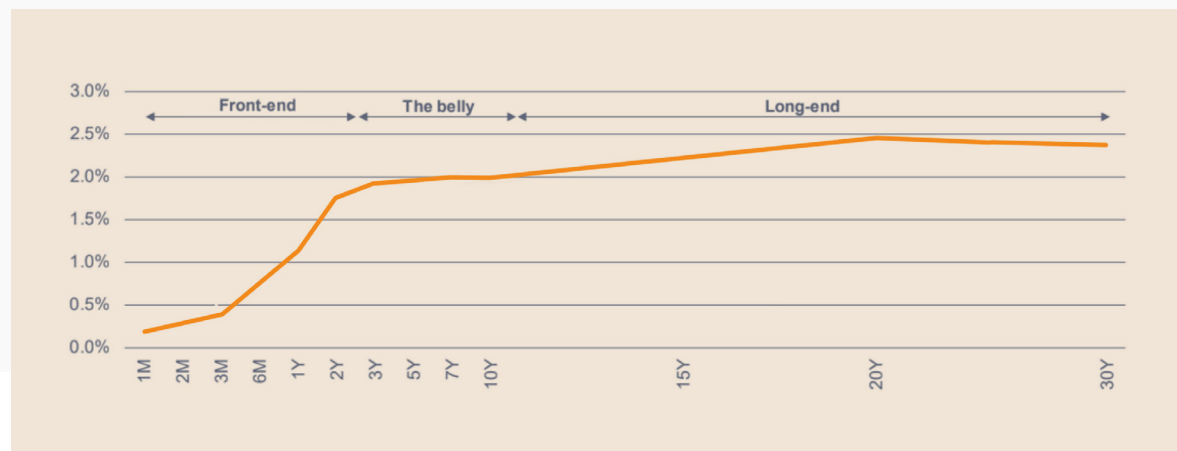
Yield Curves

- Interest rates differ across maturities, qualities, sectors, etc.
- There is no “single” market-wide interest rate
- Every sector has its own yield curve and portfolio managers must manage the difference between these curves to ensure they do not make unwanted bets
- Treasury curve is the foundation from which other types of yields are based



The Shape of the Yield Curve Matters

- Front end of the yield curve reflects expectations for the next moves of the central bank
- Yield curves tend to be upward sloping as investors usually demand more reward for lending money over a longer time horizon
- Back end of the yield curve reflects demand by pension funds for liability matching Typical Yield Curve Shape



Translating Curve Yield Terms

“Curve is steep”

Low rates now will produce higher growth rates and higher yields in the future

“Roll down the curve”

Holding a long-dated bond which appreciates as the term risk declines (assuming an upwardsloping curve)

“Implement a steepening yield curve”

Buying short-dated bonds and selling long-dated bonds, betting that the curve will be even more upward sloping in the future

A steep yield curve means investors are demanding a higher premium for longer dated bonds, reflecting an expectation for higher interest rates in the future

“Curve is flat”

There is no term premium and short-dated interest rates are not expected to change over time

“Implement a flattening yield curve”

Buying long-dated bonds and selling short-dated bonds, betting that the curve will be even flatter in the future

A flat yield curve means investors are less compensated for taking additional risk

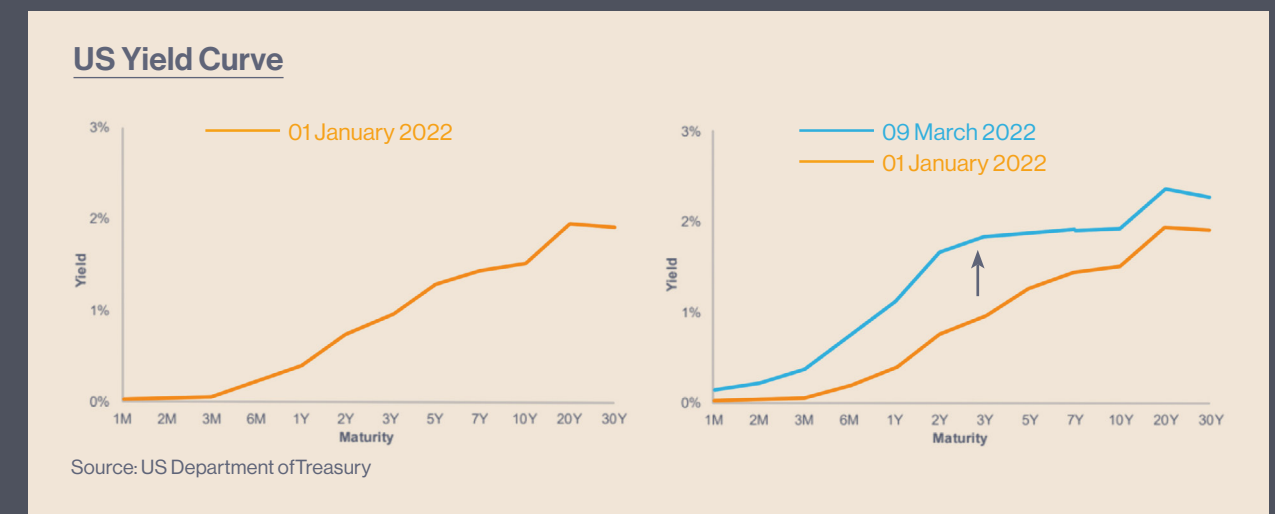
Examples of Shifting Yield Curves Source:

US Department of Treasury. In January 2022, the US yield curve was upward sloping with the Fed forecasting inflation to be 2.6% in 2022.

=> The market expected 3 rate hikes by the Fed in 2022 to tackle inflation

Fast-forward 2 months, commodity prices are up 30% in 2022 following the invasion of Ukraine and inflation expectations are rising

=> The market is now forecasting at least 6 hikes in 2022

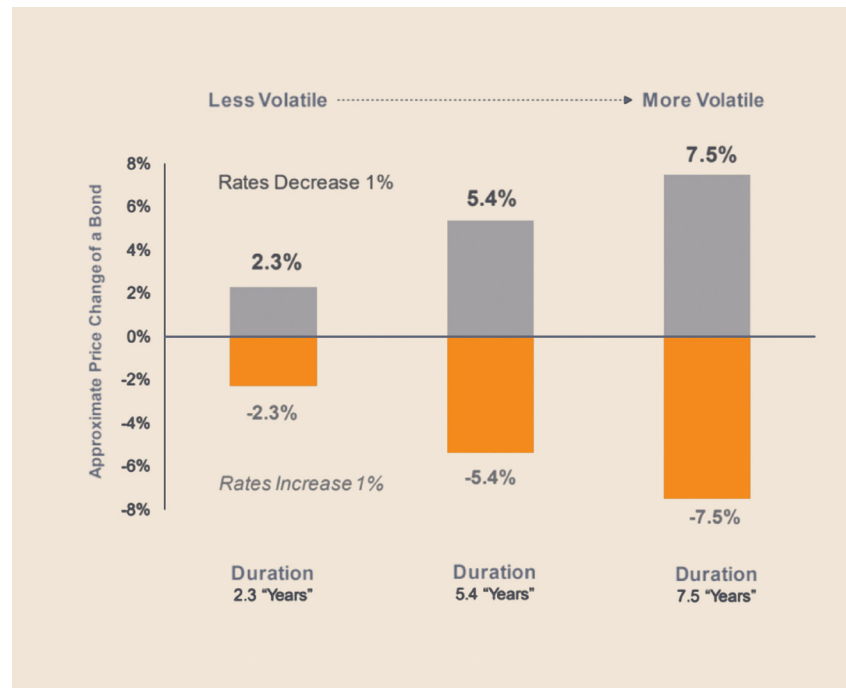


Source: US Department of Treasury

Bond Risks

Duration

- Duration is a simplified measure of a security or a portfolio's sensitivity to changes in interest rates
- The approximate percentage change in the value of a bond or a portfolio for a 100 basis point (1%) change in interest rates
- Higher durations indicate higher sensitivity to interest rate changes
- Duration is used as a key measurement of interest risk in bond investing



Interest Rate Risk

- Market value of investment will decline if interest rates rise (in most instances):
 - Why would you want a bond yielding 2% today if rates will rise tomorrow and you can get a bond yielding 3%?
- The approach fixed income investors take:
 - If expectations are for rates to RISE, keep durations SHORT – If expectations are for rates to FALL, keep durations LONG

Interest Rate Risk

- Price (Par) = \$100; 1.375% coupon; yield = 1.375%
- Spike in energy prices triggers inflation concerns
- 10-year Treasuries in the market now yield 1.90%
- Why would an investor want a security yielding 1.375% when an identical security yields 1.90%?
- The price of the 1.375% coupon note will decline to a level where it will yield 1.90%
- It will trade at a discount to par

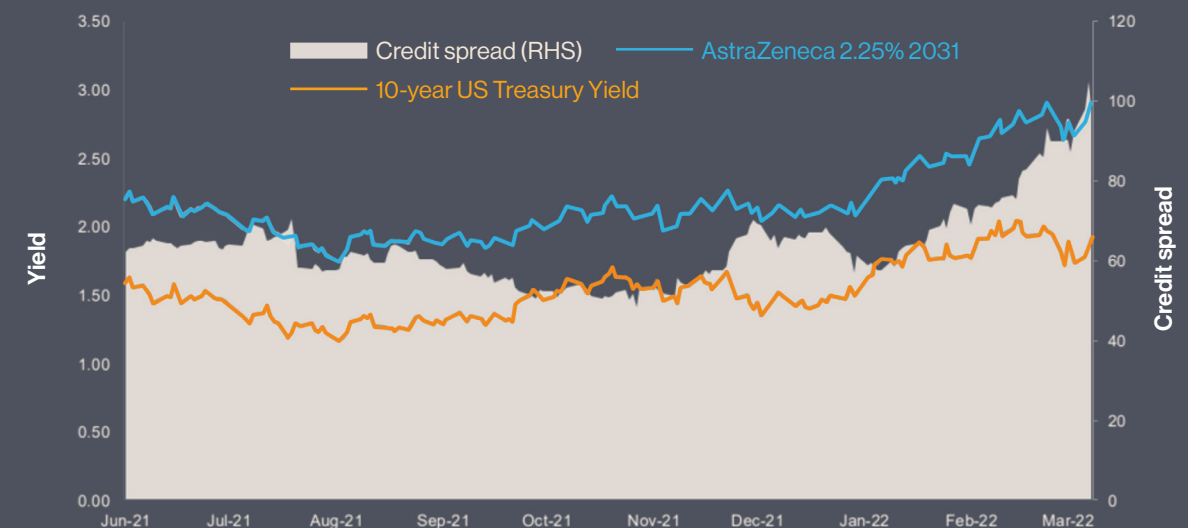
Credit Ratings

- Bonds are assigned a rating by a credit agency when they are issued. The main agencies are: – S&P – Moody's – Fitch
- These ratings quantify the borrower's general creditworthiness as well as any risk associated with a particularly security
- Rating styles vary by rating agency but generally rank from AAA to D
- Higher quality debt with lower risk is given an "investment grade" status
- Lower quality debt with higher risk is given a "high yield" or "non-investment grade" status

	Rating	Description
Investment grade	AAA	Lowest level of credit risk
	AA+, AA, AA-	Very low credit risk
	A+, A, A-	Low credit risk
	BBB+, BBB, BBB-	Moderate credit risk
Non-investment grade	BB+, BB, BB-	Substantial credit risk
	B+, B, B-	High credit risk
	CCC+, CCC, CCC-	Very high credit risk
	CCC	Highly speculative
	C	Highest level of credit risk
	D	Currently in default

Credit Spreads

- Yields in excess of Treasury (risk-free) rates reflect the market's view on the overall risk of credits
 - Spreads refer to the additional yield above Treasuries that investors require to assume risk in the bond market
- Corporate spreads are commonly referenced and are the market's assessment of overall credit risk
- Spreads typically increase as maturity increases and as credit quality decreases
 - When credit quality declines, investors demand additional yield
- Managers may seek opportunities where the market is perceived to be overly pessimistic (pricing in too much credit risk)

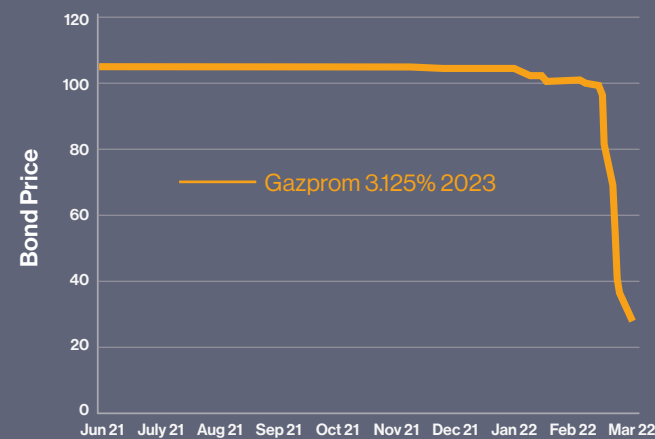


Bond Risks (Continued)

Default Risk

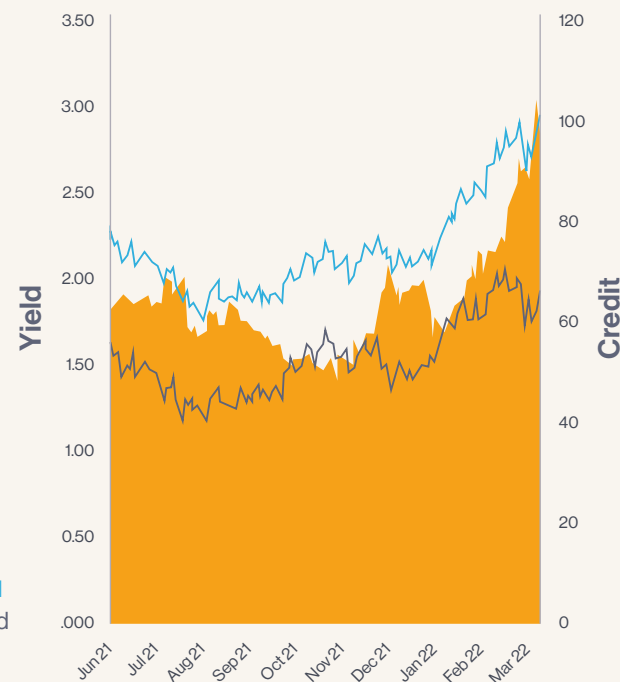
- Default risk is the risk that a borrower will be unable to make the required payments on their debt obligation
- Outcomes range from being unable to fulfil the total obligation to being unable to meet a coupon payment
- Default risk is naturally higher for lower grade borrowers, so investors demand a higher yield for the risk
- It is up to the investor to assess the perceived risk of default against the yield on offer

Sanction concerns lead to sell-off in Gazprom debt



Downgrade Risk

- Downgrade risk refers to the chance of rating agencies lower their rating on a bond
- Downgrades are usually accompanied by bond price declines
- For investment grade issues, default is less of a concern; however, increases in the perceived credit risk of an issue result in market value declines
- For instance, a ratings agency downgrade will cause investors to demand a higher yield to hold a security



■ Credit spread (RHS)
— AstraZeneca 2.25% 2031
— 10-year US Treasury Yield

Call Risk

- Call provisions allow bond issuers to refinance their debt if interest rates fall in the future (think of our environment now)
- Negatives to the investor:
 - Disruption to a stream of expected future cash flows
 - Principal is returned to the investor sooner than expected
 - Calls likely when rates are low, forcing investor to reinvest at lower rates (reinvestment risk)
 - Capital appreciation potential of a bond is reduced
 - Investor usually receives compensation for giving issuer this option in the form of higher yields than comparable non-callable securities

Liquidity Risk

- Not one single bond per issuer—multiple bonds can be issued by an issuer with varying characteristics
- Bonds traded over-the-counter instead of via an exchange
- Bonds have added liquidity risk when compared to other asset classes



Fixed Income Market Overview

<u>Comparison /Generalisation</u>	
BONDS	STOCKS
New issue	IPO
Creditor	Owner
Interest payments	Dividend payments
Principal repayments	—
High interest rate sensitivity	High earnings sensitivity
Decentralised market	Centralised market
Over-the-counter market	Exchange traded market
Dealers primarily transact as principal	Dealers transact as agent
Less liquidity & transparency	More liquidity & transparency

Key Takeaways



- Those owning bonds are lenders to the entity issuing the debt
- Price and yield are inversely related
- There is not necessarily “one” bond for every entity; there can be multiple bonds with different ratings, structures, and yields
- Duration and yields measure certain bond attributes, but caution must be used as there are multiple versions of each parameter
- Fixed income markets are less liquid and streamlined than equity markets, making for more difficult pricing and trading conditions

T. Rowe Price recently celebrated fifty years of experience as fixed income investors, having managed income assets since 1971. Fundamental research sits at the heart of everything we do, and we hope that with this manual, we have helped equip you with a clearer understanding of fixed income investing.

Author:
Amanda Stitt, Portfolio Specialist

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Contact us

Email: PMIQualifications@Pensions-pmi.org.uk

Twitter: <https://twitter.com/pmipensions>

LinkedIn: <https://www.linkedin.com/company/pensionsmanagementinstitute>

Website: www.pensions-pmi.org.uk

Registered office:

6th Floor,
9 Appold Street
London
EC2A 2AP



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