

# Managing Capital Market Risk for Retirement

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## OUTLINE

- 1 LDI overview
- 2 Recent innovations
- 3 Challenges/opportunities

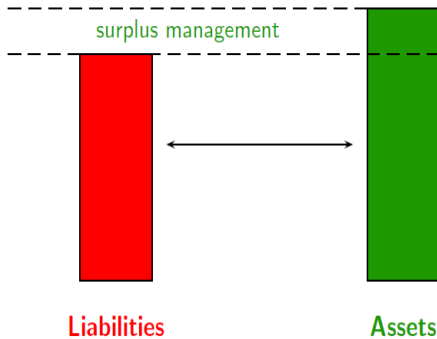
# OUTLINE

1 LDI overview

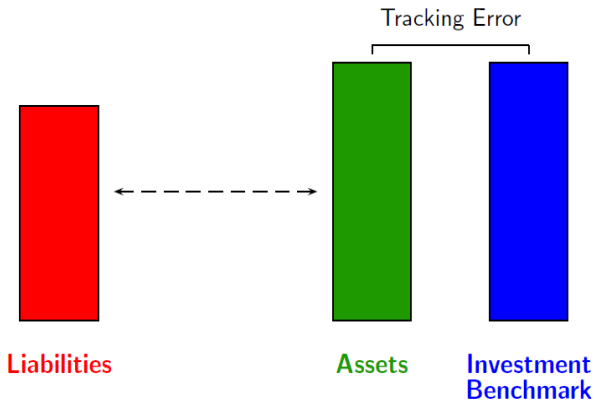
2 Recent innovations

3 Challenges/opportunities

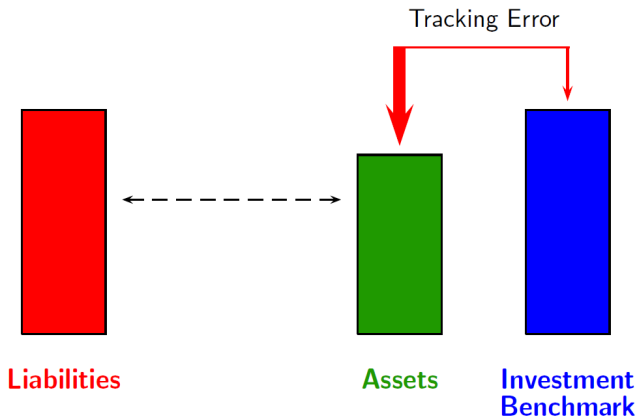
## TRADITIONAL VIEW



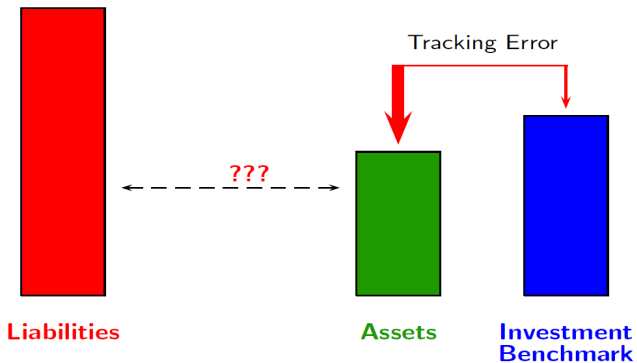
## TRADITIONAL VIEW



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## LIABILITY-DRIVEN INVESTMENT (LDI)



**Liabilities**



**Liability  
Benchmark**

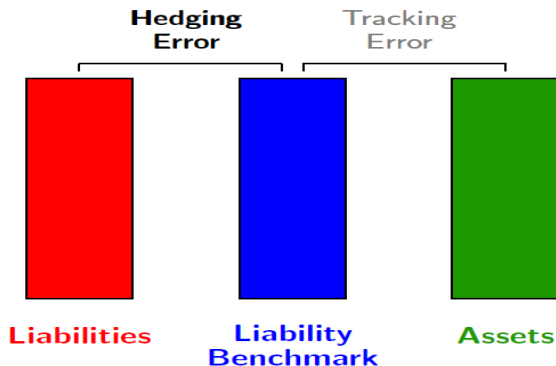


**Assets**

Think of a replicating portfolio..



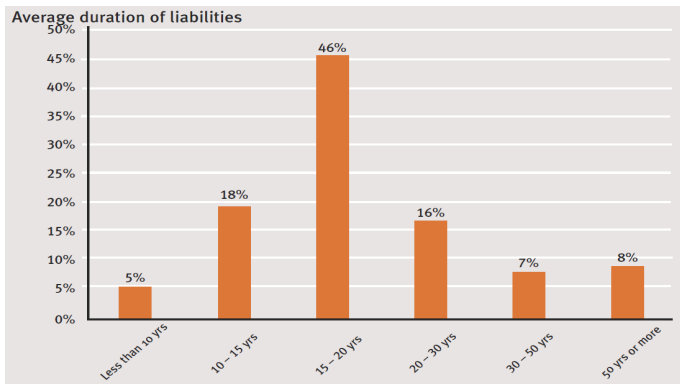
# LIABILITY-DRIVEN INVESTMENT (LDI)



Think of a replicating portfolio..

- perfect replication impossible due to unspanned sources of risk
- hence **partial/approximate hedging**

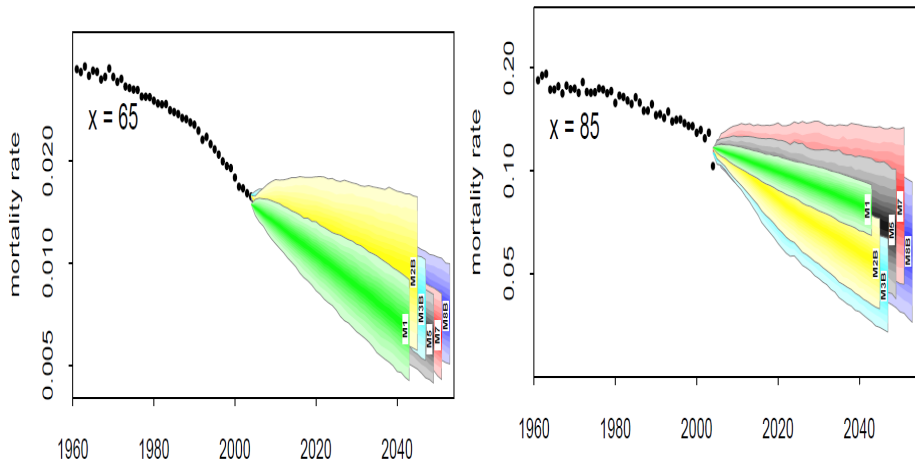
## INTEREST-RATE RISK



Source: JP Morgan (2006).

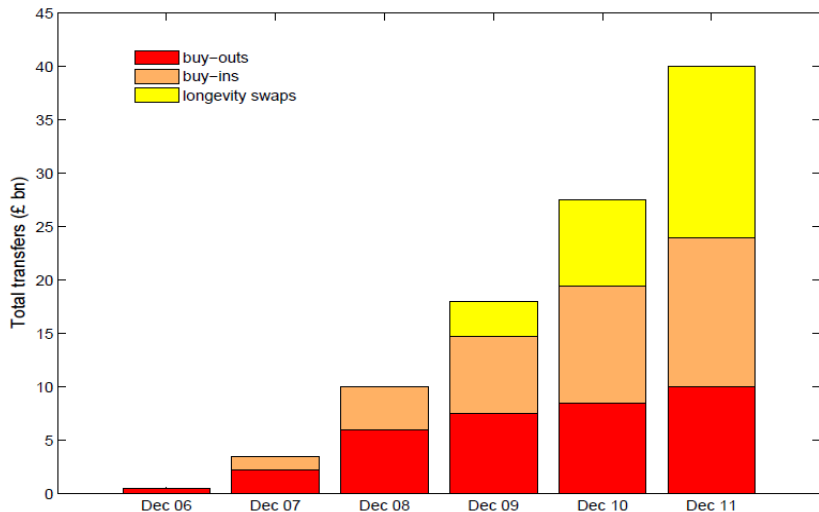
- Average duration gap: 13 years
- Swaps, swaptions, etc.
- Inflation derivatives

## LONGEVITY RISK



LifeMetrics England & Wales projections. Source: Cairns et al. (2008).

# BUYOUTS AND LONGEVITY RISK SOLUTIONS



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## LESSONS FROM THE CRISIS

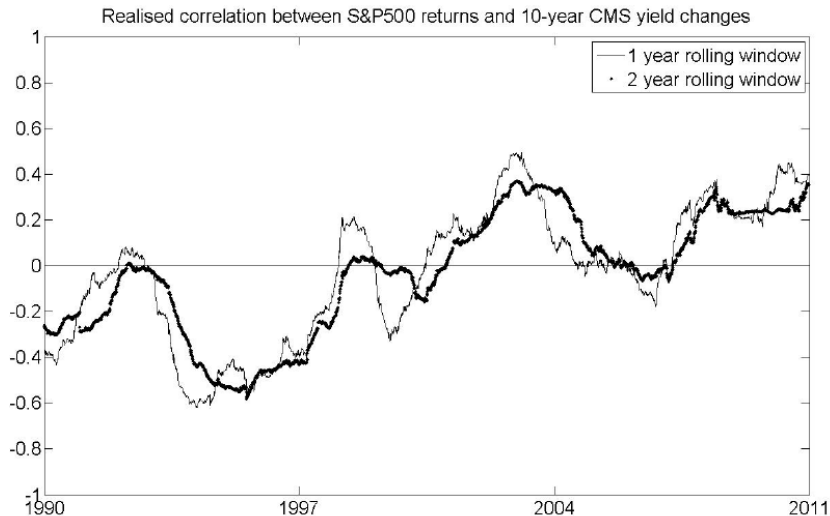
### Cross-asset correlation

- risk on/off trading style
- tail risk hedging and hybrid products
- example: stock-bond correlation swaps

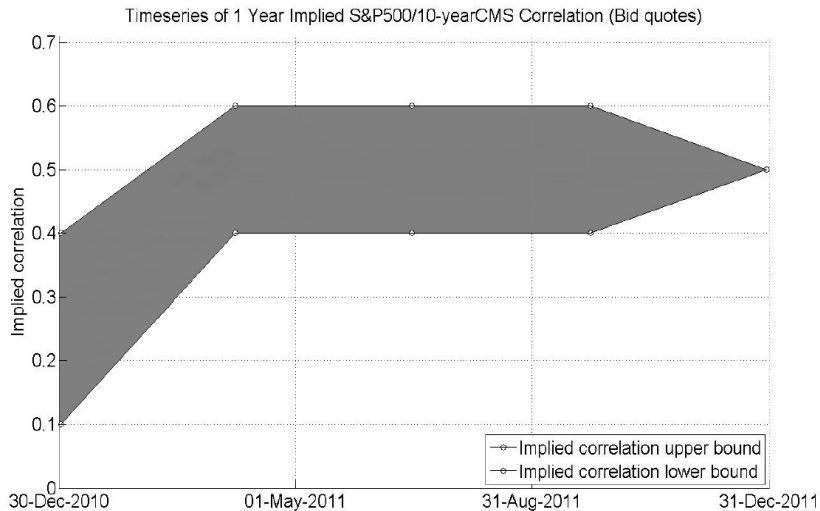
### Counterparty risk

- insurance solutions may be collateralized (e.g., bespoke longevity swaps)
- LDI and Credit Support Annex (CSA)
- collateral management and CSA pricing
- umbrella CSAs for smaller pension plans
- example: longevity swap rates

# STOCK-BOND CORRELATION

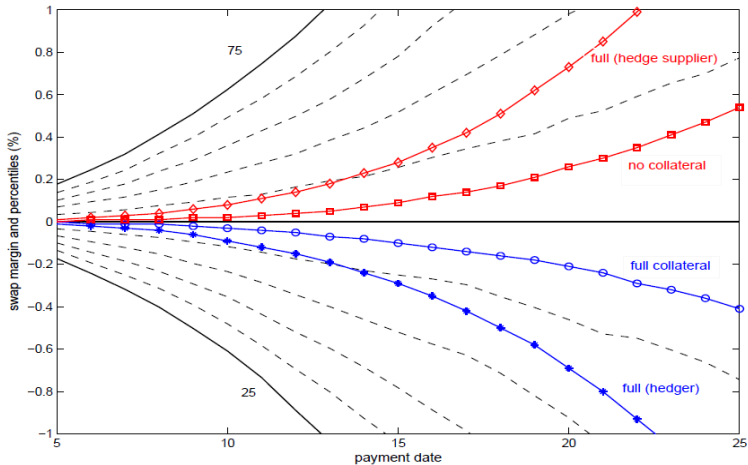


## STOCK-BOND CORRELATION QUOTES





## LONGEVITY SWAP RATES AND CSA PRICING



Hedger's credit quality lower than hedge supplier's (100 bps spread).

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## CHALLENGES/OPPORTUNITIES AHEAD

### Pension risk

- greater awareness among different stakeholders
- mortality experience, data cleansing, and buyout quotes

### Delegated asset management

- short term performance vs. slow moving liability proxies
- risk taking incentives

### Interest rate environment

- LDI and the bond market
- globalization of inflation

### A changing regulatory landscape

- Pension regulation (demand side) and Solvency II (supply side)
- **Dodd-Frank and EMIR provisions (cost of collateralization)**

## REGULATION OF OTC MARKETS

### Collateralization of non-cleared derivatives

- pension plans treated as 'covered entities' by EMIR
- two-way segregated initial margins, exchange of variation margin
- scarcity of collateral, collateral management process

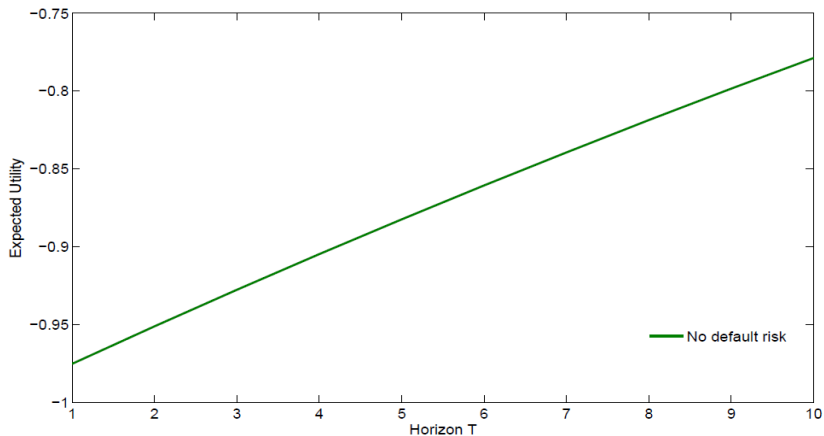
**Table 3: Non-centrally cleared derivative activity before and after central clearing takes effect**

	Total gross notional outstanding amount (EUR million)						
	Foreign exchange	Interest rate	Credit	Equity	Commodity	Other	Total
Before	54,958,056	230,135,986	24,264,950	6,596,400	2,026,853	514,734	318,496,980
After	47,863,156	107,208,907	12,132,371	2,908,279	1,211,562	408,843	171,733,118
% Reduction	13%	53%	50%	56%	40%	21%	46%

Note: The data above reflect the notional amount of non-centrally cleared derivative activity that will remain after central clearing mandates take effect (future portfolio). Each cell represents the simple sum of non-centrally cleared derivative notional amounts for each QIS respondent within each asset class and jurisdiction.

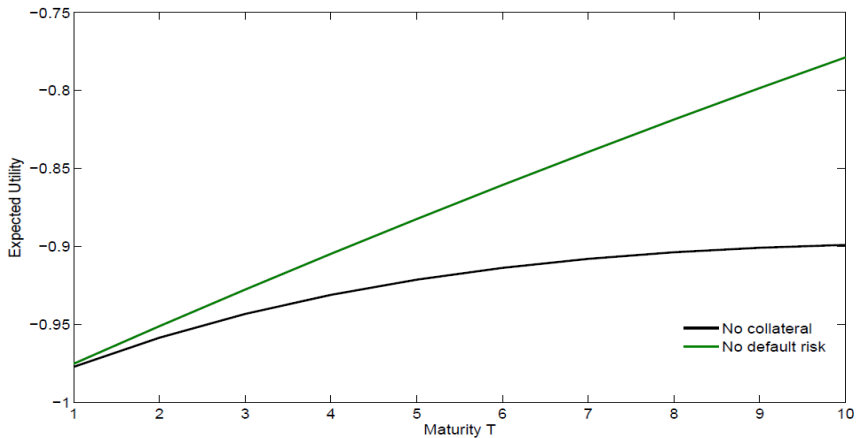
Source: BIS (2013)

## THE COST OF COUNTERPARTY RISK



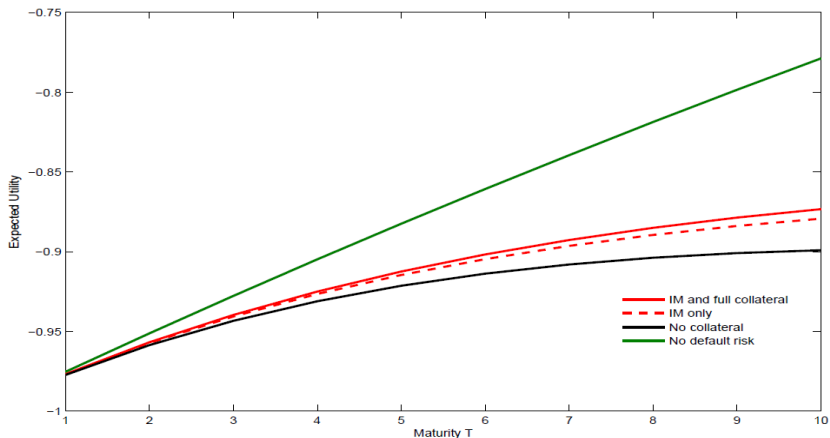
Default-free entities with opposite risk exposures enter a forward contract.

## THE COST OF COUNTERPARTY RISK



Entities are now **credit risky**: the OTC contract gives rise to **counterparty risk**.

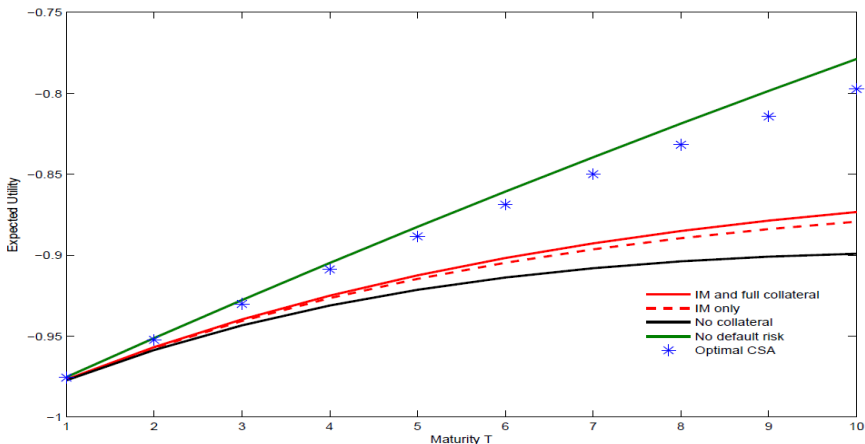
## (SUB)OPTIMAL COLLATERALIZATION



### Dodd-Frank/EMIR

- two-way Initial Margin (IM): 99% VaR over 10-day horizon (if daily collateral posting)
- variation margin (VM): full collateralization, 100% of MTM

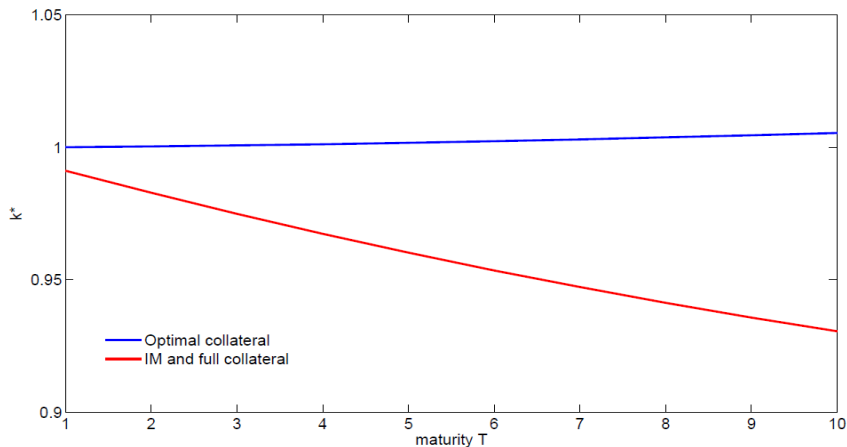
## (SUB)OPTIMAL COLLATERALIZATION



Optimal CSA: collateral thresholds, close-out convention, etc.



## IMPACT ON TRADING VOLUME



Segregation of variation margin and funding costs amplify the effect.