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LIABILITY DRIVEN INVESTMENT – A VICTIMLESS "DISASTER"

A Pensions Institute discussion paper

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Liability Driven Investment – a Victimless “Disaster”

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List of Abbreviations

BoE or Bank	Bank of England
Bn	Billion
Budget	"Ministerial Statement" of the Chancellor of the Exchequer to the House of Commons on 23 September 2022
Conventional	These bonds have a fixed coupon (interest payment) and a forward redemption date
CPI	Consumer Price Index
DB	Defined Benefit, otherwise "final salary"
DC	Defined Contribution
FRC	Financial Reporting Council (UK)
Gilt	British Government debt. It may be 'conventional' or 'index-linked'
FRS	Financial Reporting Standard (UK)
HMT	His Majesty's Treasury
HoL	House of Lords
IAS	International Accounting Standard
IFRC	International Financial Reporting Council
Index-linked	The coupon (interest payment) and redemption amount are both increased by RPI inflation
LDI	Liability Driven Investment
LDI Funds	Professionally promoted and managed collective funds or insurance policies for delivering LDI
LPI	Limited Price Indexation
ONS	Office of National Statistics
PPF	Pension Protection Fund, Funded by UK DB schemes, a "lifeboat"
QE	"Quantitative Easing" – a five-stage purchase of gilts totalling £895 bn by the Bank starting 2009
RPI	Retail Prices Index (as used for pensions legal calculations)
Sponsor	Describes an employer or business group setting up and contributing to a pension scheme
SSAP	A superseded UK pensions metric for employers
tPR	The Pensions Regulator
XPS	A pensions consultancy

Introduction

After a year of febrile UK politics, an incoming Chancellor announced a highly radical "Budget" in the planning of which he had intentionally sidelined all the usual consultees. Sterling had slid in the week's run up and continued to plummet. Long-term gilt yields, already rising, continued to do so. City rumour whispered that a large insurer had begged for central help.

The Bank announced a £65 bn gilt time-limited buy-back programme. Press rhetoric of "collapse," "bailout" and "emergency" was coupled with naming pension funds and "LDI" as villains or perpetrators.

The political heat became incandescent as Budget-supporters and -detractors from their grandstands attributed blame in many directions. The Bank's rescue actions were co-terminous with the careers of Chancellor and Prime Minister. "In war, the first casualty is truth": What part did "LDI" really play?

1. Why LDI at all? - Landscape and causes.

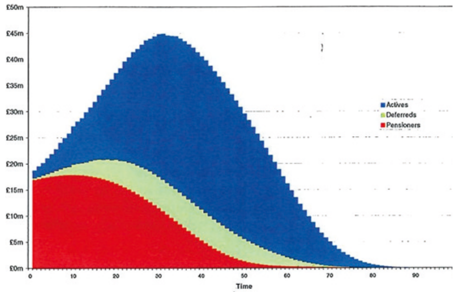
1.1 Pension funds and insurers exist to pay claims as they fall due, and financial theory has long held that the assets they choose to hold should match expected claims outgo. The tiny number of funded pension schemes (say 200,000 members) in the 1940s were run as mini-insurers. During the 1950s, scheme and member numbers rose dramatically.

1.2 A "cult of the equity" for pension funds was advocated by Ross Goobey who ran the Imperial Tobacco Pension Fund. The circumstances were that at that point, equities yielded more than bonds, inflation was not a concern, and "his" scheme was so young that it would not need to sell any investment for years; incoming contributions exceeded pension outgo. Other schemes partly followed suit. But over time, schemes profiles changed and professional opinion argued, and demonstrated, that equities alone were not an optimal "fit".

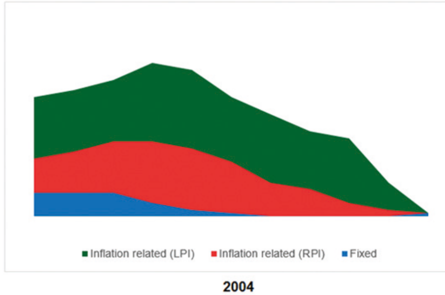
1.3 By 1980, DB member numbers had reached 13 million and schemes were maturing fast. The principal of "outgo matching" or "cashflow matching" assumed greater prominence. The impressive acronym LDI – for Liability Driven Investment – was coined by advisers. The price inflation of the 1970s and subsequent Parliamentary imposition of mandatory elements of "indexation" (inflation proofing) required the means of achieving the matching objective to be sharpened.

1.4 In the next decade, schemes near and in closure were observed constructing asset portfolios comprising a mix of both conventional and the recently introduced inflation-linked gilts.

1.5 By the millennium, "LDI" strategies were being modelled and presented by advisers to trustee boards of most ongoing schemes. The outgo modelling could plot anticipated expense by reference to beneficiary class. "Pensioners" have different characteristics from "deferreds" – those who have left the employer but not yet retired – and also from "actives" - those currently in employment (since their future rights also depend on salary inflation). Box 1



Cash flows by member class – 2002 scheme specific model



Cashflows by nature – 2004 presentation schematic

Box 1

1.6 As more and more schemes closed for "ongoing accrual", it became more meaningful to model future outgo by reference to categories of mandatory increase. Some payments are fixed for all time, some increase by RPI, some by RPI capped at 5%, some at RPI capped at 2.5%, with a possible substitution of CPI. Some increases are annual, others are cumulative.

1.7 Having thus modelled the outgo – which was needed for triennial actuarial valuations anyway – the way was eased for deciding whether to "hedge" interest and inflation risk at all: If so,

1.7.1 to what extent,

1.7.2 with what precision;

1.7.3 with what instruments?; and then

1.7.4 tasking an investment manager with fulfilling those decisions.

1.8 Until 2008, there was no obligation on an employer to have a pension scheme at all. If one was introduced, there was no obligation that it should be of the "defined benefit", DB, (then called "final salary") kind.
It could have been "DC" – defined contribution – with an individual money build up for each employee. It is therefore the more ironic that Parliament chose to impose on the more generous DB Schemes, additionally generous special increases termed "preservation" and "indexation"

Box 2 records the milestones

1975	"Preservation" for deferreds, normally 5%, in deferment
1978	GMP "revaluation" in deferment and payment, various bases
1997	Pension in excess of GMP to be indexed in payment
2005	LPI moves from RPI max 5% to RPI mark 2.5%
2011	CPI replaces RPI for LDI
	IMPOSED INFLATION RISK FOR DB SCHEMES

Box 2

1.9 Until 1981, there was no available instrument by which pension schemes could match this imposed inflation risk. A tiny issuance of index-linked gilts was introduced – available to pension schemes only – in 1981 and the Government in the form of the Debt Management Office was regularly lobbied thereafter by pension schemes to issue further index-linked gilts.

2. Sponsor Pension Metrics.

2.1 A pension scheme is created by an employer – the sponsor – and the way the scheme's attributes are reported in the sponsor's own financial accounts has been subject to heated debate over the years. Box 3 gives some salient dates. Attempts to disclose some accurate annual cost to the profit and loss account were hindered for many years by US businesses terrified of disclosing the true cost of their promises of life-long medical cover for employees.

1983	IAS 19 original
1988*	SSAP 24
1993	IAS 19, revision 1
2001*	FRS 17
2001	IAS 19, revision 2
2013	IAS 19, revision 3
2015*	FRS 102

*UK | IAS = international
SPONSOR PENSION METRICS
Box 3

2.2 For the purpose of reporting to shareholders, companies might adopt their own anticipated investment rates of return. Some adopted indefensibly optimistic rates, thus presenting an unduly benign picture. With the narrowing and tightening of the disclosure basis, scheme sponsors were compelled to present a bleaker picture. Not only were shareholders better informed, but external stakeholders such as creditors were put on alert.

2.3 There thus arose what in cricket terms is called "scoreboard pressure". It became in the sponsor management's interest to dampen down the disclosed scheme volatility. By law, the scheme sponsor must be consulted by the pension scheme trustees on the funding principles of the scheme, the scheme's actuarial criteria and the scheme's own investment policy. Trustee boards contain management appointees. Hence, while there may have been other tensions between the trustees and the sponsor as to the scheme's funding, and any deficit recovery, there was little disagreement about the principle of hedging the scheme's inflation and interest risk. It suited both sides of the table.

3. How is LDI Delivered?

3.1 Cash flow matching differs from LDI in that the former aims to match amounts of outgo over the relevant span of years with forecastable interest payments and redemptions from a portfolio of gilts and corporate bonds. At its simplest, a “buy and hold” direct portfolio could be constructed, ideally comprising a mix of conventional and index-linked gilts, but this is costly. LDI is rather more sophisticated in that, initially, it aims to hedge the interest rate and inflation risk, and, second, seeks to combine this to arrive at an optimal strategy by adding other asset classes of so called “risk assets”, equities, property, infrastructure, hedge funds and the like.

3.2 Investment managers launched “parcelled funds” to facilitate the process. An investing scheme could buy, say, a fund comprising 5-10 year corporate bonds, thus achieving the benefits of diversification and accessing the higher yields corporates deliver.

3.3 While to lay trustees, the economic effect and appearance are similar, a distinction needs to be drawn between “insurance” and “collective” funds for these purposes. For historical reasons, insurance products have enjoyed a more favoured regulatory regime than other kinds of asset management. These distinctions are anomalous and ought over time to be corrected.

3.4 Insurance based funds.

The investor holds an insurance “policy” which contains no “insurance” whatever. The value of the “policy” – say a Japanese Smaller Company Fund – is tied to some index or other measure stipulated by the provider, and, indeed, it is not always obligatory for that provider to hold a fully-matching portfolio of Japanese smaller companies. The investor has no claim to any underlying asset, merely a “personal” claim in debt against the provider.

3.5 Collective funds – strictly so-called.

Conversely, collective funds are “regulated” to greater or lesser standards, the main distinction being between retail and institutional funds. The standards of asset reporting and disclosure are much higher, and investors are protected against the fund manager’s insolvency by having proprietary rights, in common with co-investors, against the underlying assets. Providers of insurance funds operate under a less-demanding or non-existent disclosure duty.

3.6 It may be needless to record that ‘failure’ of an LDI Fund – its fall to zero – entails no compensation; the investor has clear title to the ‘policy’ or ‘units’ which, under their terms and operation, are now valueless.

3.7 A UK pension scheme may invest anywhere in the world and asset managers seek to develop products which straddle national markets. It is entirely common for UK pension schemes to invest in collective vehicles and funds domiciled in a non-UK country. Ireland, Luxembourg and The Netherlands are regularly favoured. This aspect is important for when consideration of the “regulation” of LDI Funds comes into play.

3.8 The value of schemes using LDI strategies is said to be £1.6 trn. Managed LDI Funds are estimated at £921 bn with one manager said to account for 42%. Box 4

LDI Funds	175
Schemes using LDI strategies	1,800
Value of LDI 'market'	£1.6 trn
Value of LDI Fund market	£921 bn
L&G (42%) share	£387 bn

Sources: BoE evidence to HoC; The Daily Telegraph 4.10.22; Extrapolation; Schemes using LDI strategies assumed to combine those directly incepting derivatives and also LDI Fund buyers.

Box 4

4. LEGAL CONSTRAINTS, INVESTMENTS, DERIVATIVES AND BORROWING.

4.1 At a late stage and with no consultation, a provision was introduced into the retail financial services legislation in 1986 to the effect that pension scheme trustees wishing to conduct "day-to-day" management of their fund – which many had done until then – were required to have financial services' "authorisation" under the then FSA.

4.2 Obligatory consultant reliance.
But since the formalities of "authorisation" were burdensome, few scheme trustees – 200 or so – opted for this route. This had the effect that the non-opted in majority were functionally driven into an unhealthy reliance on investment consultants. In essence, any trustee with independent thinking could be met with the riposte that they were precluded from day-to-day decision taking.

4.3 Following the Maxwell thefts, a code as to pension scheme investment was proposed by the Goode Committee and incorporated in the succeeding legislation. This explicitly, for the first time, empowered trustees to make "an investment of any kind as if they were absolutely entitled to the assets of the scheme."[1]

4.4 EU and UK measures.
As part of an exercise in harmonizing and facilitating cross-European pension activities, an EU "Proposal" was made in 2000[2] followed by a Directive "On the activities and supervision of institutions for occupational retirement provision" three years later.[3] The UK implemented the Directive in 2005.
Box 5.

4.5 For our purposes, the Proposal contained few hints as to its underlying thinking, but one sentence merits attention:

"… institutions should be able to opt for an asset allocation that suits the precise nature and duration of their liabilities."

[1] *Section 34(1) Pensions Act 1995. See Sections 33-36 generally.*
[2] *Published as 2001 C 96*
[3] *Directive 2003 41 EC of 3 June 2003*

Proposal 2001/C 96	20003/41/EC Article 18 Investment rules	SI 2005/3378 Investment by trustees	UK Pensions Data
✓	1. Member States shall require institutions located in their territories to invest in accordance with the 'prudent person' rule and in particular in accordance with the following rules:	4.—(1) The trustees of a trust scheme must exercise their powers of investment, and any fund manager to whom any discretion has been delegated under section 34 of the 1995 Act F1 (power of investment and delegation) must exercise the discretion, in accordance with the following provisions of this regulation.	
✓	(a) the assets shall be invested in the best interests of members and beneficiaries. In the case of a potential conflict of interest, the institution, or the entity which manages its portfolio, shall ensure that the investment is made in the sole interest of members and beneficiaries;	(2) The assets must be invested— (a) in the best interests of members and beneficiaries; and	
✓	(b) the assets shall be invested in such a manner as to ensure the security, quality, liquidity and profitability of the portfolio as a whole.	(b) in the case of a potential conflict of interest, in the sole interest of members and beneficiaries.	
✓	Assets held to cover the technical provisions shall also be invested in a manner appropriate to the nature and duration of the expected future retirement benefits;	(3) The powers of investment, or the discretion, must be exercised in a manner calculated to ensure the security, quality, liquidity and profitability of the portfolio as a whole.	
Absent	(c) the assets shall be predominantly invested on regulated markets. Investment in assets which are not admitted to trading on a regulated financial market must in any event be kept to prudent levels;	(4) Assets held to cover the scheme's technical provisions must also be invested in a manner appropriate to the nature and duration of the expected future retirement benefits payable under the scheme. (5) The assets of the scheme must consist predominantly of investments admitted to trading.on regulated markets. (6) Investment in assets which are not admitted to trading on such markets must in any event be kept to a prudent level. (7) The assets of the scheme must be properly diversified in such a way as to avoid excessive reliance on any particular asset, issuer or group of undertakings and so as to avoid accumulations of risk in the portfolio as a whole. Investments in assets issued by the same issuer or by issuers belonging to the same group must not expose the scheme to excessive risk concentration.	
Absent	(d) investment in **derivative instruments** shall be possible insofar as they contribute to a reduction of investment risks or facilitate efficient portfolio management. They must be valued on a prudent basis, taking into account the underlying asset, and included in the valuation of the institution's assets. The institution shall also avoid excessive risk exposure to a single counterparty and to other derivative operations;	(8) Investment in **derivative instruments** may be made only in so far as they— (a) contribute to a reduction of risks; or (b) facilitate efficient portfolio management (including the reduction of cost or the generation of additional capital or income with an acceptable level of risk), and any such investment must be made and managed so as to avoid excessive risk exposure to a single counterparty and to other derivative operations.	£234bn – Gross exposure, ONS 6/22 £498bn – Notional leverage TPR 12/99
✓	(e) the assets shall be properly diversified in such a way as to avoid excessive reliance on any particular asset, issuer or group of undertakings and accumulations of risk in the portfolio as a whole. Investments in assets issued by the same issuer or by issuers belonging to the same group shall not expose the institution to excessive risk concentration;	(9) For the purposes of paragraph (5)— (a) an investment in a collective investment scheme shall be treated as an investment on a regulated market to the extent that the investments held by that scheme are themselves so invested; and (b) a qualifying insurance policy shall be treated as an investment on a regulated market. (10) To the extent that the assets of a scheme consist of qualifying insurance policies, those policies shall be treated as satisfying the requirement for proper diversification when considering the diversification of assets as a whole in accordance with paragraph (7).	
Absent	2. The home Member State shall prohibit the institution from borrowing or acting as a guarantor on behalf of third parties. However, Member States may authorise institutions to carry out some borrowing only for liquidity purposes and on a temporary basis.	**Borrowing and guarantees by trustees** 5.—(1) Except as provided in paragraph (2), the trustees of a trust scheme, and a fund manager to whom any discretion has been delegated under section 34 of the 1995 Act, **must not borrow money** or act as a guarantor in respect of the obligations of another person where the **borrowing** is liable to be repaid, or liability under a guarantee is liable to be satisfied, out of the assets of the scheme. (2) Paragraph (1) does not preclude **borrowing** made only for the purpose of providing liquidity for the scheme and on a temporary basis	£234bn Repos and borrowing ONS 6/22

Box 5

The Proposal and its implementation may be said to be aspirational. The British tradition of law-making is to be clinically precise rather than to state wide principles. But the UK regulations in 2005 followed Westminster's habit of keeping close to the language of a parent EU Directive.

4.6 The Proposal was silent on questions of derivative usage and borrowing. These, nevertheless, formed part of the Directive. The Directive text is contained in Box 5 and repeated, in slightly different form, in the UK's implementation of that.[4] Bank participants in the derivatives market had in the past lost substantially when their customer counterparties (municipal authorities), having themselves experienced large losses, evaded honouring these by claiming, in the courts, that their activities had been outside their legal powers, "ultra vires". It is probable that the inclusion in 2003 of derivative powers to pension schemes was intended to reassure the banks rather than confer on schemes a novel freedom. An explicit statutory permission accordingly shielded the banks from this risk.

4.7 No borrowing.
The genesis of the "no borrowing" provision has not been identified. The artificiality of the derivative constraints and "no borrowing" rules became heightened with the increasing sophistication of LDI strategies. If a scheme

[4] *SI 2005-3378 REGS 4&5*

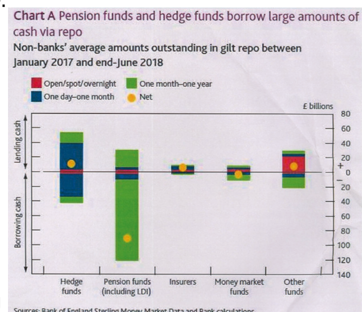
may "invest" but not "borrow" is it thereby precluded from investing in any enterprise that itself borrows? If the answer were "yes" it would rule out investment in virtually every trading entity and many long-established investment funds besides. Similarly, if derivatives may only be incepted while avoiding "excessive risk exposure to a single counterparty," does this preclude a scheme from investing in a product that itself incurs higher levels of risk – such as a leveraged LDI Fund?

4.8 Repos.
The question becomes acuter with "repos" – the common repurchase agreement encountered in all sophisticated markets. A security is sold to a counterparty at one price and the seller contracts to repurchase it at a fixed time later at a higher price. The "buyer" is functionally a lender, the "seller" is a "borrower". Just as the bill of exchange was devised by 14th Century Florentine bankers to circumvent Christian restrictions on usury[5] so a repo, though not designed with this mind, effectively functions as a form of borrowing that may circumvent the legal ban.

The author was sufficiently concerned at repos constituting unlawful borrowing, that he obtained official comfort from tPR. The official guidance[7] that emerged endorses the use of repos and leverage.

"Derivatives, such as interest rate or inflation rate swaps, **gilt repurchase arrangements (gilt "repo")** etc, can be used to match liability or cash flow characteristics more closely. They can also, through the use of **leverage**, provide increased exposure to interest and inflation rates and reduce the proportion of the scheme's assets that need to be held in the matching asset portfolio to achieve a given level of matching. This approach is known as LDI."[6]

4.9 Whether repos do or do not constitute "borrowing" may be for the Courts to decide. The Bank had no hesitation in categorising repos as "borrowing" when discussing financial stability.[7] Box 6. A large amount of schemes' borrowing at £120 bn is classed as "one month - one-year", the green band, so this cannot be defended as "temporary" borrowing.[8]



Box 6

4.10 Direct trading in derivatives is a long-established professional market dominated by the larger investment banks. The underlying contractual arrangements follow US thinking.

4.11 A pension scheme contemplating direct derivative inception needs to approach a number of bank counterparties and negotiate preliminary contracts with each. These are termed ISDAs (named after the trade association) and need to be accompanied by CSAs (Credit Support Annexes).

[5]*"Cambium non est mutuum" A sale is not a loan. See, e.g. de Roover, The Medici Bank, 1397 – 1494 page 11.*
[6]*tPR March 2017, updated September 2019 "DB Investment".*
[7]*Financial Stability Return November 2018 pp 51-7*
[8]*Refer United Dominions Trust v Kirkwood [1966] 2 Q B 431. What the City of London regarded as a "bank" was a "bank" in law. If the Bank of England categorises repos as borrowing, does that determine the legal question?*

4.12 Each document may contain many variables, and their negotiation will be detailed and time-consuming. Each party is keenly concerned with the other's credit status, their potential for default and to preserve an ability to instantly and incontestably close out a trade. Grounds for calling default may include some regulatory intervention against the counterparty, a default elsewhere (cross-default) and a failure to post collateral. In this market, some trades are short-term but others may have up to 30 years' life. Loss of such a long-term contract could be a serious matter.

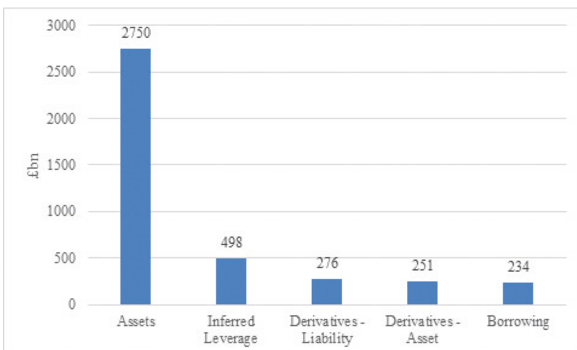
To keep each party covered against the other's default, a collateral regime is prescribed. A position is valued and collateral demanded by the disadvantaged party within a set time frame. A counterparty calling for collateral need not take any nuclear step on its non-delivery within the short time set; when the delayed item is delivered, the caller is solaced with a modest interest charge.

4.13 What is acceptable as collateral is seriously negotiated. Sometimes cash only is permitted, or sovereign credits, and the tenor of any bonds, short or long, is set. Additionally an excess margin is stipulated (known as a "haircut") such that, for example, cash may be acceptable to 100% of the calculated inter-party exposure, but a short-dated gilt must be posted to the value of 105% and a longer one to 110%. Collateral may pass either way, depending on which party's position is negative, all in accordance with the parties' contract machinery.

4.14 To reduce market risk, most (but not all, still) "over-the-counter" trades after inception are novated to central clearing in which case here, the scheme's exposure to its original counterparty investment bank is replaced by exposure to the clearing house.

4.15 The upshot is that, as the position's value changes adversely due to market movement, the party must put up additional, acceptable collateral within the (short) time frame agreed in the CSA. Failure entitles, though it does not oblige, the counterparty to declare default and instantly close out the position.

4.16 An estimate of leverage use, derivatives and "borrowing" compared with total pension scheme funds is in Box 7.



Derivatives leverage and borrowing in relation to total scheme assets. Source ONS et al.

Box 7

5. LEVERAGED LDI FUNDS.

5.1 Early LDI Funds delivered hedging on a 1:1 basis. The aim of a leveraged LDI Fund, however, is to hedge a larger amount of inflation interest risk with a smaller asset quantity. Like with all other investments, any borrowing – to create the leverage – amplifies gains or losses as markets move.

5.2 The immense utility of a leveraged LDI Fund, therefore, is not to tie up the bulk of a scheme's assets in "matching" holdings but to allow a proportion to be invested elsewhere in, hopefully, more remunerative, if more volatile, asset classes.

5.3 A typical leveraged LDI Fund, therefore, first sets upper and lower limits to the leverage deemed acceptable, and then prescribes the consequence of it straying outside that range. Upper leverage multiples of 7 are reported; a lower level might be 2.5. Where market movements so demand, the manager has options: either to call or repay investor cash; or to reduce or increase hedging exposure. An investor deciding not to meet a cash call, when made, loses a proportion of the desired hedge. Box 8 sketches the process.

Leveraged LDI fund – "rebalancing" steps		
Event	Manager Choice	Investor Consequence/Action
Upper rebalancing point reached		
Either	Tops up to maintain exposure	1 Pays cash call 2 Maintains hedge
Or	Reduces exposure	1 Cash neutral 2 Own hedge reduces
If lower rebalancing point reached		
Either	Payout to maintain exposure	1 Receives cash back 2 Maintains hedge
Or	Increases exposure	1 Cash neutral 2 Own hedge increases

Box 8

5.4 Over the years since introduction, these funds operated smoothly. Regular reports informed the investor of the leverage number's position within the prevailing range, and cash passed between the parties, in either direction, as envisaged.

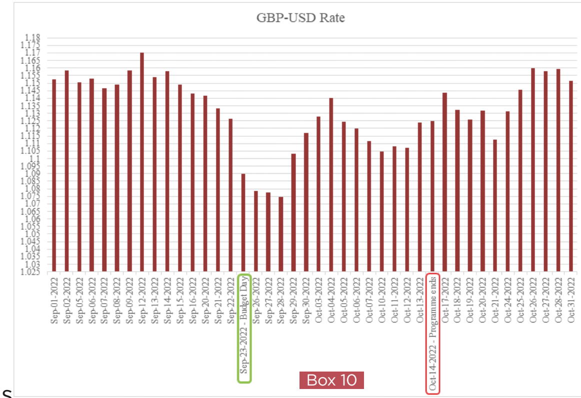
6. WHAT DID OR DID NOT HAPPEN?

6.1 The "prequel", the 18 days and the sequel of the LDI episode are well known and briefly recorded in Box 9. After a year of unstable politics, a little known new Prime Minister and Chancellor assumed office. The latter immediately unveiled a radical programme having failed to consult the usual consultees.

- 2022	
7 July	Johnson resigns
20 July	Conservative MPs choose Sunak (55% of votes)
5 September	Conservative Party members choose Truss (57% of their votes)
September	BoE MPC announce £80 bn. sales over next 12 months to unwind QE £895 bn. build-up
September	Long gilt yields rise from 3.2% to 3.83%
13 September	Sterling commences slide against Dollar (1:1.143)
"18 days" – 2022	
23 September	Budget announced
26 September	Sterling now at 1:1.035 against dollar, a "record low" Long gilt yields at 4.44%
27 September	IMF criticises budget
28 September	BoE announces £65 bn. gilt purchase measure: initially conventional gilts only Moody's downgrade – Budget "credit negative"
29 September	L&G, Aviva and Phoenix cited as "big fallers" in the FTSE 100
5 October	L&G reassures shareholders "own balance sheet not exposed"
6 October	BlackRock, Insight and LGIM cited as stressed parties
7 October	BoE says UK was on "the brink of a crisis" Long gilt yields steady back at 4.03%
10 October	BoE contradicts HMG claim that global factors and Ukraine invasion caused turbulence BoE announced it would conclude its £65 bn. gilt programme on 14 October BoE announced creation of TECRF
11 October	BoE now buys index-linked gilts as well
14 October	BoE ceases gilt purchase programme Kwarteng dismissed as Chancellor
Sequel 2022/3	
20 October 2022	Truss resigns
November 2022	BoE actively selling QE gilts
30 November 2022	Luxembourg, Ireland and ESMA require GBP LDI funds to maintain or improve resilience tPR issues "Maintaining LDI Resilience" to schemes
12 January 2023	BoE announces completion of sale of residue of LDI support gilts Purchases reported as £12.1 bn. conventional, £7.2 bn. Index-linked Bloomberg reports BoE made £3.5 bn profit
7 February 2023	House of Lords I & RC report "The Use of LDI..."
14 February 2023	Insight reported to have "disregarded" market pricing on 27/9/22 to avoid cash calls on clients
March 2023	House of Commons W&PC to consider

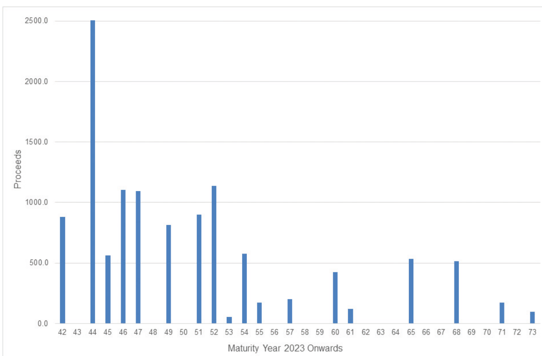
Box 9

6.2 The foreign exchange market, nervous in the previous week (see Box 10) reacted sharply. Holders of gilts, foreign and domestic, already anticipating major sales to start unwinding QE were spooked. Budget Day (a Friday) saw the largest single-day long-yield increase in 20 years as the immediate selling drove yields upwards and the value of gilts posted as collateral correspondingly downwards.

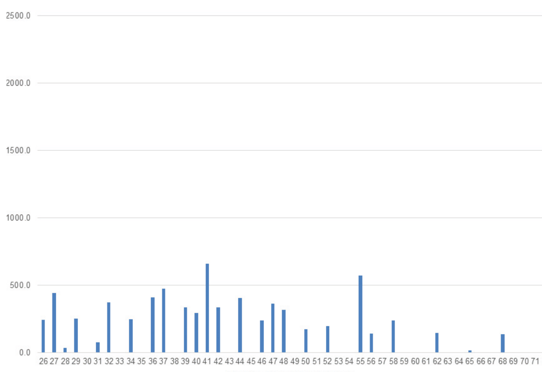


6.3 On the succeeding Wednesday (28 September), the Bank announced a gilt buying measure of up to £ 65 bn. In the 13 days the programme lasted, £19.5 bn was bought and was later resold at a profit to the Bank of £3.5 bn.

6.4 In conventional gilts, the Bank rejected 37% of those offered. The weight of



Fixed-Interest Purchases by proceeds £bn



Box 11

Index-linked purchases by proceeds £bn the sales was at the 20-year mark, which corresponds with the weight of a typical scheme's liabilities – see Box 11.

6.5 In the last three days of the programme the Bank started buying index-linked gilts and rejected just 3% of those tendered. The Debt Management Office, the body charged with supervising the sale of government credit, had initially expressed reluctance at the time to the pension scheme lobbying, to increasing the size and maturity of index-linked issuance on the ground there was unlikely to be a vibrant, active, trading aftermarket.[9] Pension scheme and insurance buyers were likely to "buy and lock up." It may be supposed that a continuing lack of natural purchasers prompted a more favourable treatment accorded to the sellers of index-linked over conventional gilts. Box 12 compares the timeframe and modesty of this intervention against the still-unresolved QE build up.

Daily gilt turnover	£45.67
Daily averaged intervention	£1.48
Intervention trading days	13 days
Intervention % to market turnover	3.2%
Total intervention	£19.3
Gilts held in QE (QE 1-5)	£895
Commencement of QE build-up	2009
Ratio of conventional gilts rejected	39.3%
Ration of index-linked limited rejected	3.2%
Profit reported by BoE	£3.5

All £ values = £ bn.
INTERVENTION IN CONTEXT
Box 12

7. TEMPORARY EXTENDED COLLATERAL REPO FACILITY.

7.1 At a late stage in the 13 days, the Bank announced a TECRF programme permitting middle-grade corporate bonds to be pledged for emergency loans.

7.2 Whatever the customer pressure, or the Bank's view as to so arranging may

Start	31 days from 10 October 2022
Total of rescue	£5.75 m
Average use per day	£0.5 m
Acceptable collateral widened	

TEMPORARY EXTENDED COLLATERAL REPO FACILITY
Box 13

have been, is unknown. The need or take-up proved in the event to be trifling. See Box 13. But the very fact of the announcement testifies to a high level of continuing central bank nervousness.

[9] *Pers. con. during the 1990s, author with Sir Robert Stheeman, then and still DMO CEO.*

8. "VICTIMS"

8.1 Large Schemes.
News reports abounded of schemes being forced to sell assets to meet collateral calls. Sponsor names included BP, BT, Royal Mail, BA, Rolls Royce, Tesco and Serco.

8.2 An enterprising journalist noted that the Bank's own scheme was also a seller.[10] These are all, of course, large, mature schemes. Reports followed about schemes issuing reassurance to the Press:

"[Royal Mail Pension Plan] regularly buys and sells assets. It is not a forced seller of any assets. Collateral needs were met."[11]

Tesco said "Like many pension schemes, we've been closely monitoring and managing the impact of the recent market volatility. Our pension scheme remains in a strong position." [12]

"The Rolls Royce ... Fund is one of the few in the FTSE 100 which is in significant surplus"
Others issued a similar reassurance to members.

8.3 One law firm later reported instances of client schemes obtaining a short-term loan from the sponsor to bridge the gap between putting up extra collateral and receiving sale proceeds.[13]

8.4 Direct Derivatives Users.
From the derivatives market itself came no stories of close-out, default or cross-default against pension scheme "customer" counterparties.

8.5 Sponsors.
No loss or damage was reported by sponsors. The rise in long-gilt yields would be neutral if their scheme were fully hedged, which was less likely. If their scheme were, say, 70% hedged, their overall funding rose.

Overall sponsor benefit (not loss) in the year is illustrated through the PPF 7800 Index. In the year to end November 2022, the aggregate deficit of schemes shrunk from £125.9 bn to £5.8 bn. Schemes in deficit reduced from 2,403 to 746.[14]

8.6 Members.
There were no reports of member prejudice, nor would one expect any. Their claims remained against their scheme: scheme funding had improved dramatically.

8.7 TV optant members.
DB Schemes are required to offer "transfer values" to members. The amount varies with interest rates and to some extent scheme funding. Those few members opting to receive transfer values will have seen the quoted figure reduced during the year in tandem with the rise in gilt yields.

[10] *Daily Mail 15.10.22.*
[11] *Mail on Sunday (London) 16.10.22*
[12] *Mail on Sunday 16.10.22*
[13] *Baker McKenzie 27.2.23, Sharp, Thomson-Hill & Hickling.*
[14] *PPF 7800 Index 30.11.22. This uses their "Section 179" 7800 methodology.*

But the reduced money amount quoted would have bought a correspondingly higher annuity – 30% improvements in these were reported – so the ostensible loss would be thereby compensated. Any prejudice would have been caused, of course, by the yield rises, not by the market disruption.

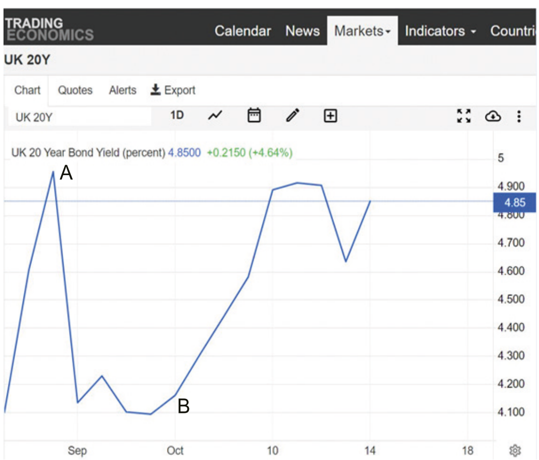
9. "SMALLER" SCHEMES.

9.1 The fullest outcome analysis has been provided by XPS[15]. They analysed the actions of 6 LDI Fund providers as observed by their client base. During and following the events, some communications were made to their consultancy ("fewer than one would have wished") under expectations of confidentiality. For this reason, the providers are anonymised.

- all 6 called capital at short notice
- 2 suffered a temporary 2-4 working days reduction in "exposure" (hedging effectiveness)
- 1 suffered a permanent reduction in exposure (hedging effectiveness)
- temporary (1-4 working days) suspensions or pricing adjustments were noted for 3.

9.2 A temporary suspension or reduction in hedging, or pricing adjustment, that is later corrected, should not cause loss. If I forget to insure my house for a week, I could put that right for the future, but I only suffer loss if lightning strikes during the uninsured week.

9.3 The issue identified by XPS is that suspension or reduction in hedging occurred during the **reversal** phase of the Bank's purchases. A spike downwards in yields in that very short window has the potential to cause permanent loss. One might say that here, the very act of rescue injured the casualty. See Box 14.



Rescuer injures casualty? Temporary reduction of hedge by LDI Fund as the 'rescue' triggers a sudden yield downspike, from 30 September to 5 October (A-B) may have caused comparative funding loss to holders

Box 14

[15] *February 2023 Investment briefing, Gold & Minnis.*

9.4 Greater impact is caused by the single Manager showing **permanent** reduction in exposure. XPS stress that, between clients, there was a material dispersion in experience across users of LDI Funds. Full reference needs to be made to the excellent paper, but an estimate of a 5% reduction in hedge, across clients may, under caveat, be cited.

9.5 To meet calls or not?
As described at 5.3, where an LDI Fund nears or crosses its upper rebalancing point by becoming too highly leveraged, the manager has a choice. It may call for more cash or reduce "exposure," hedge effectiveness. The investor has a choice if a cash called be made. It may pay the called amount to maintain its hedge or it may decline and allow its hedge to reduce. The latter, it must be said, may be an intelligent response.

Of the clients of five of the six surveyed managers, some clients with four managers opted not to meet cash calls. This decision may have stemmed from:

- inability to marshal the funds within the 2 or so days permitted through decision, authorisation or signatory lapses;
- inability likewise since sales of assets would not "settle" to provide the cash within the window; or
- a conscious decision to allow the hedge to reduce (to await events or through inability to judge the outcome of the market turmoil).

9.6 Speed of raising cash? One-stop-shops.
A point repeated in the public debate was to the effect that small (or disorganised) schemes were unable to produce the amount of the cash calls in the time allowed. To stress the point, this is not a failure within the direct derivatives market, but as to the operation of the LDI Funds with their own customer base.

9.7 So one needs to examine how LDI Fund users deploy their entire investments. All managers wish to gather as much assets as they can, and nearly all offer an entire suite of products from which the investing scheme may select.

9.8 It follows that one needs to understand what percentage of users of LDI Funds had the bulk of the rest of their assets with the **same manager**.

9.9 Separate investigation[16] by XPS reveals the high proportion of schemes using the LDI Fund manager as a one-stop shop. 80% had extra, non-LDI assets of some size with the same house. See Box 15.

% of XPS Clients	50	30	10	10
Amount with LDI Fund Manager	All	LDI Funds + 25% of all	LDI Funds + 5-25% of all	LDI Funds + Less than 5% of all
Most schemes had a high proportion of total funds with the same manager. Source: XPS				

One-stop-shop clients?

Box 15

[16] *Email Gold/Wallace 27.2.23*

9.10 It is therefore more than likely that schemes received urgent, unmeetable, calls from the very house that was managing their (less instantly liquid) assets. One may expect some "hard conversations" about this between client and manager.

10. SCAPEGOATS.

10.1 Every Good Disaster needs, these days, both victims and scapegoats. The LDI episode is a first in that scapegoats were named before any victims were found.

10.2 Two House of Commons Committees, Treasury and Work & Pensions immediately interested themselves in the issues. The House of Lords Industry and Regulators Committee made an interim communication on 7 February.[17]

10.3 "Global Factors" and the Ukraine Invasion.
An early charge was that these factors had caused the market turbulence. The Bank felt the need on 10 October publicly to contradict the Government line here.

10.4 tPR.
tPR's role is as regulator of pension schemes. It was criticized:
• for being unaware of the LDI risks;
• being aware, had failed to prevent the issues; and
• for having forced schemes to adopt risky and unremunerative strategies.

tPR labours under conflicting objectives. By law it must "minimise any adverse impact on the sustainable growth of an employer"[18] whilst also being required to protect member security.[19]

10.5 PRA.
The Prudential Regulatory Authority is part of the Bank of England, supervising banks, building societies, credit unions, insurers and major investment firms: these number 1,500 or so.

PRA's objectives include promoting the safety and soundness of the firms it regulates and contributing to the security and protection of insurance policy holders. There is a clear overlap with the next scapegoat.

10.6 FCA.
The Financial Conduct Authority is responsible for the regulation of the financial services and providers not supervised by the PRA, this including asset managers and independent financial advisers. Objectives are to secure protection for consumers and to promote and enhance the integrity of the UK financial system.

10.7 Bank of England.
The Bank is the umbrella under which the PRA operates. It is, of course, a central bank but for our purposes has a statutory financial stability objective. As a scapegoat, it came under some criticism, whether ill-informed or not. Much play was made of a 2018 report discussing derivative, repo

[17] *House of Lords I&RC letter to HMT and others 7 February 2023.*
[18] *Section 48 Pensions Act 2014.*
[19] *Section 5 Pensions Act 2004.*

and leverage risks.[20] The Bank made it publicly very clear that it had not been alerted by the Chancellor beforehand as to his Budget measures. The balance of blame shifted over time as the programme did its work and concluded. "Bailey is the caped crusader of Threadneedle Street" thundered The Times, 18 October 2022.

10.8 Sponsor pension metrics.
The scheme metrics under which sponsors must report are described in Section 2. The House of Lords I&RC argued for a more sponsor-benign metric, so as to encourage the allocation of more investment to growth classes. Equity allocation by pension schemes has indeed shrunk from 68% (2003) to 15% (2022) (see PPF Purple Book) predominantly in the light of increasing risk averseness and maturation of DB Schemes. To change sponsor metrics, as thus advocated, would require the wholesale renegotiation of international accounting standards hammered out over 40 years. A radical change must be regarded as fanciful; that ship has sailed and will not return.

Support for LDI, and leveraged LDI, was voiced by Finance Directors representing 90% of the FTSE 100. They argued that higher buffers, better governance, and full-on risk monitoring sufficed.[21]

It should be noted that the Chief Executive Officer of L&G was also highly critical of scheme metrics, arguing that LDI strategies had been entirely caused by the rigidity of these.[22]

10.9 Pension Consultants.
Pension consultants nearly all offer an entire package of actuarial, administration, insurance broking, communication and investment services. The charge against pension consultants was that they had allowed their clients to enter into risky strategies. As explained at 4.1, pension schemes had been driven by legislation into an unhealthy dependence on investment advisers. There has been a longstanding antipathy between investment consultants and asset managers since the latter resent the former's gatekeeper prominence and are not slow to criticise the former. The House of Lord's communication argued for their "regulation". However, there can be very few consultants who are not already regulated under the FCA or (if actuaries) through their profession.

10.10 LDI Funds and their providers.
Whether the LDI Funds generally were victims, scapegoats, or villains is not fully clear. In evidence, the Bank mentioned 175 affected funds. This fund figure may include unleveraged ones.

XPS' paper (see Section 9) analysed outcomes as to an anonymised six Managers, of which the LDI Funds of three experienced no problem. Of

[20] *Financial Stability Report 2 November 2018 Issue 44, pages 51-57.*
[21] *Submission to House of Commons WPC October 2022, reported 30.1.23 in Perspective.*
[22] *Evidence to House of Lords I&RC Q 30*

two, some minor issues were identified. It was the sixth that experienced the highest problem level.[23]

Market rumour initially named L&G and its subsidiary LGIM as the most stressed party. It is on record as having 42% of the LDI Fund market and its Chief Executive Officer, Sir Nigel Wilson was among those called to the House of the Commons Work and Pensions Committee.

At an early stage in the panic it put out a bulletin to its shareholders (not, it will be noted, its pension scheme LDI policyholders), that its own balance sheet was not exposed;

"LGIM acts as an agent [sic] between our LDI clients and market counterparties and therefore has no balance sheet exposure."

This neither informed nor consoled investing schemes.

10.11 A feature of XPS' analysis reveals that distress was not proportioned to leverage. "Funds with higher levels of leverage performed well" if they had in place:

• "More frequent top ups and distribution of the collateral pool to maintain leverage closer to the target level"

• "Automatic recourse to traditional sources of collateral, either other funds managed by the same manager or externally-managed funds[24]

In consequence, the period "represented the biggest test of LDI managers' operational procedures and abilities."

10.12 Other consultants were reported to be considering downgrading LDI managers. An early independent market reaction came from Jefferies' analysts:

"[the] biggest risk for LGIM is that this crisis has discredited the Firm's risk management abilities. In the process, it's possible that this sparks outflows from LDI Funds, as clients reallocate to alternative strategies, with lower liquidity risks."

10.13 Scheme Trustees.

The criticisms articulated against scheme trustees were:

- that they had been blindly led by consultants
- that they were ignorant of their strategy
- that they had not informed anyone
- that they were ignorant of the precise operation of the positions they held
- that they were unprepared for a market panic

The first two "charges" were asserted but not proved. Trustee Boards contain

[23] *February 2023 Investment briefing, Gold & Minnis.*
[24] *Refer 9.6 and accompanying Box for "one-stop shop" analysis.*

management, workforce and (often) independent appointees. They must formulate, agree and document funding, investment and actuarial principles, maintain risk registers and disclose their stewardship to beneficiaries, sponsors and regulators. All of these documents are made available automatically or on demand. From this it is clear that none of these parties can complain that information about LDI has been withheld.

The final charge may possibly have some substance.

10.14 Regulatory Responses.
As mentioned at 3.6, asset managers site their funds in different jurisdictions, and schemes are free to access these. Since attention focused quickly on the operation and supposed lapses of LDI Funds (rather than pension schemes) a coordinated response was quickly issued by Luxembourg and Ireland to the GB (only) LDI Funds they regulated.[25] Expectations were expressed over the appropriate "yield buffer" levels, at 300-400 basis points. A need for "resilience" was also stressed.

10.15 At the same time, tPR ensued its own guidance to UK pension schemes.[26] "Resilience" was also the watchword. Housekeeping areas were addressed, signatories, authorisers, priority waterfalls as to the order of assets to be realised at need, and an appreciation of applicable settlement cycles. None of the guidance took any issue with LDI as a strategy.

10.16 LDI Detractors.
The media attention on LDI's strategies prompted the emergence of a small number of detractors arguing against its use at all. Opponents need to clarify whether their ground is based on beneficiary security, sponsor advantage or some vision of wider national benefit.

10.17 An ideal DB scheme requires four things:
- that there will be a sponsor in perpetuity
- that there will always be a need for the sponsor's products or services
- that the cost can always be recovered from customers or users:
- that the sponsor and its stakeholders are indifferent to annual fluctuations in the funding level

The first three conditions are met, say, by the Hampshire Police Authority. Society will always need policemen and robust machinery collects the force's funding from the taxpayer. The conditions do not apply to virtually all private sector sponsors, and trustees of funded schemes, concerned for their beneficiaries, are right to espouse caution. In this regard, the vocal support of FTSE 100 Finance Directors mentioned in 10.8 – that LDI strategies should not be so constrained as to damage sponsors – should be borne in mind.

[25] *30.11.22*
[26] *Both as to direct LDI instrument holders and to those schemes holding LDI Funds. "Maintaining the Liability-driven Investment Resilience" tPR 30.11.22.*

11. QUESTIONS AND ANSWERS

11.1 How long have LDI strategies been adopted?
Over 30 years.

11.2 How long have LDI Funds been available?
20 years.

11.3 How long have leveraged LDI Funds been available?
Not known - possibly 15 years.

11.4 Has LDI proved effective to dampen down scheme funding volatility?
Yes. Indeed, total hedging strategies have been observed over, say 5 years, to have experienced a tracking error of less than 1% over the entire span.

11.5 Has LDI proved effective to dampen down sponsor pension metrics volatility?
Yes.

11.6 Were schemes imperilled by the events?
Not known, nor demonstrated, but highly unlikely.

11.7 Were leveraged LDI Funds imperilled by the events?
Many were tested, some were stressed, one may have been imperilled.

11.8 Can one compute a "cost" or "loss" to schemes by these events?
The House of Lords suggests that the Bank's £3.5 bn profit is a proxy for the cost or loss to schemes.

11.9 How can one attribute this spectral cost?
The one-day gilt spike was the highest recorded in 20 years. Any cost would have been borne across the total LDI market.

Hence, the "cost" to schemes in aggregate can on this measure be put at 0.22% of total funds, once in 20 years: or 0.011% pa.

If this be the "true" cost, schemes may see it as a trifling price to pay by way of gilt market panic premium.

12. CONCLUSIONS.

12.1 The Budget was an unforgivable – and unforgiven – misjudgement.

12.2 It ended two careers, and harmed Britain's reputation for fiscal prudence.

12.3 The very modesty of the regulatory response – confined to calls for fuller 'resilience' - signifies no regulatory nor legal breach, nor serious need for radical rule change respecting LDI type operations by manager or scheme.

12.4 The 'rescue' was surgical, short and profitable for the rescuer. For 13 days the "rescue" was 3.2% of gilt market turnover. Refer Box 12 supra.

12.5 There is no counterfactual against which to gauge whether what the Press termed 'melt-down', 'wipe-out' or 'doom loop' would have occurred without the Bank's actions. It can neither be proved nor disproved.

12.6 The perceived gravity of the risk 'lost nothing in the telling'. This will have been convenient for Budget-detractors, constituting the vast majority. Conversely, the instant denunciation of 'LDI' bore hall-marks of attention-diversion and blame-deflection.

12.7 If, repeat if, there was any 'cost' to pension schemes (see 11.9), at 0.22% of assets for a 20-year event, it was tiny.

12.8 Hence the LDI events – as regards the strategy and pension trustees – were not a crisis, nor proof of trustees' stupidity. Three professional managers, and the LDI Funds they managed, were stressed. Many scapegoats were proposed, but, in this "disaster" no victims were found.

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