現行解決方法的潛在問題

報告人： 政治大學統計系
余清祥

工作小組：政大風管所碩士生林銘寬
政大風管所碩士生葉政瑋

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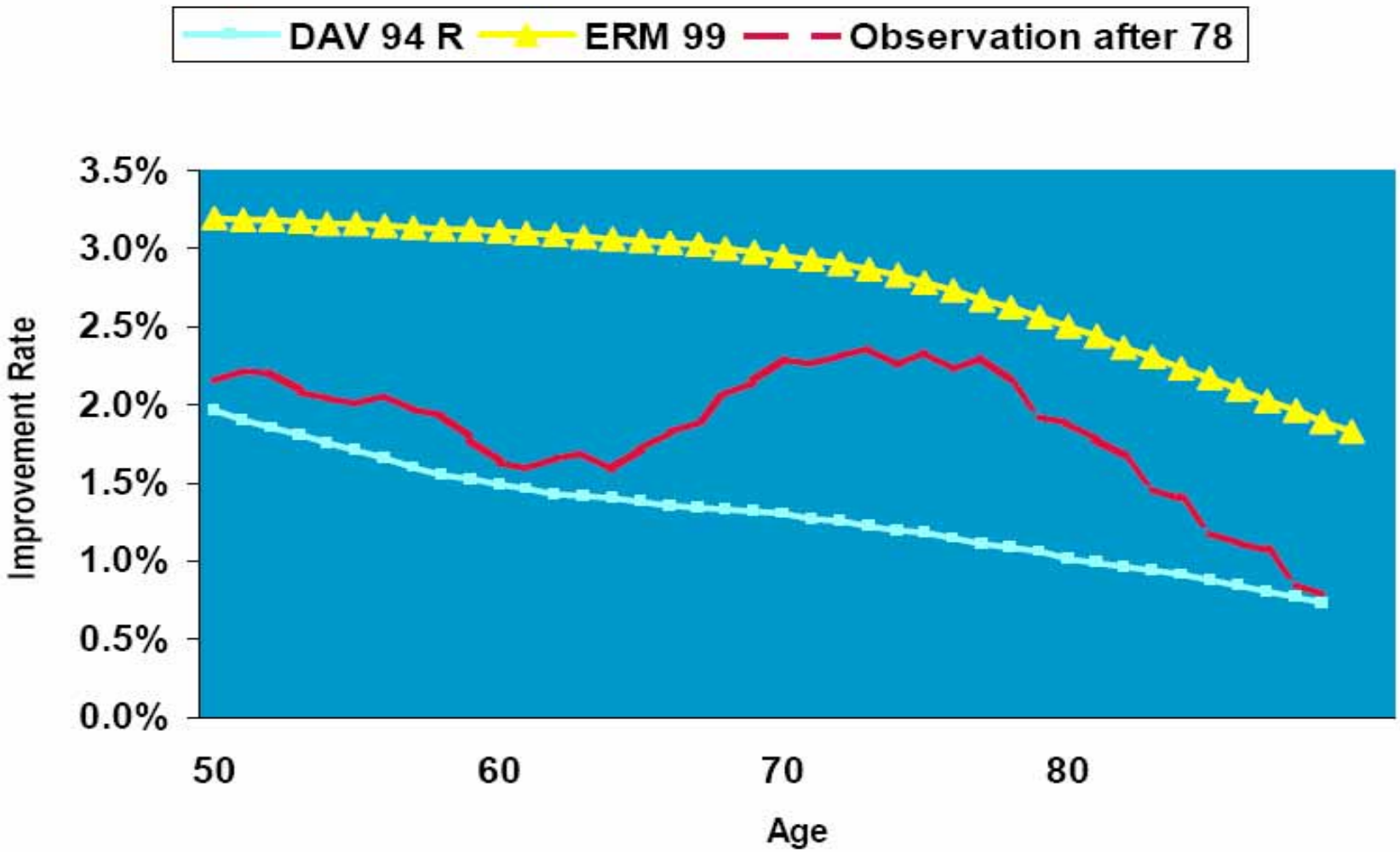
精算方面的潛在問題

- 準確預估死亡率的改善程度？
- 建立有效的資料庫
- 資料的正確性

Which Improvement Rate is „correct“?
Germany vs. Switzerland (male)



各國的死亡率預測都不盡理想

- “What is the probability that mortality rates projected under the medium cohort are off by10%?”

→No consistent or widely accepted methodology in answering this question

- **Previous projections** are not great

→Government Actuaries’ Projection of 2004 male mortality rates for 55 year old in 1979 is 1.26%, but actual ONS mortality rate is 0.64%.

各種險種均缺乏完整國內經驗

- 年金險(歷史資料？經驗費率？)

→目前業者使用之年金生命表係民國八十六年頒布施行，其死亡率為參照國民生命表八回表之百分之六十五所訂定。

- 醫療險、健康險

→國內業者大多使用國外再保公司提供的資料，而非根據國內(例如：全民健保)的經驗資料計算。

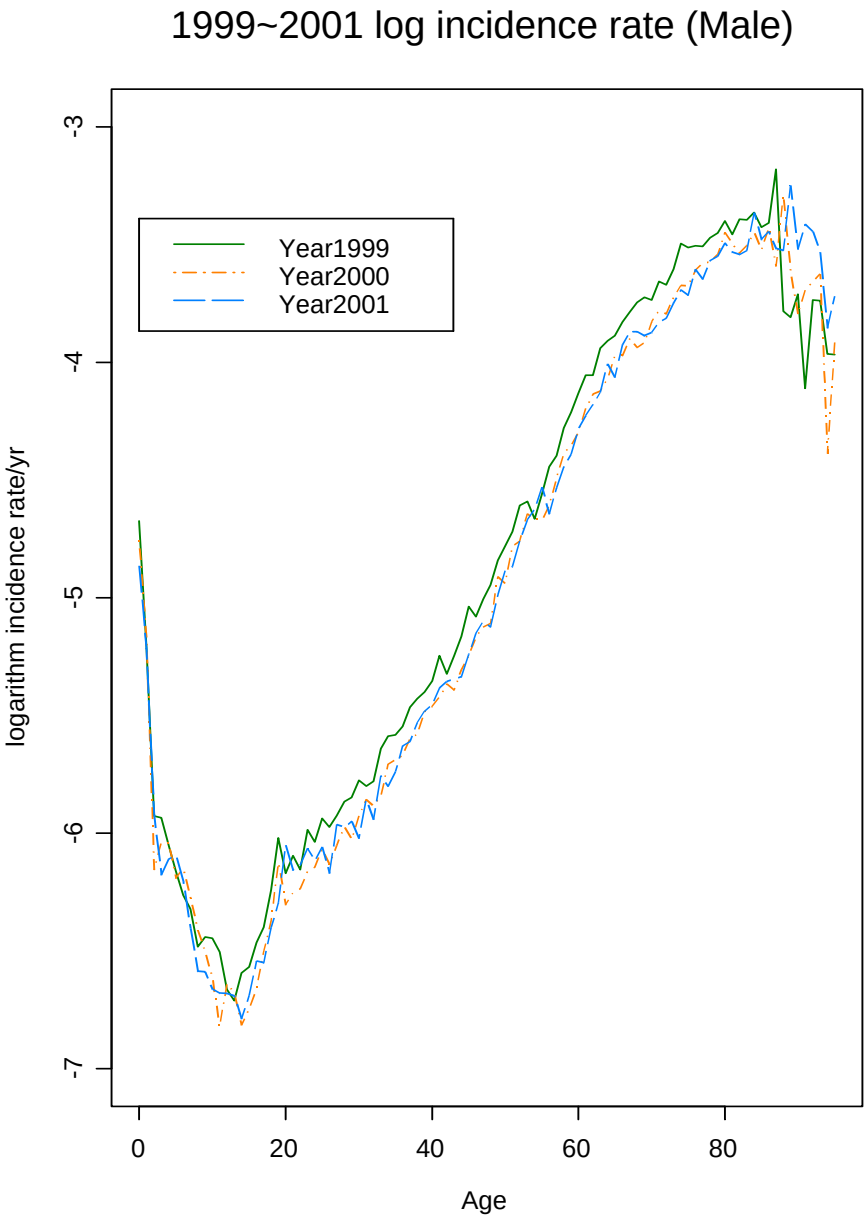
台灣地區重大傷病現況

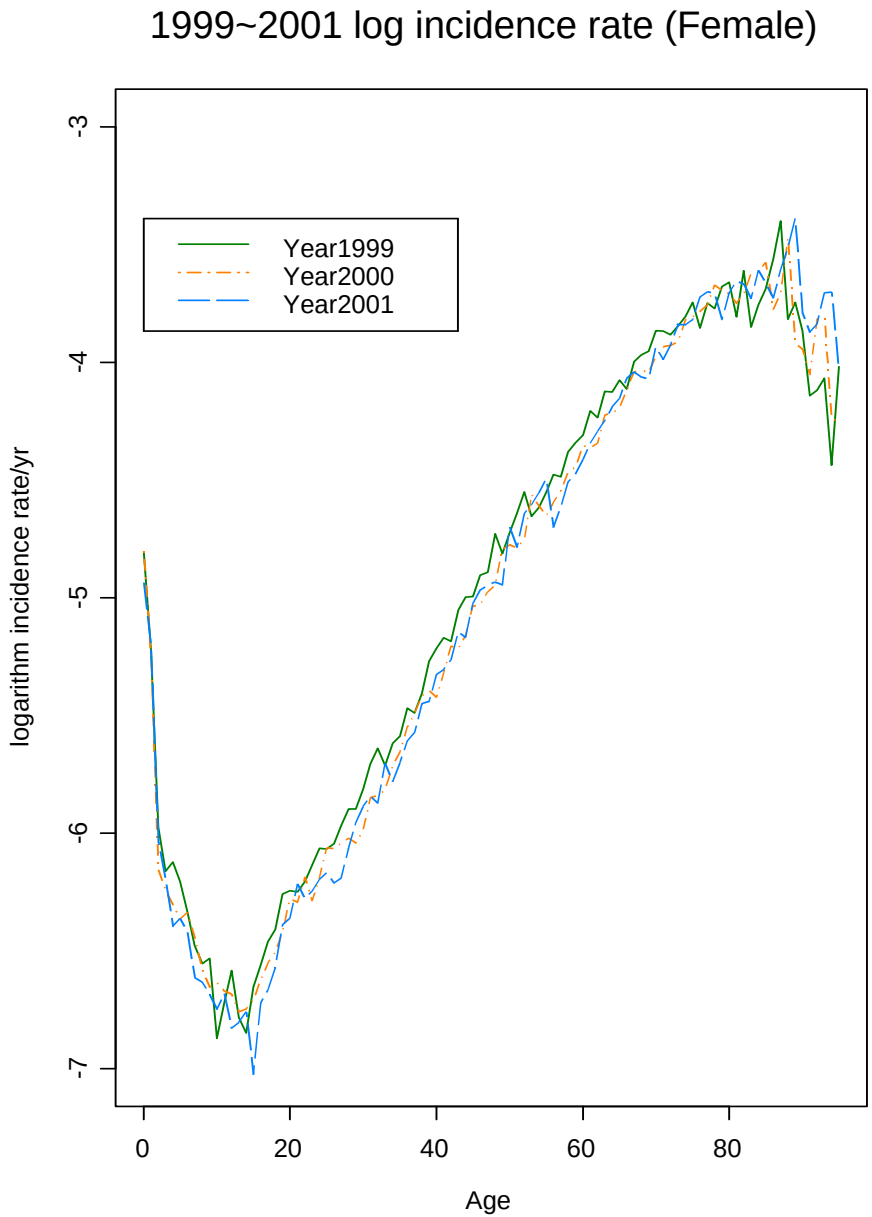
＊資料來源

- 全民健康保險學術研究資料庫分為重大傷病、住院醫療、癌症…等十二大主題以及基本資料檔
- 本文主要使用重大傷病主題資料，觀察年度自1996~2001年

重大傷病門診醫療資料內容

觀察年度	1996	1997	1998	1999	2000	2001
資料筆數	3071993	3478998	4064823	4518433	4937040	5514320
資料大小(MB)	615.23	696.75	814.07	904.93	988.75	1104.37





1999~2001年台灣重大傷病發生率

財務方面的潛在問題

- Marketing Strategies
- Re-insurance Capacity
- Risk of Financial Solution

Marketing Strategies

- Swiss Re的(reverse) mortality rate derivative的行銷策略

→潛在市場、潛在客戶？

- 保險公司如何將長壽債券(EIB)轉變為可行的保險商品

→為什麼會有銀行願意投入年金商品的市場？（死亡率愈低、投資者愈有利！）

The EIB/ BNP Paribas longevity bond: Annual Pay-off

Example based on hypothetical mortality data

Fixing date	2005	2006	2007
Mortality reference year	2003	2004	2005
Age of the cohort	65y	66y	67y
Annual mortality rate	1.50%	1.80%	2.10%
Annual survival rate	98.50%	98.20%	97.90%
Cumulative survival rate	98.50%	96.73%	94.70%
		[98.50% x 98.20%]	[96.73% x 97.90%]
£1,000 Fixed Annuity	£985 Bond pay-off Year 1	£967.3 Bond pay-off Year 2	£947.0 Bond pay-off Year 3

In the current interest rate environment, each £1,000 of Fixed Annuity equates to approximately £11,000 of bond notional

Marketing Strategies (conti.)

- **Trading of Longevity Risk**
  - Reassurance Market

Reassurers: £2~5Bn per year

ex: Britannic £350M sale to Reassurer in 2004

ex: Royal London £1Bn sale to Prudential in 2004

→Higher Cost for sale to Reassurer

Reinsurance Capacity

- **Tail risk**

→Difficulty in getting reinsurance cover for risk over 25 years into the future

- 長壽債券為具有long-tail 的性質
- 再保公司之風險吸收力的大小

Reinsurance Capacity (conti.)

- Reinsurers - how big is their appetite

→Future of longevity bonds dependent on capacity of reinsurance market

→historically there have been few longevity reinsurance deals

→limitations on duration (25-year too long!)

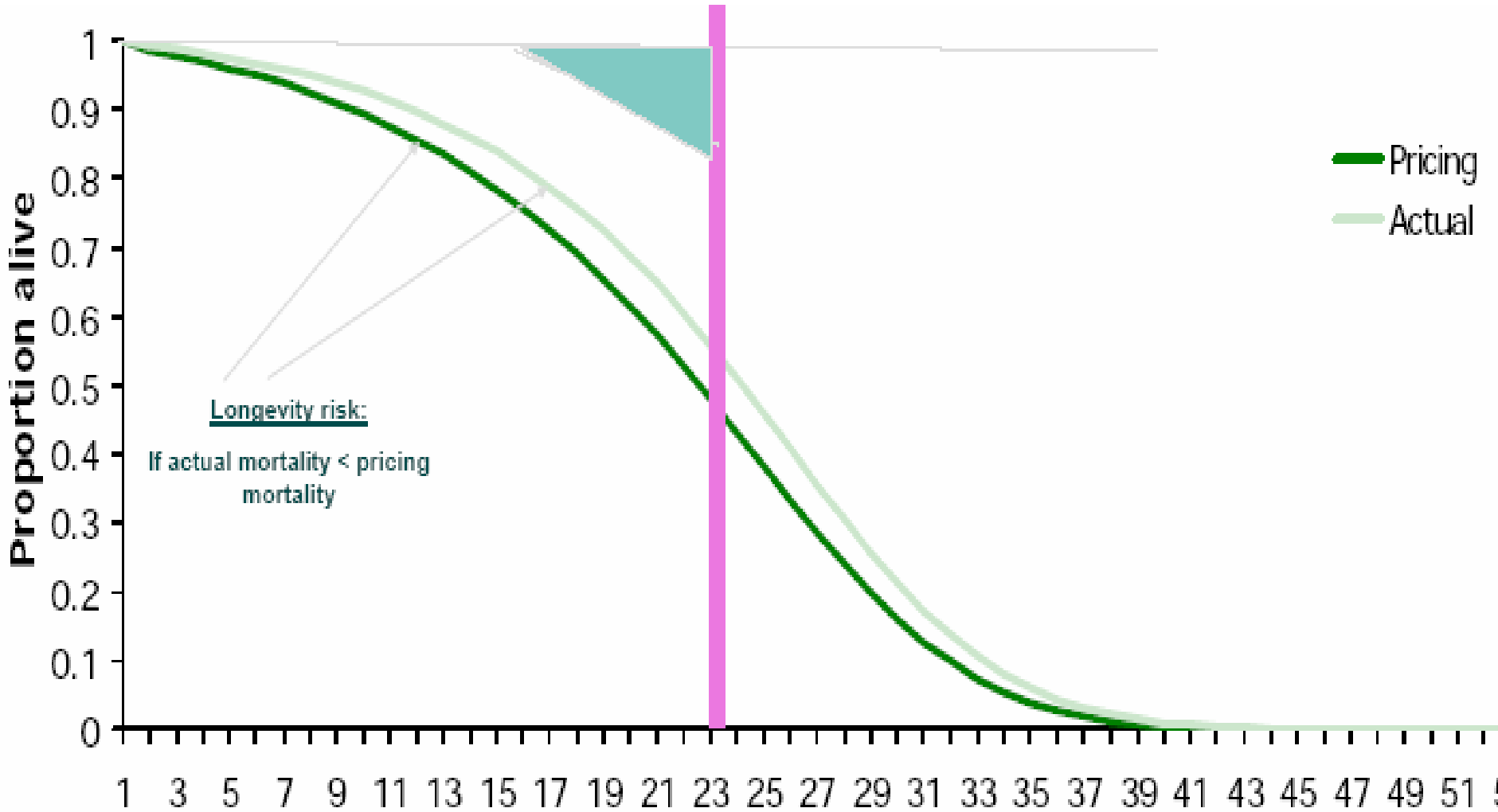
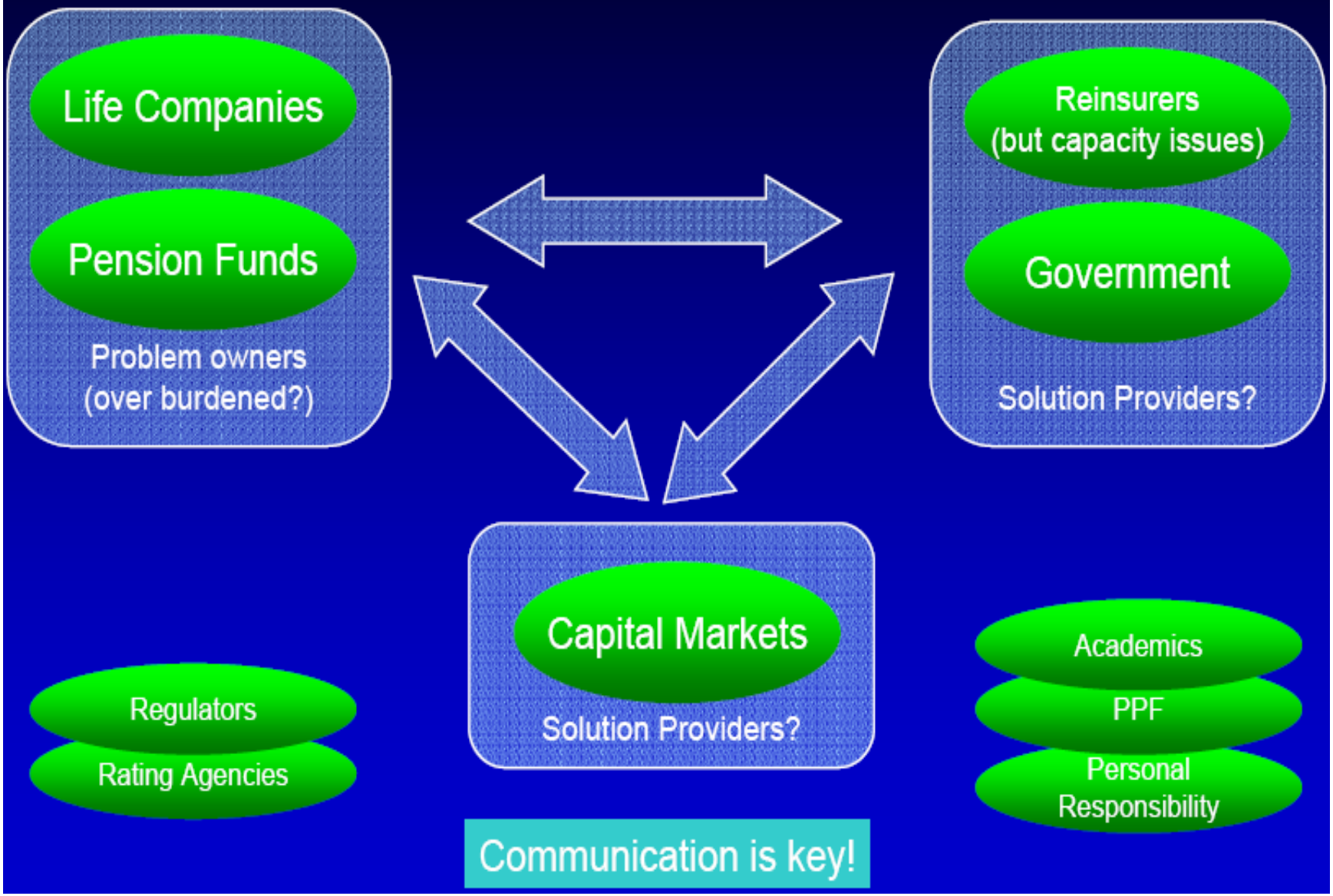
- 再保公司的最後一道防線，是否將承保風險證券化分散到金融市場上？

Risk of Financial Solutions

- 公司對於長壽風險預測的準確度
- 利率風險
- 通貨膨脹
- 交易雙方的信用風險

(現今學術研究的熱門課題！)

死亡率改善幅度較預期多時！



Longevity risk transfer – Key stakeholders