

PBA DON'T YOU JUST LOVE IT!

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Agenda

- “Whadda Ya Know”
- Let's dig into VM 20
- Recent SOA study on PBA effect regarding Term, Traditional life, UL
- Treasury and IRS positions
- Observations

Let's Test Our Knowledge

Assertion

The sky is always blue.

Reason

The water in the ocean is blue.

- A – Both Assertion and Reason are true and Reason explains the Assertion.
- B – Both statements are true but Reason does not explain the Assertion
- C – Assertion is true, reason statement is false
- D – Assertion is false, reason statement is true.
- E – Both statements are false

Question # 1

Assertion

- PBA = approach that determines reserves and capital using specific models based on approaches that include the use of industry experience as a general rule.

Reason

- Industry experience is more credible than a company's own experience.

Question # 2

Assertion

- A new SVL is being proposed wherein the PBA details will be contained in a Valuation Manual

Reason

- The SVL will enable states to conform with the requirements of the VM as they change from year to year without having to adopt a regulation each year.

Question # 3

Assertion

- Actuarial Guidelines 34 and 39 apply to variable annuities and were repealed as of 12/31/09.

Reason

- Actuarial Guideline 43 (Formerly VACARM) applies to variable annuities and supersedes AG 34 and 39 and is effective 12/31/09.

Question #4

Assertion

- PBA for life insurance reserves applies to all business in force and includes stochastic as well as a deterministic elements.

Reason

- Run times for seriatim stochastic valuation of policies should be very manageable with the advent of cloud computing.

Question #5

Assertion

- The stochastic exclusion test allows companies to not have to compute reserves using stochastic methods.

Reason

- Only large companies can afford to use cloud computing systems.

Question #6

Assertion

- A variable annuity issued in 1994 will have an AG 43 statutory basis but a tax basis of AG 34/39.

Reason

- IRS sections 807(d)(3)(A)(ii) and 807(d)(3)(B)(ii) state that the tax basis for a policy is the statutory NAIC prescribed methodology in effect on its issue date.

Question #7

Assertion

- PBA, PBR, RBC C3 Phase I, RBC C3 – Phase II, RBC C3 Phase III, and AG 43 all include the use of stochastic computations.

Reason

- CTE 70, CTE 90, CTE 95, and CTE N mean that in general, a value is determined by ranking results, looking at the N% worst results and then taking the average of those results.

Question #8

Assertion

- On September 23, 2009 the NAIC adopted changes to the Standard Valuation Model Law which includes the concept of computing reserves on a principles based approach.

Reason

- The new SVL will add reserves for certain items that contain risk but are not currently reserved and will right size reserves on certain policies that appear to be over reserved.

Question #9

Assertion

- Since the NAIC adopted a new SVL, this now becomes the basis for computing tax reserves.

Reason

- The SVL refers to the Valuation Manual.

Question #10

Assertion

- In the expense assumptions, Fraternalists will need to include the cost of benefits paid or provided to members in lieu of federal income taxes.

Reason

- Federal and foreign income taxes must be included in the expense assumptions.

Valuation Manual

- VM-20 = Life Reserving
- VM-22 = Non-variable Annuity Reserving
- VM-25 = Health Reserving
- VM-26 = Credit Life and A&H Reserving
- VM-30 = AOMR
- VM-31 = Reporting and Documentation
- VM-50 = Experience Reporting
- VM-51 = Experience Reporting Formats

VM -20

- Minimum Reserve
- Deterministic Reserve
- Stochastic Reserve
- How to get out of computing stochastic reserves (Stochastic Exclusion Test)
- Building the Cash Flow Model
- Dealing with Reinsurance
- Valuation Assumptions

VM – 20 Reserve Name Game pg1

- Seriatim Reserve – a reserve computed policy by policy using GPV methodology (assumptions for interest, mortality, policyholder behavior, expenses)
- Deterministic Reserve – a seriatim reserve computed using a single scenario set of assumptions and GPV methodology
- Stochastic Reserve – a reserve computed using CARVM methodology where future interest rates fluctuate according to a random model and which may also affect lapses or premium revenue via changes in policyholder behavior
- Scenario Reserve – Aggregate amount of stochastic reserves for a given scenario
- Gross reserve – reserve before reinsurance

VM – 20 Reserve Name Game pg2

- Policy reserve – raw reserve before any addition of allocated excess reserves and is the greater of the seriatim reserve and the CSV
- Contract reserve – Policy reserve plus any allocated CTE70 stochastic reserve excess

What is a Minimum Reserve?

- In General
 - ▣ The deterministic reserve plus any positive excess of the stochastic reserve over the deterministic reserve
- For a Contract
 - ▣ Per policy reserve plus that portion of the excess of the stochastic reserve over the deterministic reserve

Example

- Seriatim reserve = -20
- CSV = 10
- Policy reserve = 10
- Stochastic reserve = 13
- Contract reserve = 13
- Minimum reserve = 13

True or False

- You can compute all this stuff in August and September and then roll it up to 12/31?
- False
- You can compute it prior to the valuation date but no more than 3 months before and then you can roll it up.

True or False

- You can use simplifications and approximations to calculate minimum reserves?
- True
- But you have to be able to show that the approximations and simplifications don't materially change what you would have computed in the first place.

Deterministic Reserve

- Single economic scenario (prudent estimate) computed on a per policy basis
- Use GPV methodology
- Discount back at the internally generated asset earned rate which means you need some kind of allocated asset
- All before FIT
- Cash value floor
- Basically the sum of the policy reserves

Modified Deterministic Reserve

- MDR = max(single scenario stochastic reserve (meaning CARVM type approach), per policy reserves (meaning GPV type approach) + any additional amount you'd like to throw in

Stochastic Reserve

- CARVM type of approach, greatest of present values
- Means you need to compute a present value as of each future projection year
- Run over a number of scenarios
- The discount rate for each year is 105% of the one year US Treasury interest rate
- Use prudent estimate assumptions

True or False

- The deterministic reserve is similar to a CRVM reserve in that it allows for reserve relief from acquisition expenses
- Yes
- Presumably the time zero reserve would be negative and probably the time 1 year reserve but both would be floored at zero, the same as under CRVM.

Stochastic Modeling Exclusion

$$(b-a)/c < 4\%$$

Stochastic Modeling Exclusion

- b = the largest seriatim reserve (GPV methodology) computed under any other 15 economic scenarios published by the NAIC
- a = the seriatim reserve using a baseline economic scenario again defined by the NAIC
- c = the present value of just pure benefits and expenses (this will be a NSP type number)

$$(b-a)/c < 4\%$$

Cash Flow Models

- Needed for the computation of the deterministic and stochastic reserve values
- Starting assets should equal estimated starting reserves, give or take 2%, else may need to rerun or show proof that ok
- How estimate reserve?

Scenarios

- NAIC Prescribed sets of interest rates and equity returns similar to C3-Phase II
- Company generated scenarios a possibility in the future

Net Asset Returns and Discount Rates

- Deterministic reserve tied to net asset earning rates for the product with a starting portfolio taking into account reinvestment rates of net cash flows
- These net asset returns then become the discount rates for the deterministic reserve and for the stochastic exclusion test
- For stochastic and modified deterministic reserve use $1.05 \times$ one year US Treasury rates as the discount rate at the beginning of each projection year

Assumptions

- Mortality
- Interest
- Policyholder Behavior
 - ▣ Premium payment patterns, premium persistency, surrenders, withdrawals, benefit utilizations, investment allocations
- Expenses

Assumptions in General

- Prudent estimate = company experience + margin (for deterministic reserves)
- Apply to each risk factor
- Review and update as appropriate
- What to model stochastically
 - ▣ Interest
 - ▣ Equity performance

Sensitivity Testing

- Need to do sensitivity test to understand the materiality and effect of prudent estimate assumptions on the minimum reserve
- Can use samples
- Can use prior periods
- Update from time to time depending on materiality of assumptions on reserves

Assumption Margins

- Cover
 - ▣ Adverse Experience
 - ▣ Estimation error
- For items not stochastically modeled
- The greater the uncertainty, the greater the margin
- Margins should reflect fluctuations in historical experience

Mortality

- Base on credibility segments
- Rules for data sets where number of deaths greater than 30
- What if number of deaths < 30 ?
- Future mortality improvement cannot be reflected

Policyholder Behavior

- Incorporates the concept of policyholder efficiency
- Based on actual experience
- Should include margins which has the effect of increasing the minimum reserve
- Sensitivity knowledge requirement
 - ▣ Know effect on various dynamics of policy and effect on minimum reserve

Expenses

- Same rates for deterministic and stochastic except as inflation may affect expenses
- Direct costs plus appropriate portion of overhead and indirect expenses
- Spread technology costs
- Going concern
- Can't incorporate future expense improvements
- Full allocated plus margins as previously discussed

Asset Expense Assumptions

- Default costs
- Historical in nature
- Plus ever present margin

Welcome to the World of PBA

107 PD
Oct. 28, 2009

Ken Joyce
Karen Rudolph
Bill Sayre



SOCIETY OF ACTUARIES

SOA Research Project

- Initiated Fall, 2008
- Completed Fall, 2009
- SOA Section Council sponsors
- Webcast on Sept. 2
- Report posted on SOA website



SOCIETY OF ACTUARIES

Objectives

- Field Test of VM-20, primarily
- C3 Phase III calculations included
- Determine impact on blocks
 - Term, ULSG, Whole Life, Fixed DA
- Challenges of Implementation
- Explore areas where add'l guidance is needed



Term Insurance



TERM INSURANCE

TERM BLOCK	Risk Class Structure	Issue Years	Projection Period	Level Premium Period	Period Following Level Premium Period
T-1	2 Nonsmoker 1 Smoker	2006-2008	Oct. 1, 2008 through Sept. 30, 2038	10, 20, 30	Not included in calculations (100% lapse at end of level period).
T-2	3 Nonsmoker 2 Smoker	1997-2008	Oct. 1, 2008 through Sept. 30, 2058	20	Included in calculations after shock lapse 75% for two years following level premium period.
T-3	3 Nonsmoker 2 Smoker	2007-2008	Oct. 1, 2008 through Sept. 30, 2058	20,30	Included in calculations after shock lapse of 97-99%.
T-4	3 Nonsmoker 1 Smoker	1999-2008	Oct. 1, 2008 through July 31, 2028	20	Not included in calculations (100% lapse at end of level period).



TABLE I
STATUTORY RESERVE AND RELATED AMOUNTS

TERM BLOCK	Level Premium Period	Basic Reserve	Deficiency Reserve	Gross Reserve	Reinsurance Reserve Credit	Net Deferred Premium	Net Reserve for Comparison to VM-20
T-1	10	\$ 2,809	\$ 155	\$ 2,964	\$ 22	\$ 1,754	\$ 1,188
T-1	20	2,682	1,090	3,772	22	1,081	2,669
T-1	30	3,189	958	4,147	16	1,254	2,877
T-2	20	9,556	877	10,433	229	644	9,561
T-3	20	589	785	1,374	0	0	1,374
T-3	30	479	3,627	4,105	0	0	4,105
T-4	20	5,654	373	6,028	0	0	6,028



TABLE II
VM-20 DETERMINISTIC COMPONENTS

TERM BLOCK	Level Premium Period	Item #1 Sum of Serial Reserves	Item #2 Sum of Per Policy Reserves	Item #3 Sum of Per Policy Reserves ignoring Reinsurance (FN1)	Item #4 Sum of Per Policy Reserves using Anticipated Experience	Item #5 Item #4 with Mortality Margin only	Item #6 Item #4 with Lapse Margin only
T-1	10	\$ (1,897)	\$ 266	\$ 297	\$ 128	\$ 241	\$ 139
T-1	20	(710)	692	893	202	557	269
T-1	30	(4,986)	8	9	1	4	2
T-2	20	7,840	7,867	8,762	5,307	5,973	7,165
T-3	20	36	844	N/A	231	680	325
T-3	30	(1,203)	1,079	N/A	322	799	522
T-4	20	436	1,947	N/A	1,040	1,725	1,129

FN1: N/A implies reinsurance is not applicable.



TABLE III-A
COMPARISON OF DETERMINISTIC TO STATUTORY RESERVES MARGIN ANALYSIS

TERM BLOCK	Level Premium Period	A Item #2 / Net Statutory (FN1)	B Item #3 / Direct Statutory (FN2)	C Impact of All Margins (FN3)	D Impact of Mortality Margin (FN4)	E Impact of Lapse margin (FN5)
T-1	10	22%	25%	107%	88%	8%
T-1	20	26%	33%	242%	176%	33%
T-1	30	0% (FN6)	0%	457%	217%	17%
T-2	20	82%	89%	48%	12%	35%
T-3	20	61%	N/A	265%	194%	41%
T-3	30	26%	N/A	235%	148%	62%
T-4	20	32%	N/A	87%	66%	8%

FN1: Item #2 from Table II divided by Net Reserve for comparison to VM-20 from Table I.

FN2: Direct Statutory = Gross Reserve less Net Deferred Premium from Table I.

FN3: [(Item #2 - Item #4) / Item #4], from Table II.

FN4: [(Item #5 - Item #4) / Item #4], from Table II.

FN5: [(Item #6 - Item #4) / Item #4], from Table II.

FN6: Detail surrounding this result is found in Appendix F.



T-1 30 Year
RESERVES BY PROJECTION YEAR

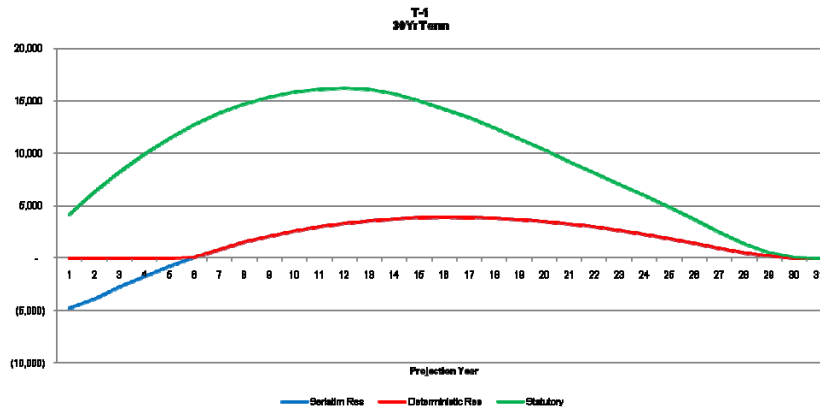


TABLE III-B
CALENDAR YEAR ANALYSIS FOR 20 YEAR LEVEL PREMIUM

ISSUE YEAR	T-1			T-2		
	Statutory	Deterministic	Ratio	Statutory	Deterministic	Ratio
2008	313	176	56%	249	364	146%
2007	1,022	242	24%	761	599	79%
2006	1,334	274	21%	1,056	818	77%
2005				1,124	945	84%
2004				1,165	963	83%
2003				1,326	1,086	82%
2002				1,072	872	81%
2001				766	652	85%
2000				375	309	82%
1999				1,155	874	76%
1998				495	373	75%
1997				18	13	72%
Total	2,669	692	26%	9,561	7,867	82%



TABLE III-B (Cont.)
CALENDAR YEAR ANALYSIS FOR 20 YEAR LEVEL PREMIUM

ISSUE YEAR	T-3			T-4		
	Statutory	Deterministic	Ratio	Statutory	Deterministic	Ratio
2008	1,007	571	57%	161	94	59%
2007	367	273	74%	322	181	56%
2006				577	193	33%
2005				553	145	26%
2004				661	177	27%
2003				673	187	28%
2002				781	234	30%
2001				941	294	31%
2000				939	304	32%
1999				419	138	33%
Total	1,374	844	61%	6,028	1,947	32%



TABLE IV-A
STOCHASTIC EXCLUSION TEST

TERM BLOCK	Level Premium Period	Ratio
T-1	10	0.11%
T-1	20	1.00%
T-1	30	1.25%
T-2	20	2.61%
T-3	20	1.38%
T-3	30	5.62%
T-4	20	3.79%



TABLE IV-B
CALENDAR YEAR ANALYSIS OF SET (T-2)

ISSUE YEAR	Stochastic Exclusion Test Ratio	Insurance Amount in \$MM
1997	0.28%	\$ 27
1998	0.48%	693
1999	0.80%	1,506
2000	1.22%	632
2001	1.40%	1,576
2002	1.97%	2,089
2003	2.37%	2,871
2004	2.74%	2,939
2005	3.08%	3,342
2006	3.41%	2,998
2007	4.42%	2,885
2008	3.73%	2,008
Aggregate	2.61%	23,567



TABLE V-A
STOCHASTIC RESERVE ANALYSIS
20 YEAR LEVEL PREMIUM PERIOD

TERM BLOCK	Deterministic Reserve	S.E.T. Ratio	Modified Deterministic Reserve	Stochastic Reserve (70CTE)	
				NAER	105% UST
T-1	\$ 692	< 4.0%	\$ 692	\$ 0	\$ 0
T-2	7,867	< 4.0%	7,911	8,145	8,394
T-3	844	< 4.0%	844	653	647
T-4	1,947	< 4.0%	1,947	652	652



TABLE V-B
STARTING ASSETS
20 YEAR LEVEL PREMIUM PERIOD

TERM BLOCK	NAER as discount		105% UST as discount	
	Starting Assets	Starting Asset Ratios	Starting Assets	Starting Asset Ratios
T-1	\$ 0	N/A	\$ 0	N/A
T-2	7,840	96%	7,840	93%
T-3	652	100%	652	101%
T-4	643	99%	643	99%



STOCHASTIC RESERVE DISTRIBUTION

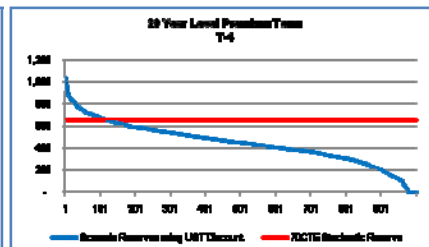
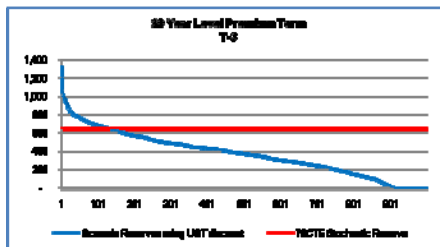
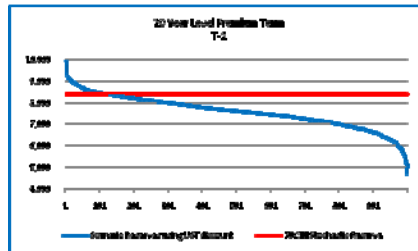


TABLE VI
MINIMUM RESERVE - 20 YEAR LEVEL PREMIUM PERIOD

TERM BLOCK	Deterministic Reserve	Excess of Stochastic Reserve over Deterministic Reserve	VM-20 Minimum Reserve	VM-20 as a percentage of Net Statutory Reserve less Deferred Premium
T-1	\$ 692	\$ 0	\$ 692	26%
T-2	7,867	44	7,911	83%
T-3	844	0	844	61%
T-4	1,947	0	1,947	32%



TABLE VII
C3 PHASE III - TERM

TERM BLOCK	Level Premium Period	Starting Assets (FN1)	Starting Assets as Pct of Statutory Reserve Net of Reinsurance (FN2)	C3P3 Stochastic Amount	Comparable Formulaic RBC Amount (FN3)	C3P3 Reported Amount (FN4)
T-1	10	\$ 2,964	101%	\$ 1	\$ 2,956	\$ 0
T-1	20	3,772	101%	405	3,768	0
T-1	30	4,147	100%	591	4,152	0
T-2	20	10,434	102%	7,541	10,256	0
T-3	20	1,374	100%	377	1,381	0
T-3	30	4,105	100%	0	4,126	0
T-4	20	5,648	94%	2,735	6,058	0

FN1: C3P3 requires the starting assets be at least equal to 98% of the reserve and other liabilities on the policies being valued.
 FN2: Starting Assets divided by Gross Reserve less Reinsurance Reserve Credit from Table I.
 FN3: For purposes of this report, the comparable RBC amount is determined as $[1 + 0.77\% * (1 - 35)] * (\text{Statutory Reserve net of reinsurance less Policy Loans})$ from Table I.
 FN4: Equal to C3P3 Stochastic Amount less the Statutory Reserve net of reinsurance from Table I, but not less than zero.



Observations- Term

- CV floor has significant impact – degree is related to competitiveness
- Deterministic < Stat Formulaic
- Wide range of Deterministic results
- SET ratio generally < 4%
- Little Stochastic excess
- C3 Phase III < Current formulaic C3



Universal Life Insurance



UNIVERSAL LIFE

UL BLOCK	Risk Class Structure	Issue Years	Projection Period	Type and Length of Secondary Guarantee Period	Lapse Assumption when Secondary Guarantee is in Play
UL-1	First two eras: 1 NS, 1 S Last era: 3 NS, 1 S	1984-2005	Oct. 1, 2008 through Sept. 30, 2038	Three eras of UL product, only one having a 9 year specified premium NLG feature	Most policies are at or beyond the NLG period. Baseline lapse assumption applicable during NLG.
UL-2	4 Nonsmoker 2 Smoker	2002-2008	Oct. 1, 2008 through Sept. 30, 2087	Shadow Account over Lifetime	0%
UL-3	4 Nonsmoker 2 Smoker	2006-2008	Oct. 1, 2008 through Sept. 30, 2127	Shadow Account; Long Term guarantee provided by a No Lapse Guarantee rider	0%
UL-4	3 Nonsmoker 1 Smoker	2006-2008	Oct. 1, 2008 through Sept. 30, 2127	Shadow Account; Long Term guarantee provided by a No Lapse Guarantee rider	0%
UL-5	5 Nonsmoker 3 Smoker	1991-2008	Oct. 1, 2008 through Sept. 30, 2038	Stipulated premium; 10 Years for most ages, 5 years for older issue ages	Most policies are at or beyond the NLG period. Baseline lapse assumption applicable during NLG
UL-6	3 Nonsmoker 2 Smoker	2006-2008	Oct. 1, 2008 through Sept. 30, 2038	Shadow Account over Lifetime	0%



TABLE I
STATUTORY RESERVE AMOUNTS

UL BLOCK	Basic Reserve	Deficiency Reserve	Gross Reserve	Reinsurance Type	Reinsurance Reserve Credit	Net Reserve for Comparison to VM-20	Cash Value
UL-1	\$ N/A	\$ N/A	\$ 122,672	YRT Risk Transfer	\$ 853	\$ 121,819	\$ 115,204
UL-2	55,011	301	55,312	YRT Risk Transfer	0	55,312	30,793
UL-3	50,036	4,348	54,384	YRT Risk Transfer	0	54,384	38,232
UL-4	29,731	0	29,731	YRT Risk Transfer	0	29,731	16,961
UL-5	146,718	0	146,718	YRT Risk Transfer	575	146,144	144,773
UL-6	78,168	31,022	109,189	None	N/A	109,189	50,015



TABLE II
VM-20 DETERMINISTIC COMPONENTS

UL BLOCK	Item #1 Sum of Seriatim Reserves	Item #2 Sum of Per Policy Reserves (FN1)	Item #3 Sum of Per Policy Reserves ignoring Reinsurance (FN2)	Item #4 Sum of Per Policy Reserves using Anticipated Experience	Item #5 Item #4 with Mortality Margin only	Item #6 Item #4 with Lapse Margin only
UL-1	\$ 59,675	\$ 116,088	\$ 116,195	\$ 115,965	\$ 116,114	\$ 115,582
UL-2	31,662	36,971	64,346	34,907	34,988	35,020
UL-3	19,006	39,711	45,497	38,811	38,925	39,486
UL-4	24,611	28,281	40,158	22,959	23,131	28,205
UL-5	124,242	144,280	144,699	143,857	144,315	143,824
UL-6	114,519	127,075	N/A	(FN3)	(FN3)	(FN3)

FN1: In all but one case, Item #2 is at least as great as Cash Value from Table I. The one exception is due to modeling variances.
 FN2: N/A implies reinsurance is not applicable.
 FN3: ATF did not calculate.



TABLE III-A
COMPARISON OF DETERMINISTIC TO STATUTORY RESERVES MARGIN ANALYSIS

UL BLOCK	A Item #2 / Net Statutory (FN1)	B Item #3 / Gross Statutory (FN2)	C Impact of All Margins (FN3)	D Impact of Mortality Margin (FN4)	E Impact of Lapse margin (FN5)
UL-1	95%	95%	0%	0%	0%
UL-2	67%	116%	6%	0%	0%
UL-3	73%	84%	2%	0%	2%
UL-4	95%	135%	23%	1%	23%
UL-5	99%	99%	0%	0%	0%
UL-6	116%	N/A	(FN6)	(FN6)	(FN6)

FN1: Item #2 from Table II divided by Net Reserve for comparison to VM-20 from Table I.
 FN2: Gross Reserve from Table I.
 FN3: [Item #2 - Item #4] / Item #4, from Table II.
 FN4: [Item #5 - Item #4] / Item #4, from Table II.
 FN5: [Item #6 - Item #4] / Item #4, from Table II.
 FN6: Table II data not available.



TABLE III-A.1
IMPACT OF REINSURANCE MODELING

UL BLOCK	Deterministic Reserve (Item #2)	Deterministic Reserve without Reinsurance Cash Flows (Item #3)	Difference	Statutory Formulaic Reinsurance Reserve Credit
UL-1	\$ 116,088	\$ 116,195	\$ 107	\$ 853
UL-2	36,971	64,346	27,375	0
UL-3	39,711	45,497	5,786	0
UL-4	28,281	40,158	11,877	0
UL-5	144,280	144,699	419	575



TABLE III-A.2
IMPACT OF REINSURANCE MODELING (UL-5)

Direct		Net of Reinsurance		Economic Credit (FN1)	Credit after allowing for CV Floor (FN2)	Statutory Formulaic Reinsurance Reserve Credit
Sum of Seriatim	Sum of Per Policy	Sum of Seriatim	Sum of Per Policy			
\$ 10,433	\$ 13,163	\$ 8,525	\$ 12,744	\$ 1,907	\$ 419	\$ 575

FN1: Equal to Sum of Seriatim Direct less Sum of Seriatim Net of Reinsurance.
FN2: Equal to Sum of Per Policy Direct less Sum of Per Policy Net of Reinsurance.



TABLE III-A.3
IMPACT OF AGGREGATE MARGIN ON SUM OF SERIATIM RESERVES

UL BLOCK	Prudent Estimate (FN1)	Anticipated Experience (FN2)	Margin Impact	Percentage Impact (FN3)
UL-1	\$ 59,675	\$ 57,587	\$ 2,088	3.6%
UL-2	31,662	27,751	3,911	14.0%
UL-3	19,006	16,488	2,519	15.3%
UL-4	24,611	17,607	7,004	39.8%
UL-5	124,242	118,176	6,066	5.1%
UL-6	114,519	98,567	15,952	16.2%

FN1: Item #1 from Table II.
FN2: Scenario #12 from Stochastic Exclusion Test analysis.
FN3: Difference divided by Anticipated Experience Sum of Seriatim Reserves.



TABLE III-A.4
ANALYSIS OF MARGIN IMPACTS

Block UL-1	No Margin	Mortality Margin	Lapse Margin	All Margins
Sum of Seriatim	\$ 57,587	\$ 58,867	\$ 69,619	\$ 59,675
Economic Impact of Margin(s)		1,280	12,032	2,088
Sum of Per Policy	115,965	116,114	115,582	116,088
Impact of Margin(s) after CV Floor		149	(383)	123

Block UL-5	No Margin	Mortality Margin	Lapse Margin	All Margins
Sum of Seriatim	\$ 118,176	\$ 123,167	\$ 119,254	\$ 124,242
Economic Impact of Margin(s)		4,991	1,078	6,066
Sum of Per Policy	143,857	144,315	143,824	144,280
Impact of Margin(s) after CV Floor		458	(33)	423



TABLE III-B
CALENDAR YEAR ANALYSIS FOR UNIVERSAL LIFE

ISSUE YEAR	UL-1				UL-2			
	Account Value	Statutory	Deterministic	Ratio	Account Value	Statutory	Deterministic	Ratio
2008					4,935	2,476	3,995	161%
2007					6,742	13,060	5,174	40%
2006					6,538	8,475	5,298	63%
2005	32	23	5	22%	5,790	7,604	4,736	62%
2004	1,302	1,055	640	61%	6,859	10,676	6,094	57%
2003	2,765	2,329	1,677	72%	10,113	8,330	9,510	114%
2002	4,918	4,236	3,043	72%	2,319	4,691	2,161	46%
2001	8,773	7,872	6,254	79%				
2000	10,910	10,060	8,427	84%				
1999	705	644	557	87%				
1998	412	411	407	99%				
1997	700	778	698	90%				
1996 & Prior	93,744	94,413	94,380	100%				
Total	124,261	121,819	116,088	95%	43,297	55,312	36,971	67%



TABLE III-B (Cont.)
CALENDAR YEAR ANALYSIS FOR UNIVERSAL LIFE

ISSUE YEAR	UL-3				UL-4			
	Account Value	Statutory	Deterministic	Ratio	Account Value	Statutory	Deterministic	Ratio
2008	5,931	5,867	5,036	86%	13,132	15,425	15,648	101%
2007	32,118	36,706	26,472	72%	11,450	14,251	12,592	88%
2006	9,571	11,811	8,202	69%	45	55	41	75%
2005 & Prior	0	0	0		0	0	0	
Total	47,620	54,384	39,711	73%	24,626	29,731	28,281	95%



TABLE III-B (Cont.)
CALENDAR YEAR ANALYSIS FOR UNIVERSAL LIFE

ISSUE YEAR	UL-5				UL-6			
	Account Value	Statutory	Deterministic	Ratio	Account Value	Statutory	Deterministic	Ratio
2008	621	504	452	90%	16,629	22,778	20,490	90%
2007	809	554	523	94%	35,219	51,467	63,220	123%
2006	1,201	899	805	89%	24,149	34,934	43,361	124%
2005	2,112	1,623	1,540	95%	2	11	5	45%
2004	2,896	2,366	2,249	95%				
2003	5,116	4,388	4,259	97%				
2002	3,330	3,049	2,916	96%				
2001	2,561	2,369	2,276	96%				
2000	1,925	1,801	1,758	98%				
1999	3,667	3,473	3,409	98%				
1998	5,397	5,160	4,959	96%				
1997	10,090	9,673	9,537	99%				
1996 & Prior	111,554	110,284	109,598	99%				
Total	151,278	146,144	144,280	99%	75,999	109,189	127,075	116%



TABLE IV-A
STOCHASTIC EXCLUSION TEST

UL BLOCK	Ratio
UL-1	5.0%
UL-2	1.7%
UL-3	7.5%
UL-4	25.4%
UL-5	2.5%
UL-6	5.6%



TABLE IV-B
CALENDAR YEAR ANALYSIS OF SET

ISSUE YEAR	Stochastic Exclusion Test Ratio			
	UL-1	UL-2	UL-3	UL-4
1992 & Prior	6.7%			
1993	8.1%			
1994	8.6%			
1995	7.7%			
1996	8.8%			
1997	6.5%			
1998	3.0%			
1999	1.6%			
2000	1.5%			
2001	1.5%			
2002	1.5%	0.6%		
2003	1.4%	1.0%		
2004	1.8%	1.1%		
2005	2.7%	1.5%		
2006		2.0%	7.2%	10.2%
2007		1.9%	7.6%	23.3%
2008		2.6%	7.2%	26.7%
Aggregate	5.0%	1.7%	7.5%	25.4%



TABLE V-A
STOCHASTIC RESERVE ANALYSIS – UNIVERSAL LIFE

UL BLOCK	Deterministic Reserve	S.E.T. Ratio	Modified Deterministic Reserve	Stochastic Reserve (70CTE)	
				NAER	105% UST
UL-1	\$ 116,088	> 4.0%	\$ N/A	\$ 91,125	\$ 90,963
UL-2	36,971	< 4.0%	36,971	32,378	32,564
UL-3	39,711	> 4.0%	N/A	20,640	20,582
UL-4	28,281	> 4.0%	N/A	25,117	24,574
UL-5	144,280	< 4.0%	150,544	147,472	150,545
UL-6	127,075	> 4.0%	N/A	112,426	112,355



TABLE V-B
STARTING ASSETS

UL BLOCK	NAER as discount		105% UST as discount	
	Starting Assets	Starting Asset Ratios	Starting Assets	Starting Asset Ratios
UL-1	\$ 92,046	101%	\$ 92,046	101%
UL-2	32,182	99%	32,182	99%
UL-3	20,535	99%	20,535	100%
UL-4	25,146	100%	25,146	102%
UL-5	145,335	99%	149,115	99%
UL-6	113,326	101%	112,705	100%

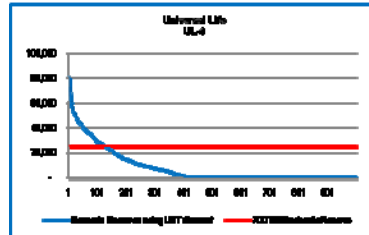
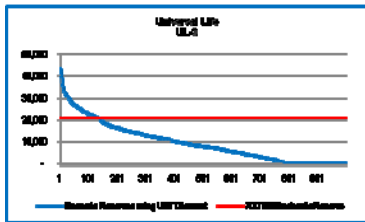
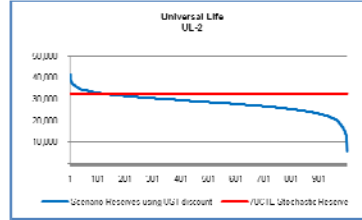
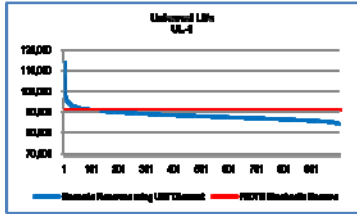


TABLE V-C
STOCHASTIC RESERVE COMPARED TO SERIATIM RESERVE

UL BLOCK	Sum of Seriatim (Table II, Item #1)	Stochastic Reserve (Table V, 105% UST)	Difference
UL-1	\$ 59,675	\$ 90,963	\$ 31,288
UL-2	31,662	32,564	902
UL-3	19,006	20,582	1,576
UL-4	24,611	24,574	(37)
UL-5	124,242	150,545	26,303
UL-6	114,519	112,355	(2,164)



STOCHASTIC RESERVE DISTRIBUTION



STOCHASTIC RESERVE DISTRIBUTION (Cont.)

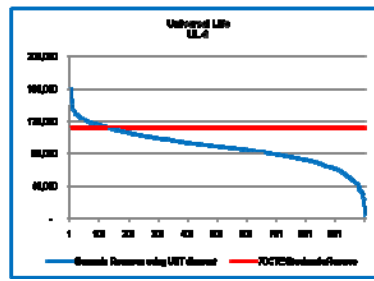
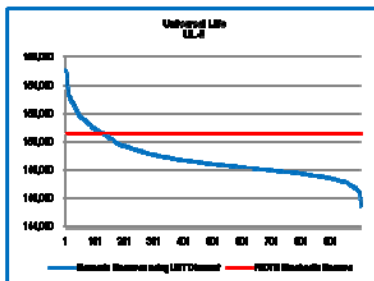


TABLE VI
MINIMUM RESERVE – UNIVERSAL LIFE

UL BLOCK	Deterministic Reserve	Excess of Stochastic Reserve over Deterministic Reserve	VM-20 Minimum Reserve	VM-20 as a percentage of Net Statutory Reserve less Deferred
UL-1	\$ 116,088	\$ 0	\$ 116,088	95%
UL-2	36,971	0	36,971	67%
UL-3	39,711	0	39,711	73%
UL-4	28,281	0	28,281	95%
UL-5	144,280	6,264	150,544	103%
UL-6	127,075	0	127,075	116%



TABLE VII
C3 PHASE III – UNIVERSAL LIFE

UL BLOCK	Starting Assets (FN1)	Starting Assets as Pct of Statutory Reserve net of Reinsurance (FN2)	C3P3 Stochastic Amount	Comparable formulaic RBC amount (FN3)	C3P3 Reported Amount (FN4)
UL-1	\$ 121,980	100%	\$ 114,736	\$ 122,429	\$ 0
UL-2	55,312	100%	49,134	55,589	0
UL-3	54,244	100%	38,232	54,656	0
UL-4	29,731	100%	19,151	29,880	0
UL-5	148,626	102%	153,862	140,890	7,718
UL-6	109,614	100%	80,198	108,992	0

FN1: C3P3 requires the starting assets be at least equal to 98% of the reserve and other liabilities on the policies being valued.
 FN2: Starting Assets divided by Gross Reserve less Reinsurance Reserve Credit from Table I.
 FN3: For purposes of this report, the comparable RBC amount is determined as $[1 + 0.77\% * (1-.35)] * (\text{Statutory Reserve net of reinsurance less Policy Loans})$ from Table I.
 FN4: Equal to C3P3 Stochastic Amount less the Statutory Reserve net of reinsurance from Table I, but not less than zero.



Observations- Universal Life

- CV floor drives Deterministic Reserve
- Deterministic range is 67% to 116% of Statutory
- CV floor masks impact of assumption margins and reinsurance reserve credit
- Margin determination (i.e., increase or decrease) can vary by granular characteristics
- SET results mixed
- Only one block with Stochastic excess
- C3P3 results mostly lower than formulaic



Whole Life Insurance



TRADITIONAL WHOLE LIFE

WL BLOCK	Product Type	Issue Years	Projection Period	Handling of Non-Guaranteed Elements
WL-1	PAR	1988-2008	Oct. 1, 2008 through Sept. 30, 2038	The interest component varies with the underlying changes to the net investment earnings rate.
WL-2	PAR	1925-2008	Oct. 1, 2008 through Sept. 30, 2078	The interest component varies with the underlying changes to the net investment earnings rate.
WL-3	PAR	2005-2008	Oct. 1, 2008 through Sept. 30, 2098	The interest component varies with the underlying changes to the net investment earnings rate.
WL-4	Pre-need	2001-2008	Oct. 1, 2008 through Dec. 31, 2037	Though contractually non-guaranteed, increases in face amount are projected to increase regardless of economic conditions.



TABLE I
STATUTORY RESERVE AND RELATED AMOUNTS

WL BLOCK	Basic Reserve	Deficiency Reserve	Gross Reserve	Reinsurance Reserve Credit	Net Deferred Premium	Net Reserve for Comparison to VM-20	Policy Loan Amount	Cash Value
WL-1	\$124,907	\$ 835	\$125,742	\$ 0	\$ 3,670	\$122,072	\$ 15,023	\$80,186
WL-2	165,059	0	165,059	405	3,801	160,853	20,596	155,408
WL-3	11,982	0	11,982	0	2,733	9,249	0	1,752
WL-4	772,890	0	772,890	0	0	772,890	35	703,791



TABLE II
VM-20 DETERMINISTIC COMPONENTS

WL BLOCK	Item #1 Sum of Seriatim Reserves	Item #2 Sum of Per Policy Reserves	Item #3 Sum of Per Policy Reserves ignoring Reinsurance (FN1)	Item #4 Sum of Per Policy Reserves using Anticipated Experience	Item #5 Item #4 with Mortality Margin only	Item #6 Item #4 with Lapse Margin only
WL-1	\$ 73,040	\$ 102,004	\$ N/A	\$ 100,162	\$ 101,477	\$ 100,684
WL-2		160,903	159,497	158,160	158,830	158,427
WL-3	5,503	7,224	N/A	6,277	6,626	6,506
WL-4	762,544	765,626	N/A	761,674	766,709	760,028

FN1: N/A implies reinsurance is not applicable.



TABLE III-A
COMPARISON OF DETERMINISTIC TO STATUTORY RESERVES MARGIN ANALYSIS

WL BLOCK	A Item #2 / Net Statutory (FN1)	B Item #3 / Direct Statutory (FN2)	C Impact of All Margins (FN3)	D Impact of Mortality Margin (FN4)	E Impact of Lapse margin (FN5)
WL-1	84%	N/A	2%	1%	1%
WL-2	100%	99%	2%	0%	0%
WL-3	78%	N/A	15%	6%	4%
WL-4	99%	N/A	1%	1%	0%

FN1: Item #2 from Table II divided by Net Reserve from Table I.
 FN2: Direct Statutory = Gross Reserve less Net Deferred Premium from Table I.
 FN3: [Item #2 - Item #4] / Item #4, from Table II.
 FN4: [Item #5 - Item #4] / Item #4, from Table II.
 FN5: [Item #6 - Item #4] / Item #4, from Table II.



TABLE III-A.1
MARGIN ANALYSIS – DOLLAR IMPACT

WL BLOCK	Sum of Per Policy Reserves		Margin Impact	
	With Margins	Without Margins	\$	%
WL-1	\$ 102,004	\$ 100,162	\$ 1,842	2%
WL-2	160,903	158,160	2,743	2%
WL-3	7,224	6,277	947	15%
WL-4	765,626	761,674	3,952	1%



TABLE III-B
CALENDAR YEAR ANALYSIS FOR WHOLE LIFE

ISSUE YEAR	WL-1			WL-2		
	Statutory	Deterministic	Ratio	Statutory	Deterministic	Ratio
2008	1,718	3,929	229%	312	619	199%
2007	3,767	3,131	83%	1,216	1,171	96%
2006	4,880	3,613	74%	2,843	2,486	87%
2005	4,283	3,412	80%	4,188	3,815	91%
2004	4,495	3,677	82%	5,155	4,786	93%
2003	4,333	3,891	90%	6,426	6,126	95%
2002	2,982	2,569	86%	8,447	8,211	97%
2001	3,930	3,018	77%	6,867	6,756	98%
2000	1,082	1,011	93%	5,587	5,558	99%
1999	2,163	1,960	91%	5,676	5,693	100%
1998 & Prior	88,439	71,793	81%	114,137	115,682	101%
Total	122,072	102,004	84%	160,853	160,903	100%



TABLE III-B (Cont.)
CALENDAR YEAR ANALYSIS FOR WHOLE LIFE

ISSUE YEAR	WL-3			WL-4		
	Statutory	Deterministic	Ratio	Statutory	Deterministic	Ratio
2008	83	419	505%	171,109	169,407	99%
2007	1,805	1,102	61%	192,389	187,078	97%
2006	5,211	3,807	73%	131,003	126,961	97%
2005	2,149	1,896	88%	107,424	111,507	104%
2004				119,406	119,927	100%
2003				46,451	45,546	98%
2002				5,049	5,134	102%
2001				59	66	111%
2000						
1999						
Total	9,249	7,224	78%	772,890	765,626	99%



TABLE IV
STOCHASTIC EXCLUSION TEST

WL BLOCK	Ratio
WL-1	0.47%
WL-2	0.10%
WL-3	0.35%
WL-4	1.23%



TABLE V-A
STOCHASTIC RESERVE ANALYSIS – WHOLE LIFE

WL BLOCK	Deterministic Reserve	S.E.T. Ratio	Modified Deterministic Reserve	Stochastic Reserve (70CTE)	
				NAER	105% UST
WL-1	\$ 102,004	< 4.0%	\$ 114,137	\$ 116,671	\$ 115,949
WL-2	160,903	< 4.0%	160,903	155,203	148,758
WL-3	7,224	< 4.0%	7,224	5,993	5,813
WL-4	765,626	< 4.0%	765,626	762,723	749,457



TABLE V-B
STARTING ASSETS

WL BLOCK	NAER as discount		105% UST as discount	
	Starting Assets	Starting Asset Ratios	Starting Assets	Starting Asset Ratios
WL-1	\$ 121,192	104%	\$ 121,192	105%
WL-2	162,389	105%	162,389	109%
WL-3	5,998	100%	5,834	100%
WL-4	768,515	101%	751,202	100%



STOCHASTIC RESERVE DISTRIBUTION

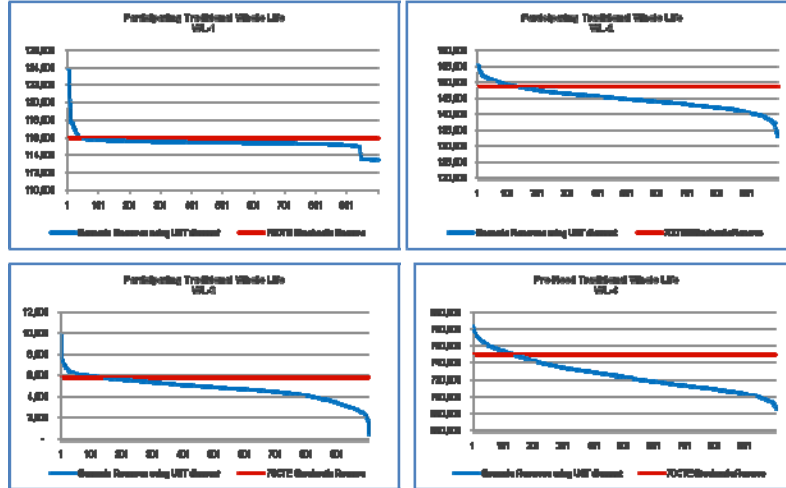


TABLE VI
MINIMUM RESERVE – WHOLE LIFE

WL BLOCK	Deterministic Reserve	Excess of Stochastic Reserve over Deterministic	VM-20 Minimum Reserve	VM-20 as a percentage of Net Statutory Reserve less Deferred Premium
WL-1	\$ 102,004	\$ 12,133	\$ 114,137	93%
WL-2	160,903	0	160,903	100%
WL-3	7,224	0	7,224	78%
WL-4	765,626	0	765,626	99%



TABLE VII
C3 PHASE III – WHOLE LIFE

WL BLOCK	Starting Assets (FN1)	Starting Assets as Pct of Statutory Reserve Net of Reinsurance (FN2)	C3P3 Stochastic Amount	Comparable formulaic RBC Amount (FN3)	C3P3 Reported Amount (FN4)
WL-1	\$ 129,640	103%	\$ 122,001	\$ 111,273	\$ 0
WL-2	162,389	99%	155,715	144,779	0
WL-3	11,982	100%	8,176	12,042	0
WL-4	775,858	100%	761,666	776,722	0

FN1: C3P3 requires the starting assets be at least equal to 98% of the reserve and other liabilities on the policies being valued.
 FN2: Starting Assets divided by Gross Reserve less Reinsurance Reserve Credit from Table I.
 FN3: For purposes of this report, the comparable RBC amount is determined as $[1 + 0.77\% * (1-.35)] * (\text{Statutory Reserve net of reinsurance less Policy Loans})$ from Table I.
 FN4: Equal to C3P3 Stochastic Amount less the Statutory Reserve net of reinsurance from Table I, but not less than zero.



Observations- Whole Life

- CV floor can have material impact
- Applying margins may sometimes be nonsensical
- SET test results very low
- PBA capital lower than formulaic
- Handling of outlier scenarios
- Policy loan earnings rate



Treasury and IRS Issues

- Notice 2008-19
- Tax reserves come in to play in
 - ▣ 50% Reserve Ratio test – qualification as a life insurance company
 - ▣ Section 7702 test – qualification as a life insurance contract
 - ▣ Contract by contract versus aggregation method
 - ▣ Prevailing interest and mortality
 - ▣ Applicability to in force contracts
 - ▣ Tax administration

Practical Problems

- Multiple valuation systems
 - ▣ One for new policies
 - ▣ One for old policies
- C3 Phase III applies to all policies, PBR only applies to new policies
- Booking of reserves requires much higher level of audit than making a C3Pi computation
- Explaining the change in reserves to the CEO

Interesting Problems

- Find the amount of margin needed to fund the CTE 70 reserve
- Suppose you ran 1000 trials of CTE70 computations, what would be the mean of those computations and the std deviation?

Implications on Pricing?

- Stochastic PBR requirements means you will need to project future reserves somehow.
- Treatment of margins means you need to coordinate with valuation actuary