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International Financial Reporting for Insurers: IFRS and U.S. GAAP
September 2009

Session 3: Traditional Life & Health Insurance Products - SFAS 60 &97 Limited Pay

Thomas Herget

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GAAP for Traditional Life and Health Products *SFAS 60* and *SFAS 97 Limited Pay*

Hong Kong
September 2009
Tom Herget

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Agenda

- Overview
- Long Duration Contracts
  - Benefit Reserves
  - Deferred Policy Acquisition Costs
  - Assumptions
  - Earnings Patterns
  - Practical Issues
- Claim Reserves
- *SOP 05-1* Prospective Unlocking

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Overview

- Sequence of pronouncements follow the evolution of the US products & economy
- Original purpose – show gain as gain and loss as loss

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SFAS 60

- Issued in 1982
- Compiled mostly from 1972 “Audit Guide”
- Prescribed accounting rules for insurance and annuity contracts issued by stock life insurance companies
- No special guidance for “new” products, such as universal life, deferred annuities
- Address short-term and long-term contracts

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SFAS 60 – Short Duration Contracts

- Provides insurance protection over a fixed period of short-duration
- Insurer may cancel or adjust at end of any contract period
- Examples – most non-life, group life, group health, credit insurance
- Premiums recognized as revenue over the period of the contract in proportion to amount of protection provided
- Hold an Unearned Premium Reserve

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SFAS 60 Long Duration Contracts

- Provides insurance protection over an extended period
- The contract generally is not subject to unilateral changes by the insurer
- Premium is recognized when due

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SFAS 60 Long Duration Contracts

- Examples
  - Non participating whole life
  - Stock company participating whole life
  - Guaranteed renewable term life
  - Individual disability income
  - Individual medical

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Long Duration Contracts

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Benefit Reserves

- All material policy-related obligations are reserved for:
  - Death and health benefits
  - Surrender benefits
  - Endowments
  - Policy-related maintenance expenses
  - Policyholder dividends (for stocks)
- Exception: income tax
- Benefit premium equals the portion of gross premiums required to provide for all benefits and maintenance expenses

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US GAAP – Example

Ten Year Endowment
Statutory Profits

Year	Premium	Interest	Death Benefits	Surrenders	Maturities	Commission	Underwriting	Marketing	Maintenance	Cost of Claims	Change in Reserve	Book Profit
1	100.00	(0.48)	0.40	0.00	-	50.00	35.00	20.00	1.00	0.20	0.00	(7.08)
2	89.96	5.30	0.45	8.99	-	17.99			0.90	0.18	80.93	(14.18)
3	80.93	10.83	0.49	17.19	-	16.19			0.81	0.16	73.75	(16.82)
4	72.79	16.98	0.51	23.64	-	-			0.73	0.15	58.08	6.66
5	65.47	20.79	0.52	28.62	-	-			0.65	0.13	44.77	11.56
6	58.87	23.66	0.53	32.34	-	-			0.59	0.12	33.54	15.41
7	52.94	25.73	0.53	35.02	-	-			0.53	0.11	24.13	18.36
8	47.60	27.15	0.52	36.83	-	-			0.48	0.10	16.24	20.58
9	42.79	28.01	0.51	37.90	-	-			0.43	0.09	9.69	22.18
10	38.46	28.37	0.50	-	384.14	-			0.38	0.77	(341.14)	22.17
NPV	509.38		3.36	141.74	186.38	80.74	35.00	20.00	5.09	1.28		35.56

Ben NP	65%
DefAcq NP	23%
NDAcq NP	4%
Maint NP	1%
Profit	7%

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Benefit Reserve

- Prospective:

  PV Future Benefits – PV Future Benefit Premiums

  $A_{x+t} - P_x \ddot{a}_{x+t}$

- Fackler (follow the cash):

$$\frac{\left({}_{t-1}V + P\right)\left(1+i\right) - DB \times q^{d} \times \left(1+i\right)^{1/2} - CV \times q^{w}}{\left(1-q^{d}\right)\left(1-q^{w}\right)}$$

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US GAAP – Example

GAAP Benefit Reserve

Year	Benefit Net Premium	Interest	Death Benefits	Surrenders	Maturities	Cost of Claims	Benefit Reserve	In Force	BR per 1000 In Force	Maint Net Premium	Maint Reserve
								1.0000			
1	65.08	4.88	0.40	0.00	-	0.20	69.54	0.8996	77.30	1.25	0.06
2	58.54	9.61	0.45	8.99	-	0.18	128.23	0.8093	158.46	1.13	0.14
3	52.66	13.57	0.49	17.19	-	0.16	176.77	0.7279	242.85	1.01	0.23
4	47.37	16.81	0.51	23.64	-	0.15	216.79	0.6547	331.14	0.91	0.33
5	42.60	19.45	0.52	28.62	-	0.13	249.68	0.5887	424.11	0.82	0.46
6	38.31	21.60	0.53	32.34	-	0.12	276.70	0.5294	522.70	0.74	0.61
7	34.45	23.34	0.53	35.02	-	0.11	298.92	0.4760	628.03	0.66	0.79
8	30.97	24.74	0.52	36.83	-	0.10	317.26	0.4279	741.45	0.60	1.01
9	27.85	25.88	0.51	37.90	-	0.09	332.55	0.3846	864.58	0.54	1.27
10	25.03	26.82	0.50	-	384.14	0.77	-	-	1000.00	0.48	-

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Deferred Policy Acquisition Cost (DPAC or DAC) for Long Duration Contracts

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DAC

- Represents unamortized balance of deferrable acquisition expenses

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US GAAP – Example

DAC

Year	Deferrable Expense Net Premium	Interest	Deferrable Expenses	DAC	In Force	DAC per 1000 In Force
					1.0000	
1	22.72	4.67	85.00	66.95	0.8996	74.42
2	20.44	4.84	17.99	69.34	0.8093	85.68
3	18.39	5.04	16.19	72.17	0.7279	99.15
4	16.54	4.17	-	59.80	0.6547	91.35
5	14.88	3.37	-	48.30	0.5887	82.03
6	13.38	2.62	-	37.54	0.5294	70.91
7	12.03	1.91	-	27.42	0.4760	57.61
8	10.81	1.25	-	17.85	0.4279	41.72
9	9.72	0.61	-	8.74	0.3846	22.72
10	8.74	0.00	-	0.00	-	-


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$$Mean_t = \tfrac{1}{2}\left(DAC_{t-1} + P - Cost + DAC_t\right)$$

Need deferred premium and cost of collection where

cost of collection = % exp × Gross Deferred Premium


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$$\text{MidTerminal}_t = \tfrac{1}{2}\left(DAC_{t-1} - \text{Per Policy Cost} + DAC_t\right)$$

Plus Unearned Premium Reserve less Equity in UEPR where

EUEP = % exp × Gross Unearned

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Assumptions for Long Duration Contracts

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Assumptions for Reserves and DAC

- Assumptions needed for:
  - Investment earnings
  - Mortality and morbidity
  - Termination
  - Deferrable and maintenance expenses
  - Policyholder dividends

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Assumptions for Reserves and DAC

- Assumptions must be consistent with experience at the time policies are issued
- Assumptions must contain provision for adverse deviation ("PAD")
- Assumptions must be "locked-in" at issue

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General Guidance for PADs

- Investment earnings for non-par
  - Best estimate rate less small margin (0.25% to 0.50% common in today's environment)
  - Conservative ultimate rate
- Mortality / morbidity for non-par
  - 5% to 10% PAD is common
- Lapse and maintenance expense
  - Most often, there is none
- Total PADS must not cause net premium to be larger than gross premium

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Earnings Pattern for Long Duration Contracts

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Earnings Pattern

- Expected pre-tax income emerges as:
  - Level % of gross premium
  - + "Release from risk" (e.g., earned interest in excess of GAAP reserve interest)
  - + Deviations on experience
  - – Non-deferrable acquisition and overhead expenses
  - + Investment income on invested assets backing GAAP equity

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US GAAP – Example

US GAAP Financial Statements

Year	Premium	Interest	Benefits	Deferrable Expenses	Other Expenses	Change in Ben Reserve	Change in DAC	Profit	% Premium	Benefit Reserve	DAC
1	100.00	(0.48)	0.40	85.00	21.20	69.54	66.95	(9.73)	-9.7%	69.54	66.95
2	89.96	5.50	9.44	17.99	1.08	58.69	2.39	10.59	11.8%	128.23	69.34
3	80.93	9.19	17.67	16.19	0.97	48.54	2.83	9.53	11.8%	176.77	72.17
4	72.79	13.23	24.15	-	0.87	40.01	(12.37)	8.57	11.8%	216.79	59.80
5	65.47	16.62	29.14	-	0.79	32.90	(11.51)	7.71	11.8%	249.68	48.30
6	58.87	19.47	32.87	-	0.71	27.02	(10.76)	6.93	11.8%	276.70	37.54
7	52.94	21.86	35.55	-	0.64	22.21	(10.12)	6.23	11.8%	298.92	27.42
8	47.60	23.90	37.35	-	0.57	18.34	(9.57)	5.60	11.8%	317.26	17.85
9	42.79	25.64	38.42	-	0.51	15.29	(9.11)	5.04	11.8%	332.55	8.74
10	38.46	27.10	384.64	-	1.15	(332.55)	(8.74)	4.07	11.8%	-	0.00
						NPV		35.56			

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Practical Issues for Long Duration Contracts

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Variations

- Interpolated reserve factors
- Terminal $(1 - q^d) \times (1 - q^w)$

versus

- Final $(1 - q^d)$ in denominator

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DAC Calculation Methods

- Factors
  - Apply actuarially determined factor to each unit of in force at valuation date
- Worksheet
  - Calculate DAC balances for blocks of insurance contracts by issue year
  - Adjust for total termination experience different from assumed

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DAC Assumptions

- True-up each reporting period
- Commissions – capitalize bonus amounts

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Factor Method for DAC Calculation

- Compatible with benefit reserve factor method
- Have to be careful that factors defer correct amounts

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Static Worksheet Method

Example (i = 0%)

Yr	Def Exp	Premium	DAC
1	1,000	1,000	750
2	0	900	525
3	0	800	325
4	0	700	150
5	0	600	0
PV	1,000	4,000	(k = 25%)

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Dynamic Worksheet Method
Example

Actual Premium In Force EOY 1 = 850
Expected Premium EOY 1 = 900

DAC = (850 / 900) (750) = 708


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Worksheet Method for DAC Calculation

- Based on estimates of future premiums as of issue date
- Based on actual deferrable expenses
- Simple to maintain and understand
- Introduces need to monitor and adjust regularly for lapse experience


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Valuation Cycle Example

Product – 10 year term

- Assumptions (Direct)
- Mortality – with 5% PAD
- Lapse
  - Year one: 8%
  - Year two: 7%
  - Year three: 6%
  - Years four through nine: 5%
  - Year ten: 100%
- Interest rate: level 7%

Assumptions (Direct)

Issue Costs – age:	25	30	35	40	45	50	55	60
	$210	$225	$240	$260	$320	$350	$390	$440

Commissions – year one: 115%

Years two–ten: 3%

Premium Tax: 2.5%

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Risk Classes

- Sex – Male & Female
- Tobacco – Smoker & Nonsmoker
- Size bands – four: lower limit 50, 100, 250, 1000

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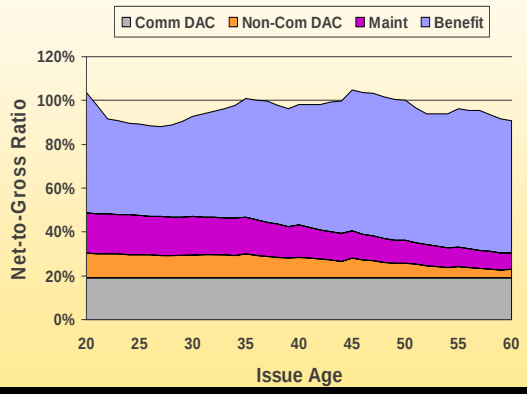
GAAP Net to Gross Premiums Ratios

Direct: One Each (Weighted Avg. = 95.8%)



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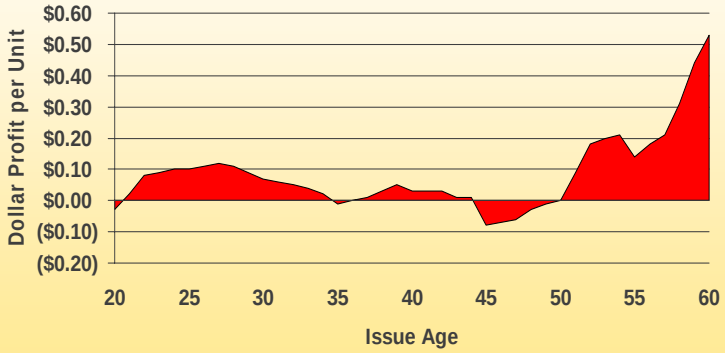
GAAP Dollar Profit per Unit

Direct: One Each (Weighted Avg. = $0.08)



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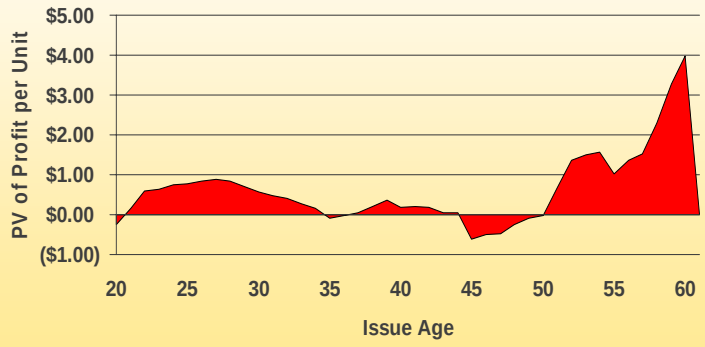
GAAP PV of Profit per Unit

Direct: One Each (Weighted Avg. = $0.63)



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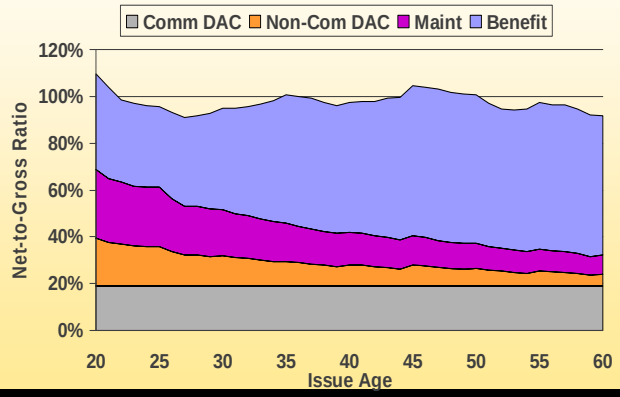
GAAP Net-to-Gross Premium Ratios

Direct: Actual Distribution (Weighted Avg. = 98.0%)



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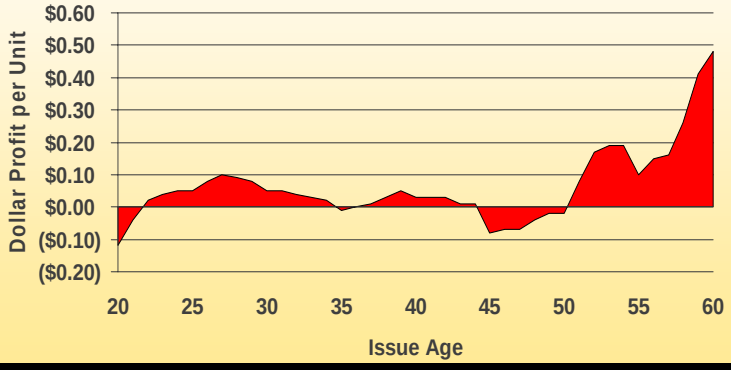
GAAP Dollar Profit per Unit

Direct: Actual Distribution (Weighted Avg. = $0.03)



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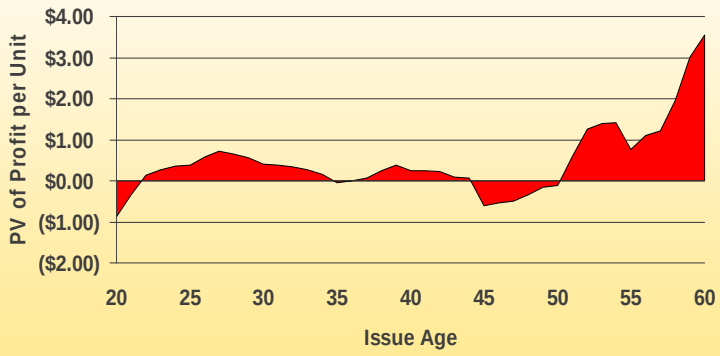
GAAP PV of Profit per Unit

Direct: Actual Distribution (Weighted Avg. = $0.26)



GAAP Profit Summary – 10 Year Term

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10 Year Age Groups

IAge	Distr%	Ratio
25	1.7%	95.6
35	25.1%	100.6
45	40.0%	104.7
55	30.9%	97.3
65	2.4%	91.7
Total	100.0%	**100.9**

5 Year Age Groups

IAge	Distr%	Ratio
20	0.1%	109.6
25	0.7%	95.6
30	4.0%	94.9
35	13.1%	100.6
40	22.6%	97.4
45	19.1%	104.7
50	18.4%	100.6
55	15.4%	97.3
60	6.5%	91.7
Total	100.0%	**99.3**

Seriatim

IAge	Distr%	Ratio
20	0.0%	109.6
21	0.0%	103.8
22	0.0%	98.5
23	0.0%	96.9
24	0.1%	95.9
25	0.1%	95.6
26	0.2%	92.9
27	0.3%	90.9
28	0.4%	91.8
29	0.5%	92.9
30	0.7%	94.9
31	1.0%	95.1
32	1.3%	95.8
33	1.6%	96.8
34	2.0%	98.0
35	2.7%	100.6
36	3.0%	99.9
37	3.9%	99.3
38	4.3%	97.2
39	4.5%	95.9
40	4.8%	97.4

Seriatim continued...

IAge	Distr%	Ratio
41	4.4%	97.7
42	4.6%	97.9
43	4.2%	99.3
44	4.2%	99.5
45	3.8%	104.7
46	3.5%	103.9
47	3.3%	103.3
48	3.6%	102.0
49	3.5%	100.9
50	3.4%	100.6
51	3.5%	97.1
52	4.5%	94.4
53	4.2%	94.2
54	3.7%	94.6
55	3.4%	97.3
56	2.3%	96.4
57	1.9%	96.3
58	1.9%	94.6
59	2.2%	92.3
60	2.4%	91.7
Total	100.0%	**98.0**

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Reinsurance

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Assumptions (Ceded)

- Coinsurance
- Policy fee excluded
- Expense allowance of 100% year one; 25% thereafter

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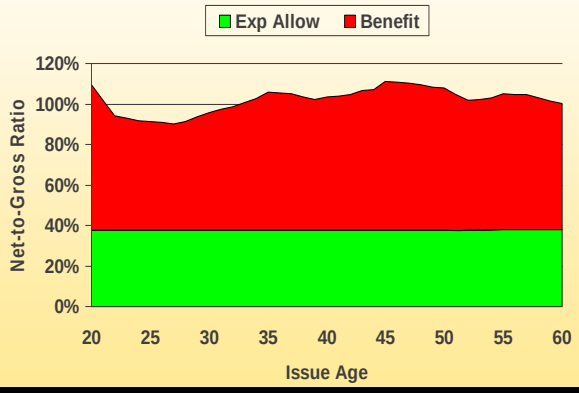
GAAP Net-to-Gross Premium Ratios

Ceded: One Each (Weighted Avg. = 103.2%)



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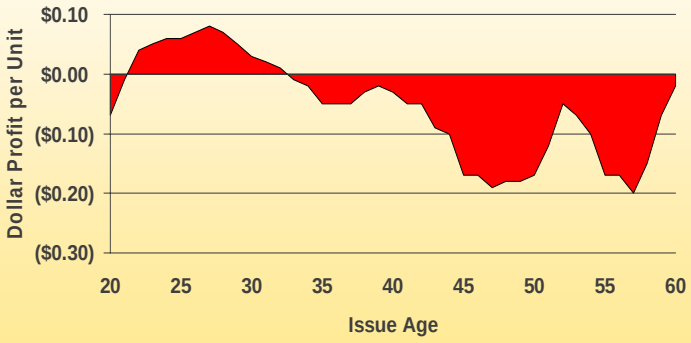
GAAP Dollar Profit per Unit

Ceded: One Each (Weighted Avg. = –$0.06)



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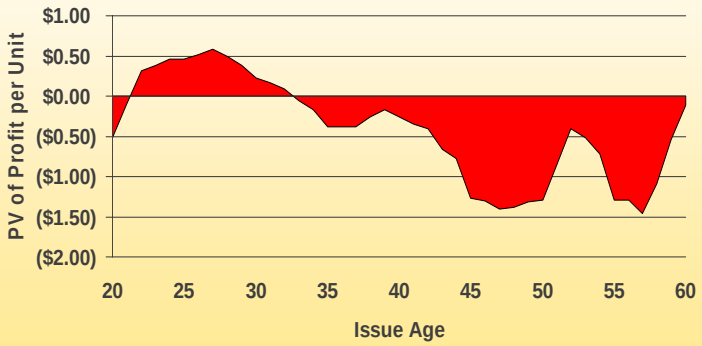
GAAP PV of Profit per Unit

Ceded: One Each (Weighted Avg. = –$0.42)



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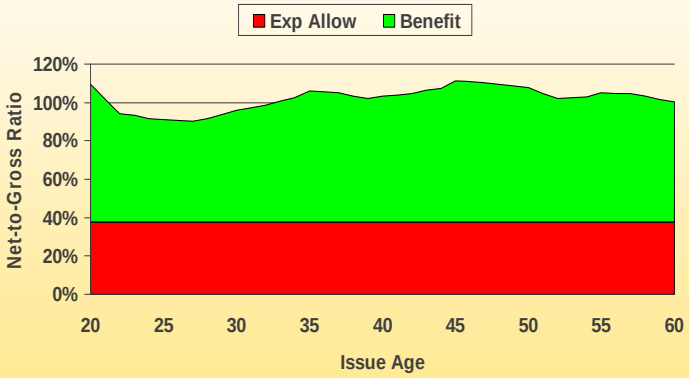
GAAP Net-to-Gross Premium Ratios

Ceded: Actual Distribution (Weighted Avg. = 104.8%)



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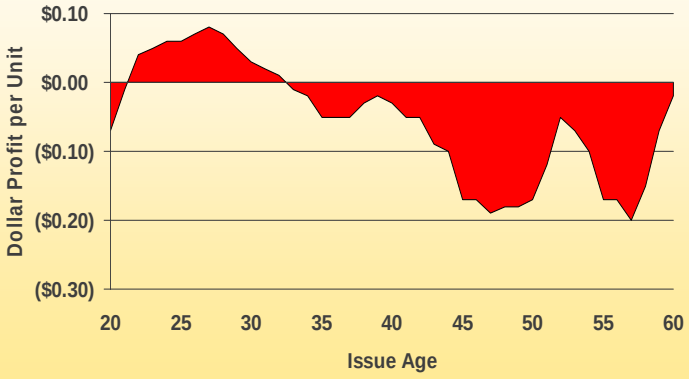
GAAP Dollar Profit per Unit

Ceded: Actual Distribution (Weighted Avg. = –$0.07)



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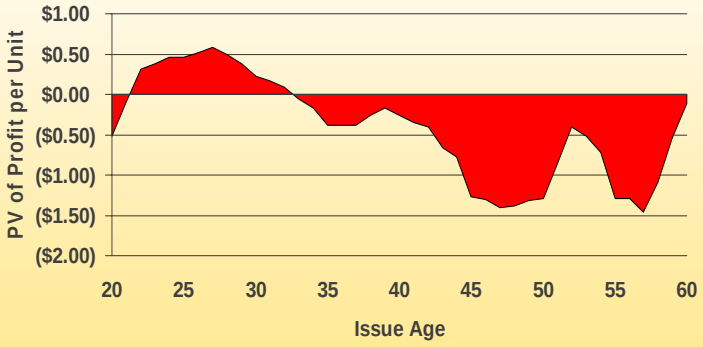
GAAP PV of Profit per Unit

Ceded: Actual Distribution (Weighted Avg. = –$0.54)



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Reinsurer's Perspective Based on Actual Distribution

Assumption	Net-to-Gross Ratio
Same as direct	104.8%
20% Worse lapse – all years	104.1%
1.5%/Yr. Mort improvement	99.7%
2.5%/Yr. Mort improvement	96.4%
2.5%/Yr. Mort & 20% worse lapse	96.0%


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Direct Less Reinsurance


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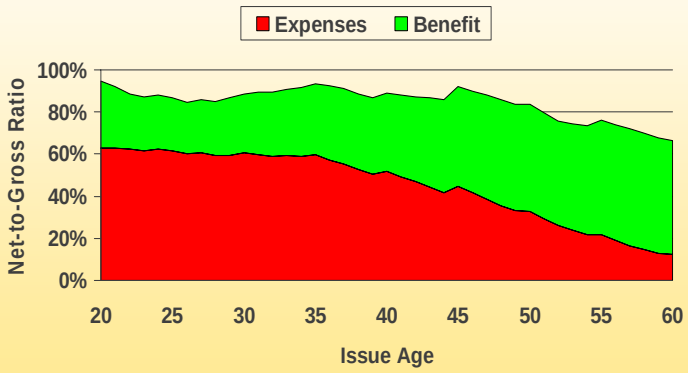
GAAP Net-to-Gross Premium Ratios

Net Results w/75% Ceded: One Each (Weighted Avg. = 81.2%)



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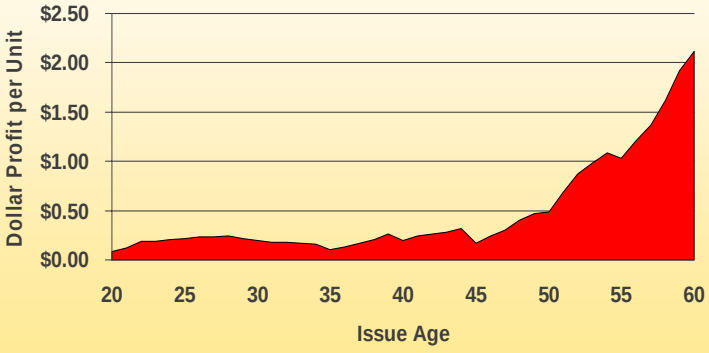
GAAP Dollar Profit per Unit

Net Results w/75% Ceded: One Each (Weighted Avg. = $0.49)



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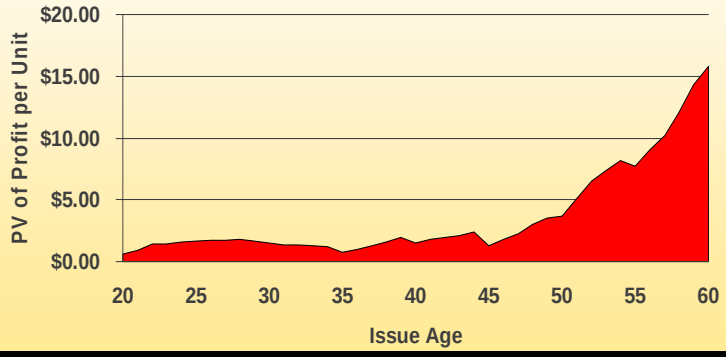
GAAP PV of Profit per Unit

Net Results w/75% Ceded: One Each (Weighted Avg. = $3.64)



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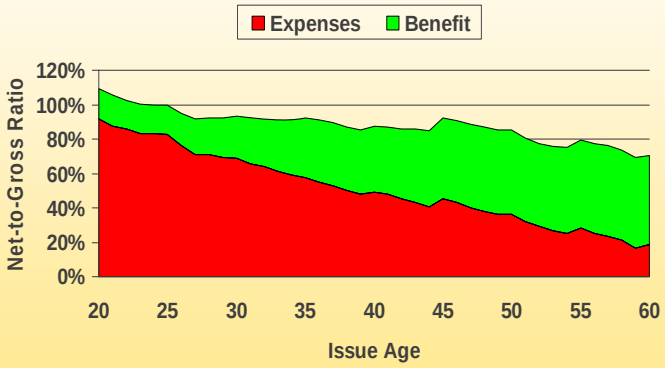
GAAP Net-to-Gross Premium Ratios

Net Results w/75% Ceded: Actual Distribution
(Weighted Avg. = 85.1%)



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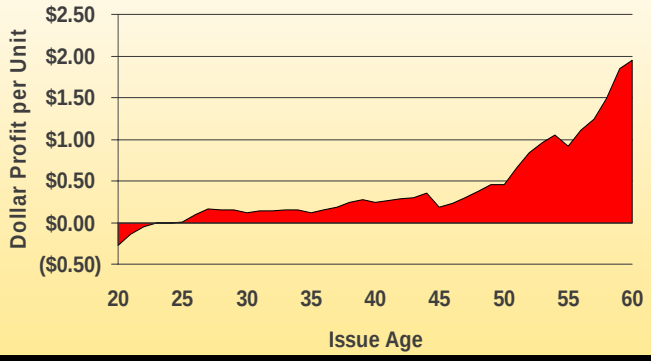
GAAP Dollar Profit per Unit

Net Results w/75% Ceded: Actual Distribution
(Weighted Avg. = $0.36)



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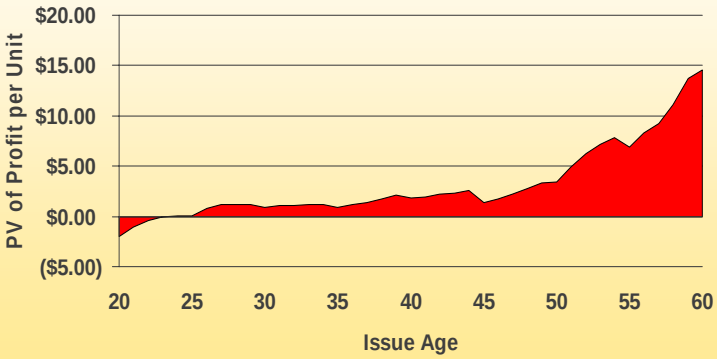
GAAP PV of Profit per Unit

Net Results w/75% Ceded: Actual Distribution
(Weighted Avg. = $2.67)



Recommended GAAP Reserving Process for Term

- Round one – put in pricing assumptions and match
- Round two – convert this to GAAP and add PAD
- Round three – establish GPV
  - What you think will happen with lapses and mortality

Special Considerations Shock Lapse Rate

- Admin system – new plan or continuation of existing plan
- Use 100% or say 80%
  - If 80%, ensure that lapse occurs at first opportunity to pay eleventh premium
- For annual, this is "year ten"
- For non-annual, this is heavily skewed to start of year eleven

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$$\text{Mean}_t = \tfrac{1}{2}\left(V_{t-1} + P + V_t\right)$$

$$\text{MidTerminal}_t = \tfrac{1}{2}\left(V_{t-1} + V_t\right)$$

Note: The ending value needs to include any dividend, endowment or bonus paid at policy year-end.

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Fackler Formula – Terminal Reserve

$$\frac{\left({}_{t-1}V + P\right)(1+i) - DB \times q_x\left(1+\frac{i}{2}\right) - CV \times q_w}{(1-q_d)\times(1-q_w)}$$

$$= \frac{(3.00+1.50)(1.06) - 1000\times 0.00132\times(1.03) - 0\times 0.80}{(1-0.00132)\times(1-0.80)}$$

$$= \frac{4.77 - 1.36 - 0}{0.99868\times 0.2}$$

$$= \frac{3.41}{0.19974}$$

$$= 17.07$$

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Fackler Formula – "Final" Reserve

- A moment before the lapse, or
- A moment before the terminal reserve

$$\frac{({}_{t-1}V + P)(1+i) - DB \times q_x\left(1+\frac{i}{2}\right)}{(1-q_d)}$$

$$= \frac{(3.00+1.50)(1.06) - 1000 \times 0.00132 \times (1.03)}{(1-0.00132)}$$

$$= \frac{4.77 - 1.36}{0.99868}$$

$$= \frac{3.41}{0.99868}$$

$$= 3.42$$

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Special Considerations Differences in Modes Reinsurance vs. Direct Policy

- Contract with policyholder is modal
- Contract with reinsurer is annual
- Apparent anomaly with benefit reserves at beginning of each policy year – visualize as prepayment of insurance protection
- Consideration of uniformity of lapse application

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SFAS 97 Limited Pay

- Paragraph 16

"Any gross premium received in excess of the net premium shall be deferred and recognized in income in a constant relationship with insurance in force (when accounting for life insurance contracts) or with the amount of expected future benefit payments (when accounting for annuity contracts)."

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SFAS 97 Limited Pay Income Pay Annuity Example

- Premium $100.00
- Commission 6.00%
- Benefit Reserve $ 90.00

So, 4% must be established as a reserve (Deferred Profit Liability) and amortized over expected future payments

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SFAS 97 Limited Pay Other Comments

- For health usually use expected benefit payments
- For the multi-pay life and health contracts, profits no longer emerge as a level percent of premium

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Ways to Understand Reserve Movement

- Reserve per unit by issue year by major product
- GAAP reserve / Stat reserve by issue year and/or major product

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How to Understand the DAC Movement

DAC prior year
- + New deferrals
- – Amortization
- + Interest
- = DAC current year

Trend amortization, interest over average DAC balance

Loss Recognition and Recoverability for Long Duration Contracts

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Recoverability Testing

- Testing is performed on current year's issues
- Is the block of business profitable enough to recover deferrable expenses?
- Deferrable costs are limited by
  - PV of premiums less benefits and maintenance expenses
- Non-recoverable costs may not be deferred, even if product eventually becomes more profitable


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Loss Recognition (Premium Deficiency)

- Can think of as recoverability testing after issue
- Basic principle: probable future losses must be anticipated – PV future GAAP profits may not be negative
- Need to decide on what defines a block of business to be tested. Multiple years' issues, products, etc. can be aggregated
- Paragraph 32: "…contracts shall be grouped consistent with the manner of acquiring, servicing and measuring the profitability of its insurance contracts…"


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Loss Recognition and Recoverability Assumptions

- Best estimate assumptions w/o PADs
- Do not include overhead expenses
- Once in loss recognition, these new best estimate assumptions are locked in

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US GAAP – Example

After year 3, interest rates drop from 7.5% to 3.0%

Year	Premium	Interest	Benefits	Deferrable Expenses	Other Expenses	Change in Ben Reserve	Change in DAC	Profit	Benefit Reserve	DAC
1	100.00	(0.48)	0.40	85.00	21.20	69.54	66.95	(9.73)	69.54	66.95
2	89.96	5.50	9.44	17.99	1.08	58.69	2.39	10.59	128.23	69.34
3	80.93	9.19	17.67	16.19	0.97	48.54	2.83	9.53	176.77	72.17
4	72.79	5.29	24.15	-	0.87	40.01	(12.37)	0.63	216.79	59.80
5	65.47	6.65	29.14	-	0.79	32.90	(11.51)	(2.27)	249.68	48.30
6	58.87	7.79	32.87	-	0.71	27.02	(10.76)	(4.75)	276.70	37.54
7	52.94	8.75	35.55	-	0.64	22.21	(10.12)	(6.89)	298.92	27.42
8	47.60	9.56	37.35	-	0.57	18.34	(9.57)	(8.74)	317.26	17.85
9	42.79	10.26	38.42	-	0.51	15.29	(9.11)	(10.35)	332.55	8.74
10	38.46	10.84	384.64	-	1.15	(332.55)	(8.74)	(12.19)	-	0.00

DAC of 59.80 is not recoverable
DAC is reduced to 21.00

NPV yr 5 to 10 (38.80)

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US GAAP – Example

If future DAC factors are reduced in the same ratio

Year	Premium	Interest	Benefits	Deferrable Expenses	Other Expenses	Change in Ben Reserve	Change in DAC	Profit	Benefit Reserve	DAC
1	100.00	(0.48)	0.40	85.00	21.20	69.54	66.95	(9.73)	69.54	66.95
2	89.96	5.50	9.44	17.99	1.08	58.69	2.39	10.59	128.23	69.34
3	80.93	9.19	17.67	16.19	0.97	48.54	2.83	9.53	176.77	72.17
4	72.79	5.29	24.15	-	0.87	40.01	(51.17)	(38.18)	216.79	**21.00**
5	65.47	6.65	29.14	-	0.79	51.64	(4.04)	0.00	268.43	**16.96**
6	58.87	8.31	32.87	-	0.71	45.28	(3.78)	0.00	313.71	**13.18**
7	52.94	9.78	35.55	-	0.64	40.15	(3.55)	0.00	353.86	**9.63**
8	47.60	11.09	37.35	-	0.57	36.09	(3.36)	0.00	389.95	**6.27**
9	42.79	12.28	38.42	-	0.51	32.99	(3.20)	0.00	422.94	**3.07**
10	38.46	13.36	384.64	-	1.15	(422.94)	(3.07)	0.00	-	**0.00**

DAC of 59.80 is not recoverable
DAC is reduced to 21.00

NPV yr 5 to 10 0.00

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Claim Reserves

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Guiding Literature

- *SFAS 60,* (Accounting and Reporting by Insurance Enterprises)
  [¶ 17, 18]
- *SFAS 5,* (Accounting for Contingencies)
  [¶ 8, 3]


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When to Establish – *SFAS 5*

¶ 8 – establish a loss accrual if both the following are met:

(a) probable that a loss has been incurred

(b) amount of loss can be reasonably estimated

¶ 3 “probable”: the future event is likely to occur


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How to Establish – *SFAS 60*

- ¶ 17
  - Applies to incurred but not reported
- ¶ 18
  - Best estimates
    - No PAD
    - No lock-in
  - Include provisions for expenses and inflation

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SOP 05-1 and Prospective Unlocking

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Statement of Position 05-1

- Includes first-ever accounting literature reference to “Prospective Unlocking” (¶ 20, “Prospective Revision”)
- Appeared in actuarial literature in early 1980s
- Mechanically, halfway between *SFAS 60* and *SFAS 97*
  - Guaranteed renewable A&H
  - Indeterminate premium non-par life

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Prospective Unlocking

$$ {}^{OLD}V = A_{x+t}^{NEW} - P \times \ddot{a}_{x+t}^{NEW} $$

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Prospective Unlocking

- Method for unlocking:
  - Lock-in current benefit reserve, DAC, maintenance reserve and VOBA
  - Enter new future assumptions
  - Recalculate net premiums prospectively
- Need to capture prior period reserve and the new net premium
- Need to watch impact on DAC and VOBA where premiums change

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