



SOCIETY OF ACTUARIES

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A3: Catastrophe Bonds – A Diversification Tool

Stuart Silverman
Maria Wittman

Moderator
Jingsu Pu

Life Insurance Linked Securities

Stuart Silverman, FSA, MAAA, CERA
Principal & Consulting Actuary

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1



WILL COVER:

- Types of Life ILS
- History of Life ILS Market
- Current Developments
- Potential Future of ILS Market

2



Types of Life ILS

- **Excess Reserves Financing for**
 - Term Life (XXX)
 - Universal Life (AXXX)
- **Embedded Value Financing for**
 - Par Whole Life Closed Blocks
 - YRT Reinsurance
 - Long Term Disability
 - Variable Annuity M&E Fees
- **Risk Transfer for**
 - Catastrophic Mortality
 - Longevity Risk

3



Excess Reserve Financing - Terminology

- **XXX**
 - aka Valuation of Life Ins Model Regulation
 - Defines reserving methodology for term and UL with secondary guarantees
- **AXXX**
 - aka Actuarial Guideline 38
 - Attempts to close loopholes in XXX
 - Clarifies reserve methodology for UL with secondary guarantees

4

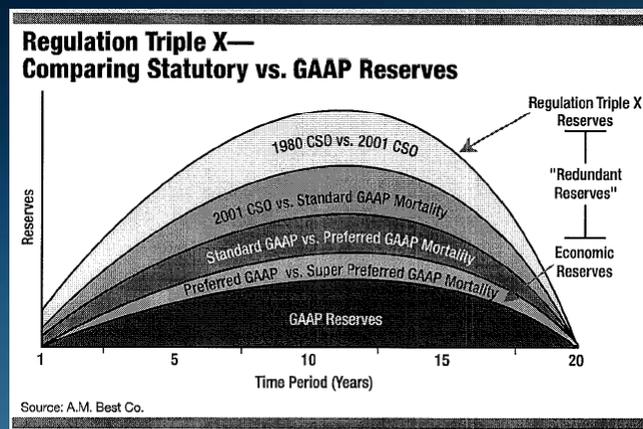


Excess Reserve Financing - Purpose

- To obtain capital market financing of redundant XXX or AXXX reserves
- Where “redundant” is defined as the excess of statutory reserves over “best estimate” reserves (aka Economic Reserves)
- Investor will require capital to protect against adverse deviations from best estimate assumptions

5

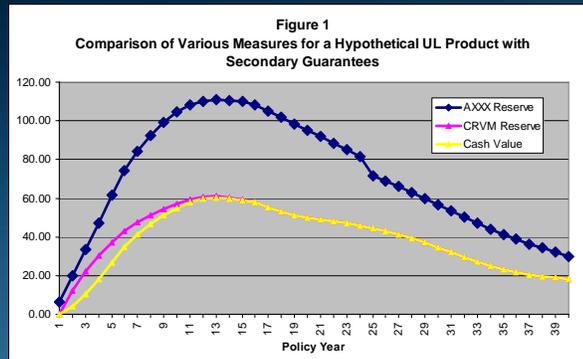
Triple X Securitization What Created the Opportunity?



On level term, main reason for redundancy is conservative valuation mortality

6

Compare AXXX with UL-CRVM



Reserve for NLG is excess above UL-CRVM – but how much is redundant?

7



Why are AXXX Reserves Redundant?

- **Conservative valuation assumptions**
 - Valuation mortality far exceeds expected experience mortality
- **However, there is a weak correlation between the AXXX reserve and the secondary guarantee benefit**

8



Issues for AXXX Securitizations

- Whole Policy vs. Rider Only
- Risks associated with policyholder premium optionality
- Risks associated with company optionality (non-guaranteed elements)
- How to define “economic reserves”
- Older age underwriting and mortality
 - Evolving underwriting standards and not much industry mortality data
- Product / secondary guarantee complexity

9



Embedded Value ILS Transactions

- A tool for acquisition financing and accelerating balance sheet
- Reserve Financing Transactions are a form of Embedded Value Transactions
- Have been used in combination with other types of transactions (i.e., Reserve Financing) in lieu of infusing capital

10



Risk Transfer Securitizations - Motivation

- Reinsurers / insurers seeking to mitigate extreme mortality and longevity risk
- Capital markets bring more capacity to the market place
 - Diversification from traditional retrocession
 - Avoid credit risk
- To date:
 - Mostly Mortality Cat Bonds and some Mortality Cat Swaps
 - A Few Longevity Swaps
- Future – may see longevity bonds as well

11



Mortality Cat Bond Trigger Definition

- Mortality index > Attachment Point
 - Reduction in Principal Repayment

$$\text{Loss} = \frac{(\text{Index} - \text{Attachment Point})}{(\text{Exhaust Point} - \text{Attachment Point})}$$

12



Mortality Cat Bond Example



Attachment Point = 130%
Exhaustion Point = 150%

13



Mortality Cat Bond Transactions to Date

- **Difference in Attachment Points and Exhaustion Points are not standardized**
 - Highest attachment points at 130%
 - Lowest attachment points at 105%
 - Different points for senior and junior tranches – depending on risk profile
- **Tranches spread ranged from 100 to 625 bps over 3 month Libor**
 - Depends on risk profile and markets

14



Longevity Swaps

- **Norwich Union transferred longevity risk on a block of older UK annuitants until 2018**
 - In Swap, Norwich Union is fixed payer of annuity payments
 - Receives floating swap payments (to offset actual payments made to annuitants)
 - Under International Financial Reporting Standards and Market Consistent Embedded Value, the transaction was immediately accretive for Norwich Union and also releases capital
- **Longevity Swaps (with banks)**
 - BMW / Abbey Life (owned by Deutsche Bank)
 - Babcock International / Credit Suisse
 - Canada Life / JP Morgan
 - Lucida / JP Morgan

15



Life Settlement Securitizations

- **Only a few transactions to date**
 - Usually internal transactions
- **Original buyers bought with inappropriate mortality assumptions**
 - Since then LE providers have modified mortality assumptions
 - Investors are looking to sell, even at large discount
- **Big push from the LS industry to securitize but not much happening**
 - Too much volatility from small pools of lives
 - Poor experience to date
 - Rating agencies are not really there
- **Doesn't mean there isn't opportunity for investors**

16



List of Past Public Transactions

Company	Type	Year	Amount Raised / Notional Amount	Company	Type	Year	Amount Raised / Notional Amount
BMW	Longevity Swap	2010	£3,000	Prudential	private XXX	2006	\$3,000m
Babcock Internatio	Longevity Swap	2009	£500	Forethought	EV	2006	\$ 134m
Swiss Re	private XXX	2009	\$ 1,000m	AXA	CAT	2006	€150m + \$250m
Lincoln	private XXX	2009	\$ 550m	Unum	EV (DI)	2006	\$ 130m
Norwich Union	Longevity Swap	2009	£475	Genworth	AXXX	2006	\$ 315m
SCOR	CAT Swap	2009	\$ 75m	Banner Life	XXX	2006	\$ 450m
Genworth	private XXX	2008	\$ [confidential]	RGA	XXX	2006	\$ 850m
Swiss Re	private XXX	2008	\$ 1,500m	Scottish Re	CAT	2006	\$ 155m
SCOR	CAT Swap	2008	€36m + \$100m	Scottish Re	XXX	2006	\$1,700m
Munich Re	CAT	2008	\$ 100m	Genworth	XXX	2006	\$ 750m
Canada Life	Longevity Swap	2008	£500	Swiss Re	EV	2005	\$ 370m
Lucida	Longevity Swap	2008	£ [confidential]	Scottish Re	XXX	2005	\$ 457m
Prudential	private AXXX	2007	\$ 500m	Swiss Re	CAT	2005	\$ 362m
Unum	EV (DI)	2007	\$ 800m	Scottish Re	XXX	2005	\$ 850m
Protective	AXXX	2007	\$ 575m	Swiss Re	EV	2005	\$ 245m
Transamerica Re	XXX	2007	\$ 550m	Genworth	XXX	2004	\$ 850m
Genworth	XXX	2007	\$ 500m	Banner Life	XXX	2004	\$ 550m
Swiss Re	CAT	2007	€240m + \$390m	Swiss Re	CAT	2004	\$ 400m
				Forethought	EV	2004	\$ 150m
				Genworth	XXX	2003	\$1,100m
				MONY	EV (CB)	2002	\$ 300m
				Prudential	EV (CB)	2001	\$1,900m

- A significant number of private transactions as well

17



The Life ILS Market Has Evolved Considerably Due To The Financial Crisis

- **Early in 2007, it was a buyer's market for Life ILS solutions but that changed by the end of 2007**
 - In Oct 2007 the last wrapped Life ILS was executed
 - After that deal, investors began to lose confidence in monolines
- **During 2008 investors became cautious of structured securities and insurers began to consider financing via bank LOCs**
 - LOCs are the predominant form of financing today
- **While banks previously relied on credit risk of affiliate guarantee when issuing LOCs, starting in 2009 banks required underlying collateral (i.e., business cash flows) to stand on its own (and guarantees from affiliate company is just another form of protection)**
- **Banks are looking for other investors to spread their exposure to**

18



The XXX/AXXX Market is Growing Once Again

- **The debt capital markets reopened for insurers**
 - Several senior debt financings are suspected to have financed reserve redundancy
- **Banks are offering LOC deals**
 - Several closed last year and a few are about to close
 - Deals have new forms of protection (relative to past deals)
 - However, banks have limited capacity
- **Some banks are once again proposing structured long-term funded solutions**
 - However, concern about where to invest funds from both the investor and the insurance company

19



What's Next

- **No one truly knows, but here are some thoughts**
- **XXX/AXXX financing continues**
 - PBR is coming but won't be best estimate or get rid of past redundancies
- **EV deals will continue to be useful tool**
 - But it will depend on buyer and seller differences in assumptions
- **Risk Transfer**
 - Still very much needed for carriers to diversify their risk
 - Cat bonds will continue as fears of swine flu ease
 - Longevity bonds and swaps are picking up steam
 - First in the UK but then following to the US
 - LLMA – formed to standardize and develop marketplace for longevity risk transfer deals
 - Life Settlement transactions
 - A big push from the LS industry but not many buyers (including rating agencies)
 - Could be big opportunities for investors with liquidity that understand mortality risk

20



What's Needed

▪ New Primary Investors

- Original investors: Monolines; Current Investors: Banks
- Bank capacity is becoming constrained
- New investors can be Pension Funds, Hedge Funds, Private Equity
- Requires significant investment in understanding complexity of these transactions
- Possible creation of new type of transaction that possibly utilizes bank's regulatory arbitrage of lower capital requirements to create higher returns for other investors

▪ More Transparency and Uniformity

- Current secondary trades of ILS are trading significantly below par
- Problem was due to assets, not liabilities, but secondary investors can't tell

▪ Proper Analysis

- Too often investments are made without appropriate analysis and due diligence (and then people wonder what went wrong)
- Potential significant returns on less correlated risks but need to do homework

21



Contact Information

Stuart Silverman, FSA, MAAA, CERA
Principal & Consulting Actuary
stuart.silverman@milliman.com
+1-646-473-3108

One Penn Plaza
38th Floor
New York, NY 10119

22

