Institute and Faculty of Actuaries

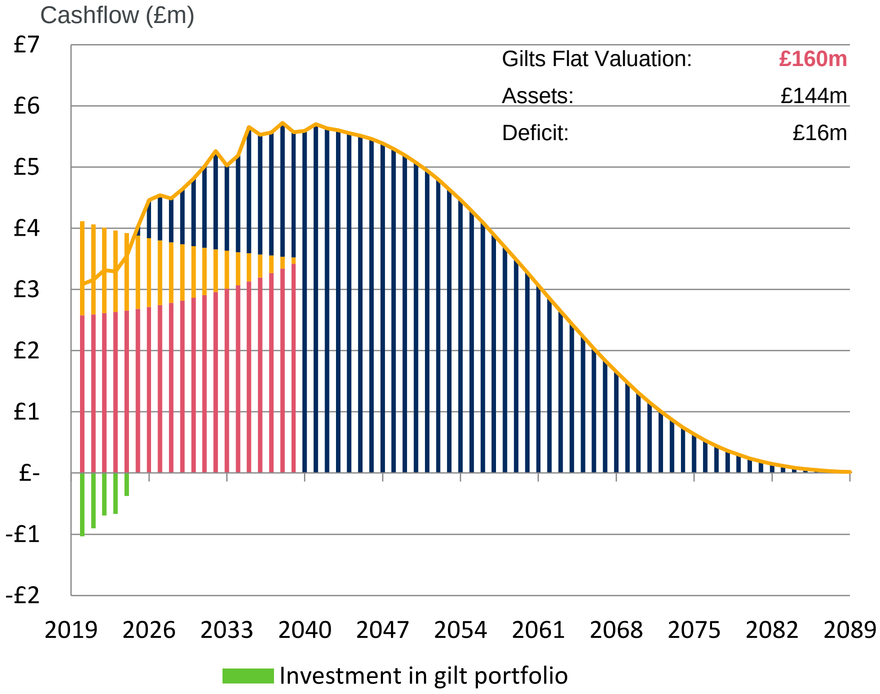
Plus ca change ….
what is new about CDI and what really isn't?

Jon Exley,
Solution Manager, Schroders

4 December 2019

There is nothing really new about meeting cashflows…

You can meet payments by selling traditional growth assets



The investment objectives of most pension schemes probably include

‘*meeting cashflows as they fall due*’.

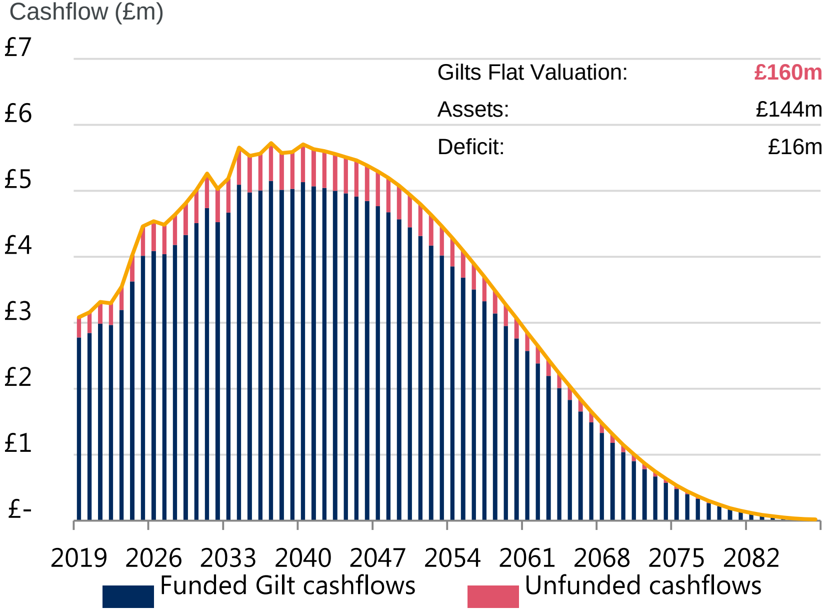
This objective could potentially be met by sale of assets or by use of income.

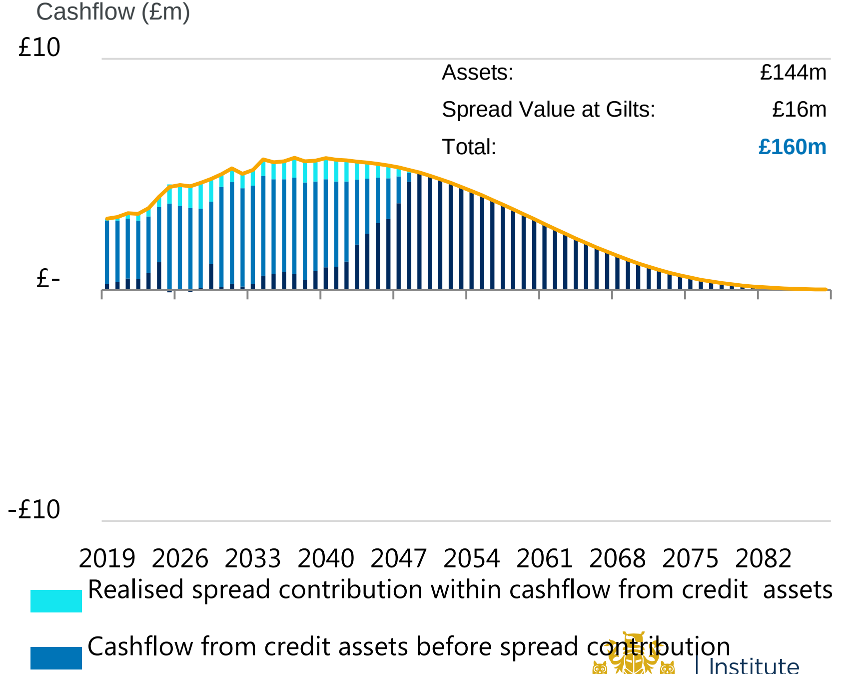
Institute and Faculty of Actuaries

Source: Schroders. For illustration purposes only.

So what is CDI about?

CDI uses “held-to-maturity” fixed income assets to meet cashflows



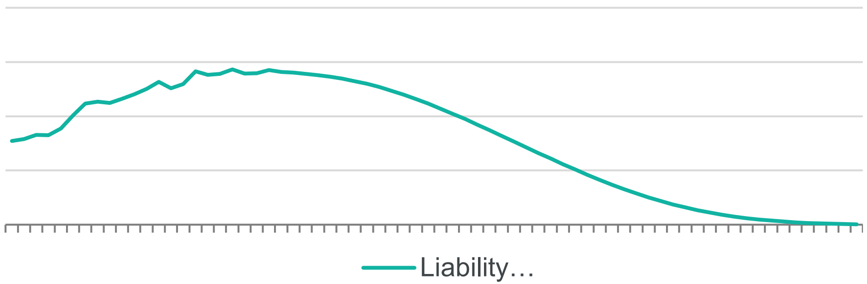


Source: Schroders. For illustration purposes only.

Institute and Faculty of Actuaries

So the spreads meet the deficit

Spread DTS measures how much deficit we can repair



Value of liability cashflows discounted at Gilts

Value of asset cashflows discounted at Gilts

Deficit (Gilt basis) + **Asset value** = **Credit Duration x Spread[1]** + **Asset value**

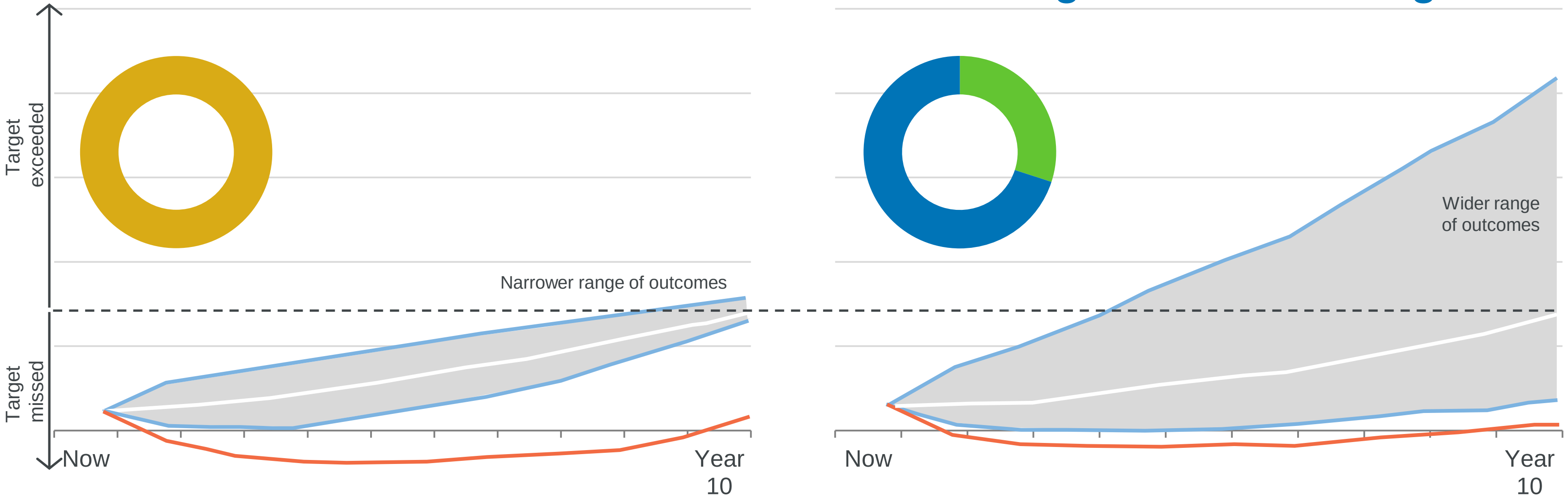
Source: Schroders. For illustration purposes only. [1]Approximate due to convexity effects

What is different about “held-to-maturity” fixed income?

Comparing CDI with a traditional approach

CDI assets

Traditional growth + matching



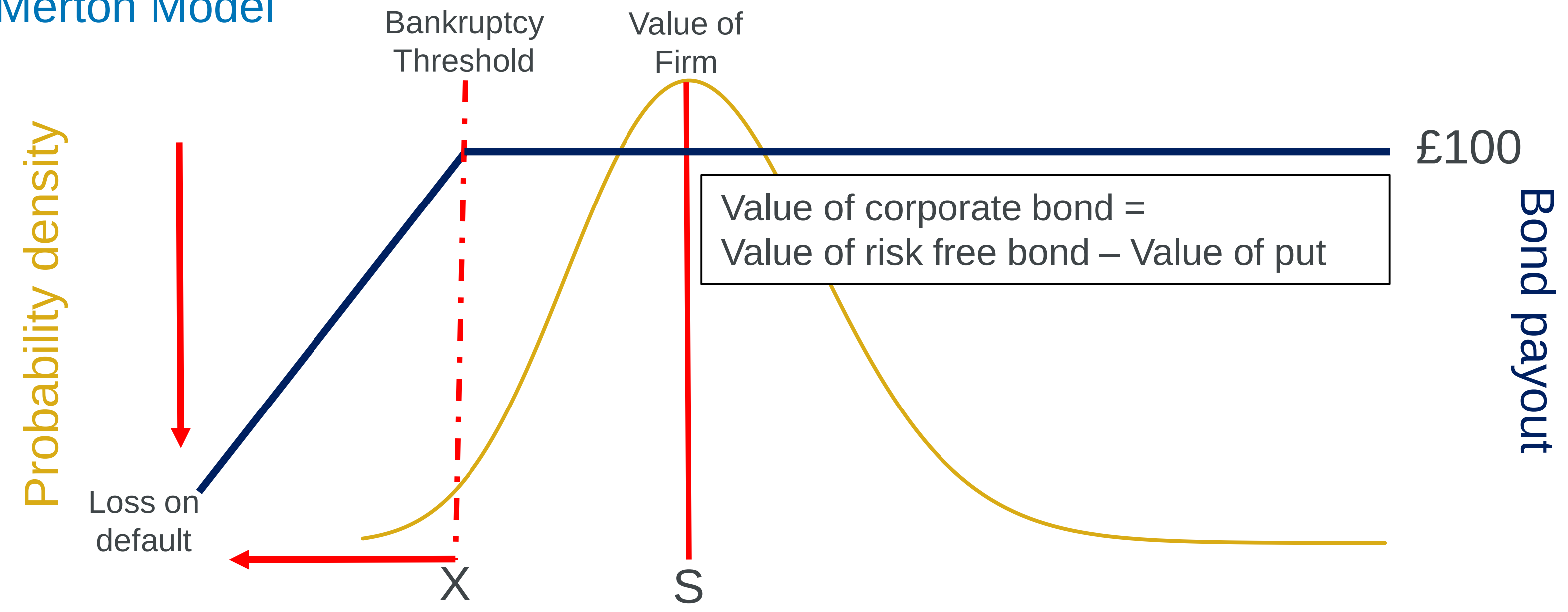
Buy and maintain credit | Equities | Gilts | Shaded areas represent vast majority of outcomes | ‘Base-case’ | Low probability downside scenario

Source: Schroders. For illustrative purposes only. *Portfolio of corporate bonds with average credit rating of A by S&P.

Institute and Faculty of Actuaries

No free lunch - credit investment as a written put

The Merton Model



- In this framework the “illiquidity” premium on corporate bonds is explained by impact of:
  - risk neutral valuation and
  - volatility skew

Source: Schroders. For illustration purposes only.

Institute and Faculty of Actuaries

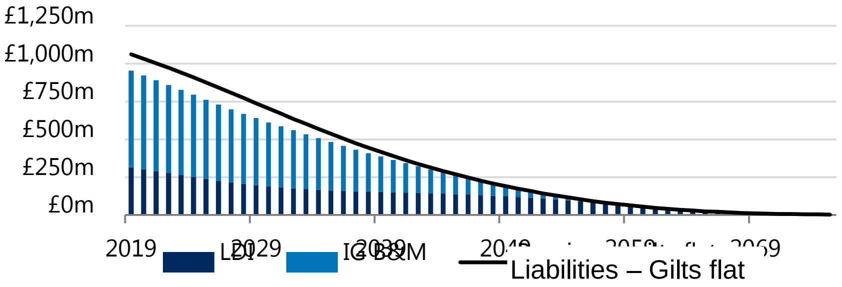
Case study: CDI solution

Solution targeting “self-sufficiency”

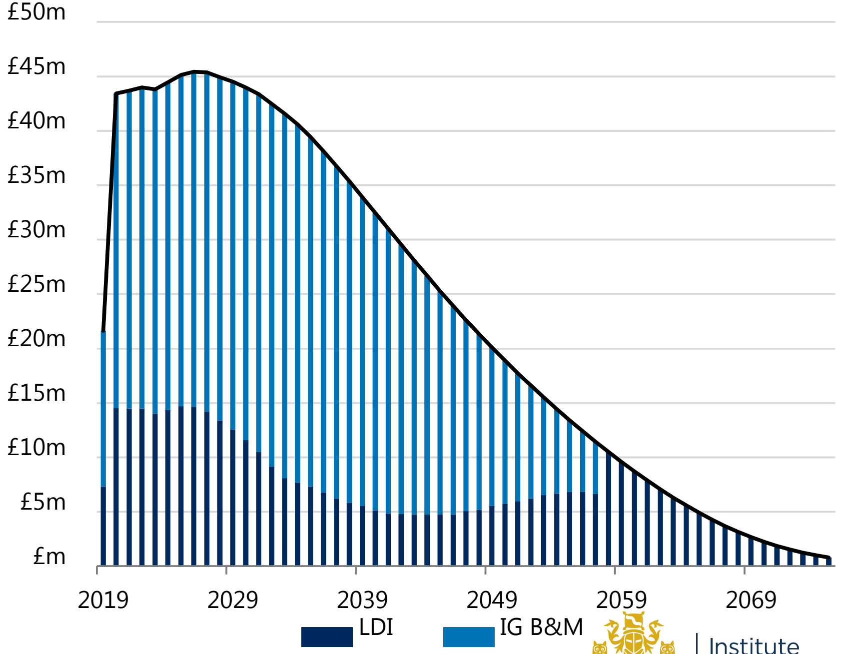
Solution maths

	Initial Spread (net)	Spread duration	Spread DTS	Allocation
Short Dated B&M	1.05%	7 years	7%	12.5%
Long Dated B&M	1.15%	14.4 years	17%	55%
LDI	-	-	-	32.5%
Total	0.75%	8.8 years	10%	100%

Asset allocation through time



Cashflow profile

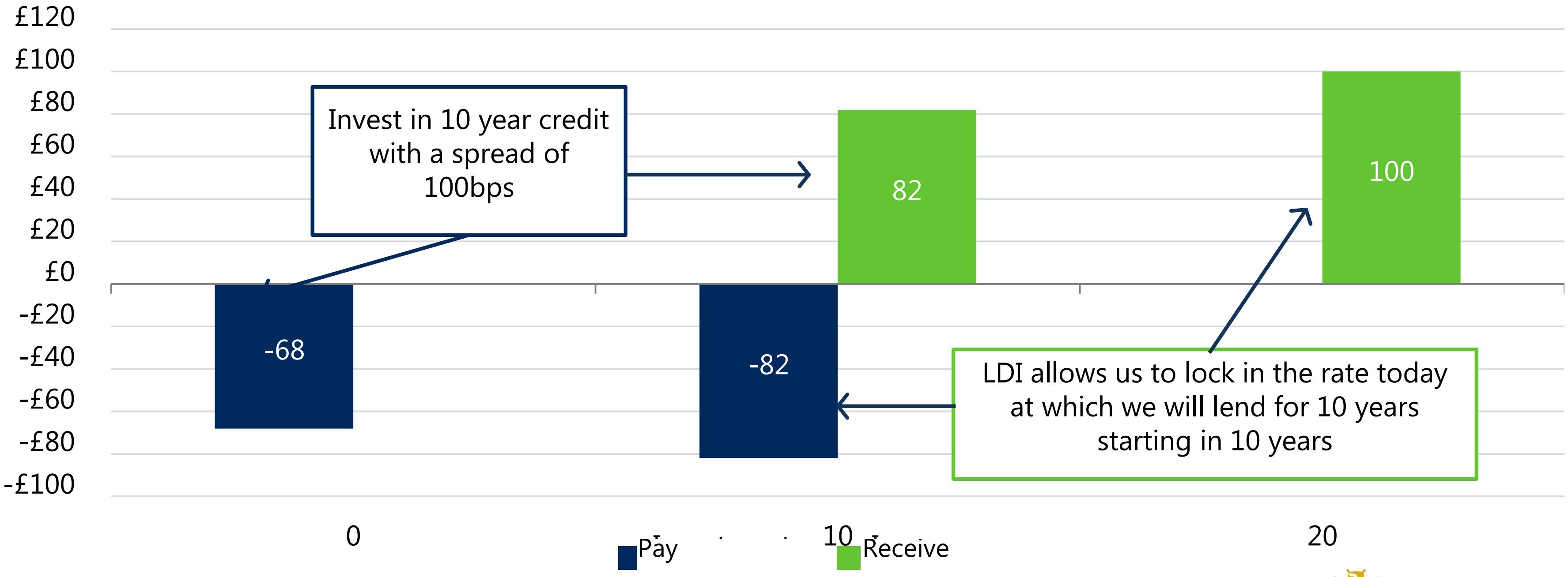


Institute and Faculty of Actuaries

Source: Schroders. Estimates as at 1 July 2019. The solution is an example for illustrative purposes only. There can be no guarantees these returns will be achieved. Scheme is 95% funded on TPs of Gilts + 50bps. Equivalent Gilts flat funding is 90%. TP liabilities total £1,000m. Liability duration is 15 years. Liabilities are ~75% real.

Is CDI about cashflow matching?

No. LDI allows us to retime cashflows



Source: Schroders. Estimates based on UK Gilt zero curve as at 1 July 2019 and an assumed spread of 100bps. For illustrative purposes only. There can be no guarantees these returns will be achieved.

Institute and Faculty of Actuaries

What about currency hedging?

More complicated than traditional NAV hedging

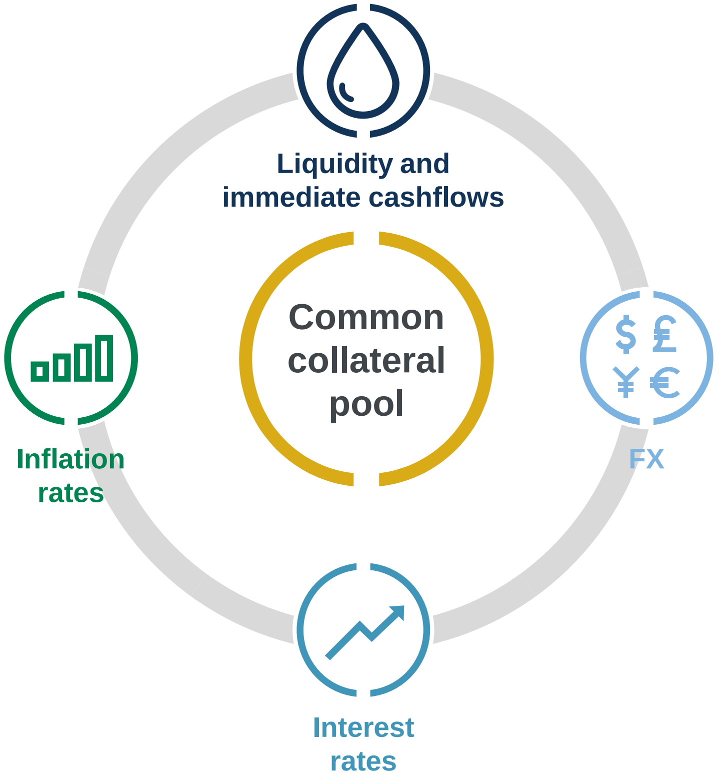
$ bond - **$ rates exposure** + **$/£ FX hedge** + **£ rates exposure** = **£ bond**

Range of options available to hedge currencies

Source: Schroders.

What about collateral?

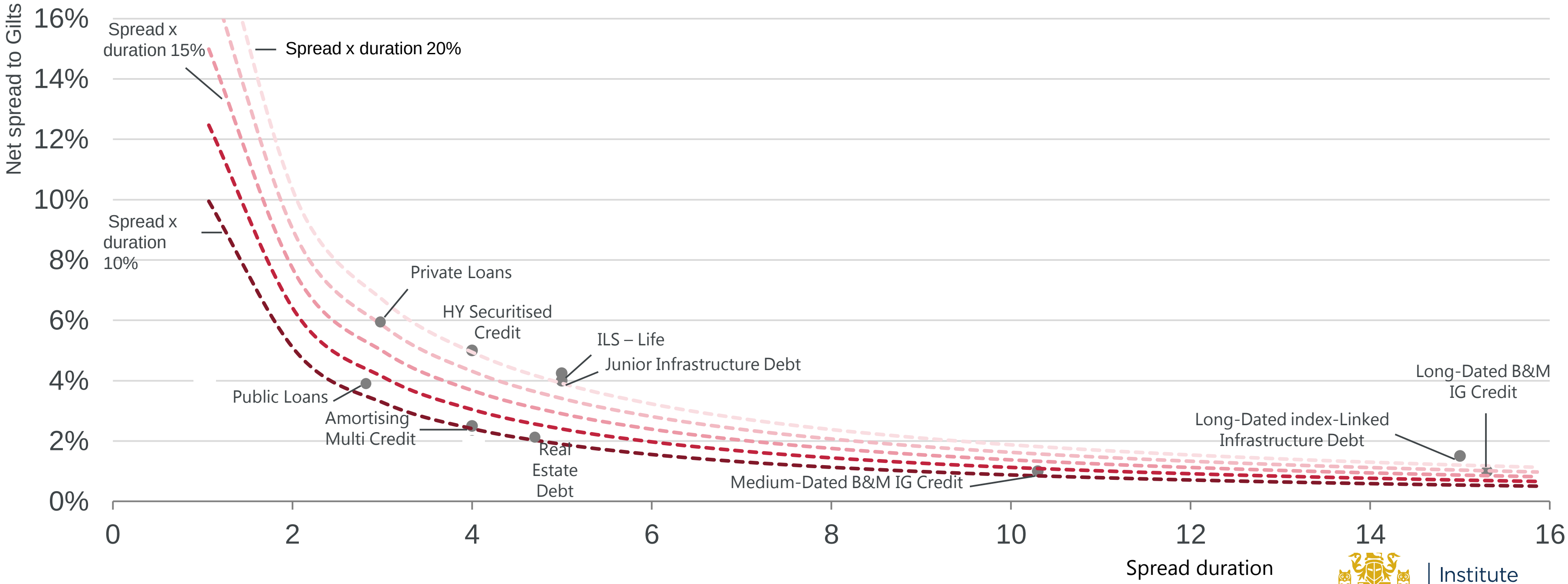
LDI capital pool supports a range of needs



Source: Schroders.

Which assets can be included?

Range of CDI building blocks enables flexibility in solution design



Source: Schroders. For illustrative purposes only and should not be viewed as a recommendation to buy or sell.

Institute and Faculty of Actuaries

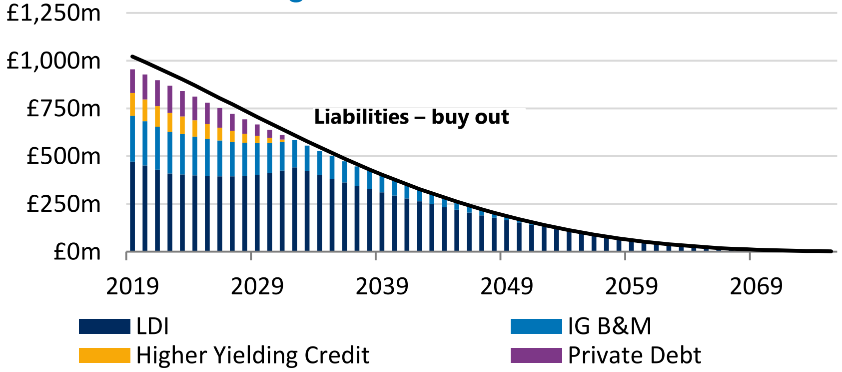
Case study: CDI solution

Solution targets buy out in 15 years

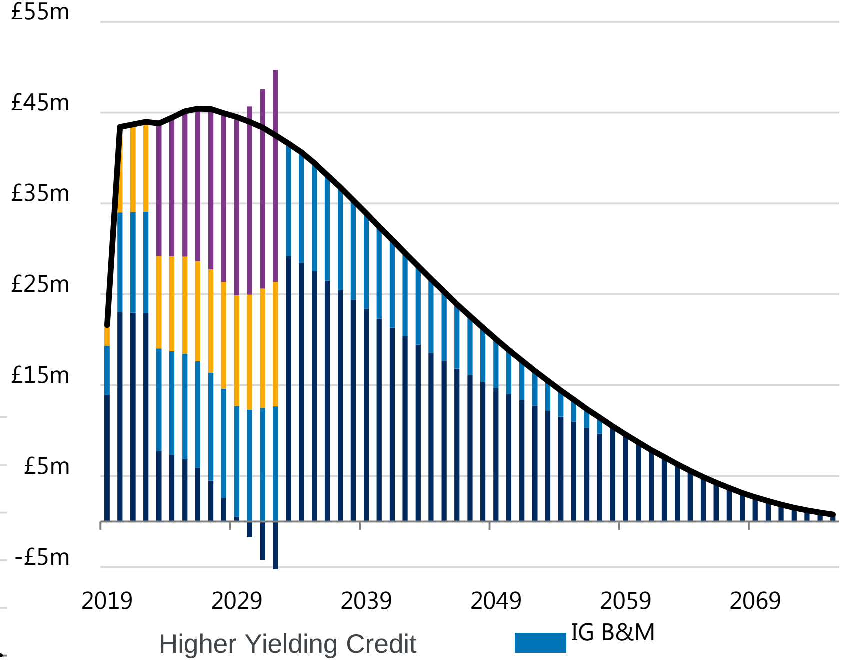
Solution maths

	Initial Spread (net)	Spread duration	Spread DTS	Allocation
Short Dated B&M	1.05%	7 years	7%	5%
Long Dated B&M	1.15%	14.4 years	17%	20%
Higher Yielding Credit	2.00%	6.8 years	14%	12.5%
Private Debt	4.00%	8.2 years	33%	12.5%
LDI	-	-	-	50%
Total	**1.05%**	**5.1 years**	**9.5%**	**100%**

Asset allocation through time



Cashflow profile

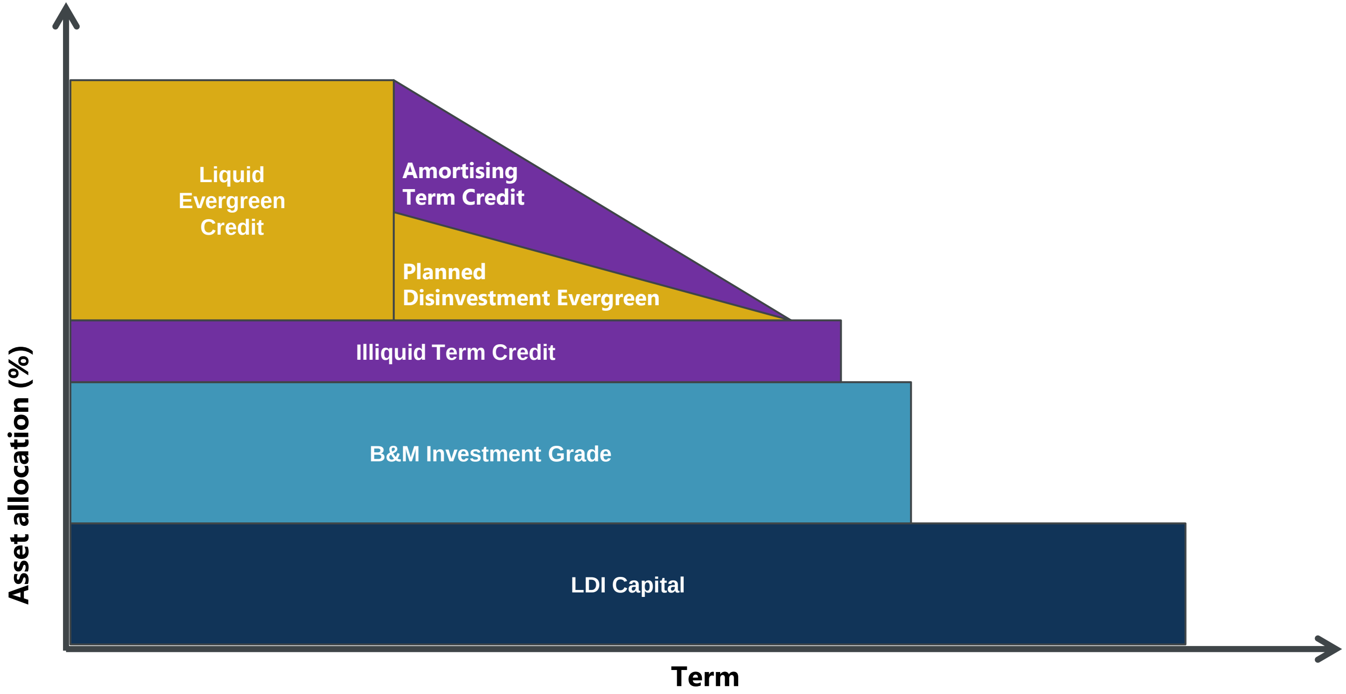


Source: Schroders. Estimates as at 1 July 2019. The solution is an example for illustrative purposes only. There can be no guarantees these returns will be achieved.

Institute and Faculty of Actuaries

Constructing broader solutions

Component roles

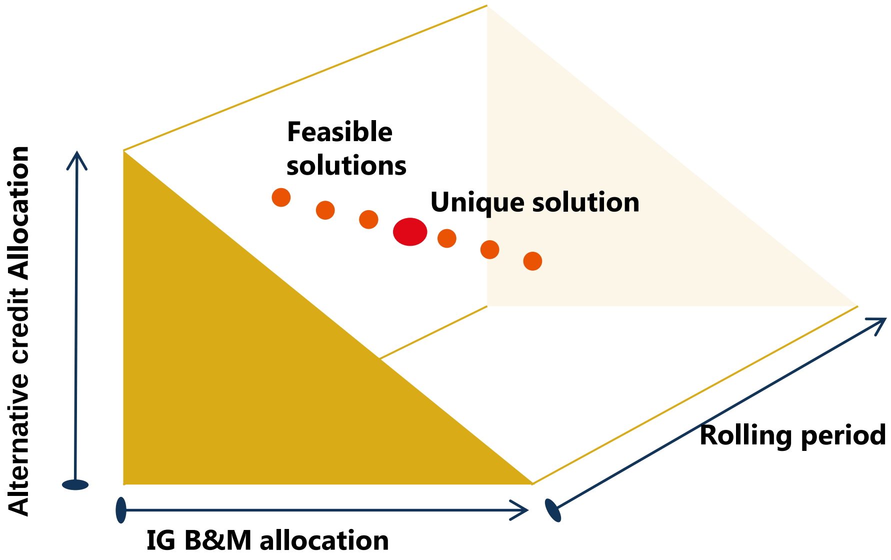


Source: Schroders. For illustration only.

Institute and Faculty of Actuaries

Constructing broader solutions

Feasible solutions and optimisation criteria



Examples of feasibility constraints

- Sufficient LDI capital
- Achieves buy out funding
- Fees, costs, implementation

Examples of “scored” criteria

- Attractive market opportunities
- Market risk profile
- Diversification
- Length of rolling period

Institute and Faculty of Actuaries

Source: Schroders. For illustration purposes only.

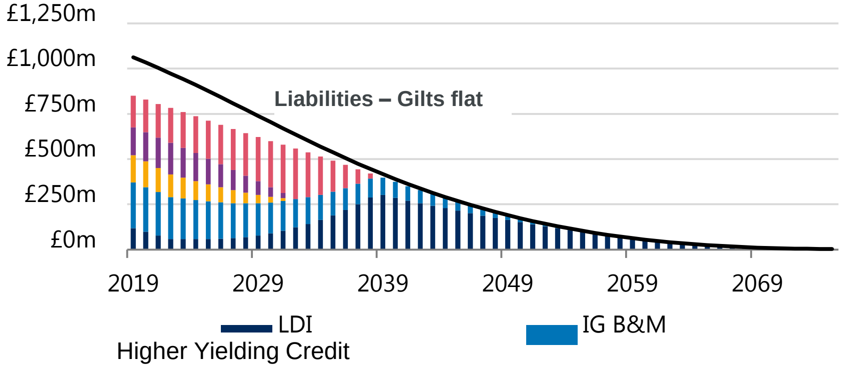
Case study: “Partial CDI” solution

20% of initial assets held on “rolling” basis

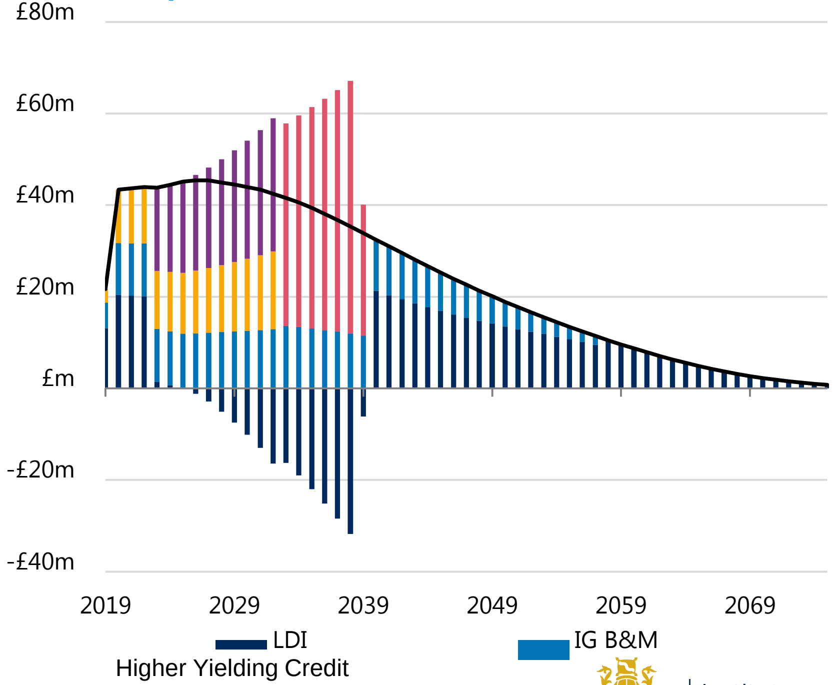
Solution maths

	Initial Spread (net)	Spread duration	Spread DTS	Allocation
Short Dated B&M	1.05%	7 years	7%	7.5%
Long Dated B&M	1.15%	14.4 years	17%	22.5%
Higher Yielding Credit	2.00%	6.8 years	14%	17.5%
Private Debt	4.00%	8.2 years	33%	17.5%
Rolling Credit Strategies	2.50%	16.3 years	41%	20%
LDI	-	-	-	15.0%
Total	**1.90%**	**9.8 years**	**20.8%**	**100%**

Asset allocation through time



Cashflow profile

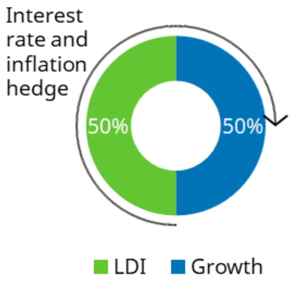
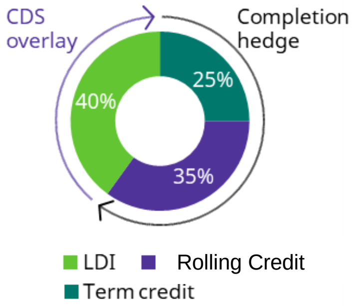
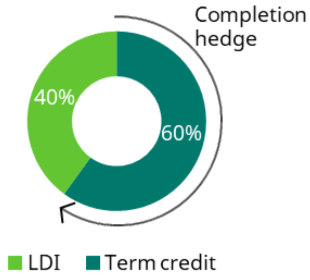
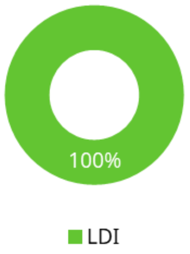


Institute and Faculty of Actuaries

Source: Schroders. Estimates as at 1 July 2019. The solution is an example for illustrative purposes only. There can be no guarantees these returns will be achieved. Scheme is 86% funded on TPs of Gilts + 50bps. Equivalent Gilts flat funding is 80%. Solution holds 80% of assets on a to-maturity basis day one.

When can CDI principles be used?

From traditional strategies to “Full CDI”

	0 Growth + LDI	1 Partial CDI	2 Full CDI	3 Gilts
Asset allocation				
Funding level on Gilt Curve	65%	75%	90%	100%
Portfolio irr (over life of liabilities)	Gilts + 2.0%	Gilts + 1.5%	Gilts + 0.5%	Gilts Flat

Source: Schroders. For illustration only. Various assumptions have been applied to estimate the excess return of the strategies. These include: growth portfolio 4.0% excess return over gilts. Evergreen CDI assumes a return of Gilts + 3.5% over the life of the liabilities. CDI portfolio constructed such that portfolio delivers target return over the life of the liabilities.

Institute and Faculty of Actuaries

What is CDI?

Key principles

1 **CDI improves the certainty of outcome by changing the return distribution of the growth assets**

– It is not really about matching cashflows

2 **LDI is an essential part of CDI solutions**

– Efficient LDI management can significantly enhance outcomes

3 **CDI can be used to meet both self-sufficiency and buy out objectives**

– There is investment flexibility in solution design

4 **Partial CDI solutions can also be considered to extend the solution set**

– These can form part of a journey to full CDI

Institute and Faculty of Actuaries

Important information

Marketing material for professional investors or advisers only. **Not suitable for Retail clients.**

This presentation is intended to be for information purposes only and it is not intended as promotional material in any respect. The material is not intended as an offer or solicitation for the purchase or sale of any financial instrument. The material is not intended to provide, and should not be relied on for, accounting, legal or tax advice, or investment recommendations. Information herein is believed to be reliable but Schroder Investment Management Ltd (Schroders) does not warrant its completeness or accuracy. No responsibility can be accepted for error of fact or opinion. This does not exclude or restrict any duty or liability that Schroders has to its customers under the Financial Services and Markets Act 2000 (as amended from time to time) or any other regulatory system. Schroders has expresses its own views and opinions in this document and these may change. Reliance should not be laced on the views and information in the documents when taking individual investment and/or strategic decision.

Past Performance is not a guide to future performance and may not be repeated. The value of investments and the income from them may go down as well as up and investors may not get back the amounts originally invested. Exchange rate changes may cause the value of any overseas investment to rise or fall.

For the purposes of the Data Protection Act 1998, the data controller in respect of any personal data you supply is Schroder Investment Management Limited (SIM). Personal information you supply may be processed for the purposes of investment administration by the Schroders Group which may include the transfer of data outside the European Economic Area. SIM may also use such information to advise you of other services or products issued by the Schroder Group unless you notify it otherwise in writing.

Risk Forecast Warning

The forecasts stated in the presentation are the result of statistical modelling, based on a number of assumptions. Forecasts are subject to a high level of uncertainty regarding future economic and market factors that may affect actual future performance. The forecasts are provided to you for information purposes as at today's date. Our assumptions may change materially with changes in underlying assumptions that may occur, among other things, as economic and market conditions change. We assume no obligation to provide you with updates or changes to this data as assumptions, economic and market conditions, models or other matters change.

Schroders' estimates and data

The data contained in this document has been sourced by Schroders and should be independently verified before further publication or use.

Derivatives – Investment

The strategy can use derivatives for investment purposes and may leverage the portfolio. These instruments can be more volatile than investment in equities or bonds. The use of leverage can increase gains as well as losses and expose the strategy to increased risk. The use of derivatives and leverage involves a higher degree of risk and may lead to a higher volatility in the unit prices of the funds.

Important information

Marketing material for professional investors or advisers only. **Not suitable for Retail clients.**

Back testing

The hypothetical results shown must be considered as no more than an approximate representation of the portfolio's performance, not as indicative of how it would have performed in the past. It is the result of statistical modelling, based on a number of assumptions and there are a number of material limitations on the retrospective reconstruction of any performance results from performance records. For example, it may not take into account any dealing costs or liquidity issues which would have affected the strategy's performance. This data is provided to you for information purposes only as at today's date and should not be relied on to predict possible future performance.

Hypothetical Modelling Results.

The hypothetical results shown in this presentation must be considered as no more than an approximate representation of a portfolios' performance, not as indicative of how it would have performed in the past. It is the result of statistical modelling, based on a number of assumptions and there are a number of material limitations of the retroactive reconstruction of any performance results from performance records. For example, it does not take into account any dealing costs or liquidity issues which would have affected a real investment's performance.

Liability Driven Investment

Entering into derivate contracts introduces counterparty risk, the potential to incur a loss if the counterparty is unable to honour its obligations. This means clients are exposed to potential losses if a counterparty were to default on its obligation. We mitigate much of this risk by receiving collateral with a value at least equal to the exposure to each counterparty. Subject to minimum transaction limits, the level of collateral will be updated on each business day. However, in the event of a default, there would be a cost involved in liquidating and reinvesting.

Liability hedging strategies may also be subject to basis risk between the valuation methodology applied to a pension scheme's liabilities and that applied to the underlying swap contracts. Derivative contracts may involve a commitment to meet LIBOR-based payments on the underlying strategies. There is a risk that the assets of a pension scheme fail to deliver the returns needed to meet these payments which would result in a deterioration in the scheme's funding level.

Whilst hedging strategies are constructed to reflect the expected behaviour of pension fund liabilities, note that pension fund liabilities can only be estimated and as such there may be a divergence between the performance of the hedge and an individual scheme's actual liabilities.

Important information

Marketing material for professional investors or advisers only. **Not suitable for Retail clients.**

Third Party Data Warning

Third party data are owned by the applicable third party identified above and is provided for your internal use only. Such data may not be reproduced or re-disseminated and may not be used to create any financial instruments or products or any indices. Such data are provided without any warranties of any kind. Neither the third party data owner nor any other party involved in the publication of this document can be held liable for any error. The terms of the third party's specific disclaimers are set forth in the Important Information section on our website www.schroders.co.uk.

Issued December 2019 by Schroder Investment Management Limited, 1 London Wall Place, London EC2Y 5AU. Registration No. 1893220 England. Authorised and regulated by the Financial Conduct Authority.