

2017 Valuation Actuary Seminar  
October 18-19, 2017  
Boston Marriott Copley Place  
Boston, MA

Session 11PD: US GAAP Income Statement Analysis

**Moderator:**

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**Presenters:**

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# SOA Valuation Actuary Seminar

## Session 11: GAAP Income Statement Analysis (Part 1)

Joshua Liu FRM, FSA, MAAA  
FIA Risk Analysis under GAAP Framework  
10/19/2017



# Introduction



# Derivatives Implementation Group

- “The carrying value assigned to the host contract is the difference between the proceeds received from the issuance of the hybrid instrument and the fair value of the embedded derivatives.”
- $GHC_0 = \text{Initial Premium} - VED_0$
- No gain/loss at issue



# Fixed Indexed Annuity Contracts 1/2

- **Statement 133 implementation issue No. B30**
  - This Subtopic defines an equity-indexed annuity as a deferred fixed annuity contract with a guaranteed minimum interest rate plus a contingent return based on some internal or external equity index.
  - The guaranteed contract value is generally designed to meet certain regulatory requirements.
  - Typically have minimal mortality risk and are therefore classified as investment contracts.



# Fixed Indexed Annuity Contracts 2/2

- **Statement 133 implementation issue No. B30**

- These Equity-indexed annuities often do not have specified maturity dates.
- Customers typically can surrender the contract at any point in time, at which time they receive their cash value.
- The account value is generally defined in the policy as the greater of the policyholder's initial investment plus the equity-indexed return or a guaranteed floor amount.

p.s. Policyholder receives cash surrender value in the event that his or her policy is voluntarily terminated before its maturity or the insured event occurs. The cash value is the account value after deducting any stipulated costs such as surrender charge, partial withdrawal, advanced loan, administration cost,... Therefore, it is also known as "cash value", "surrender value" and "policyholder's equity"



# FASB 133 Reserve

- Value of Embedded Derivatives (VED)
  - Actuarial present value of FAS133 excess benefit between projected FIA fund and projected guaranteed fund discounted at risk free rate
  - Theoretically, this is a call option reserve for which value can go up or down depending on market performance
- Guaranteed Host Contract (GHC)
  - $GHC = \text{Initial premium} - VED$
  - $FIA \text{ reserve}_t \text{ at any time} = GHC_t + VED_t$



# FIA GAAP Valuation - Combination of

- SFAS 97 (DAC)
- SFAS 91 (host contract)
- SFAS 133 (Derivative Instruments and Hedging Activities)
- SFAS 157 (Fair Value Measurement)



# Bifurcation

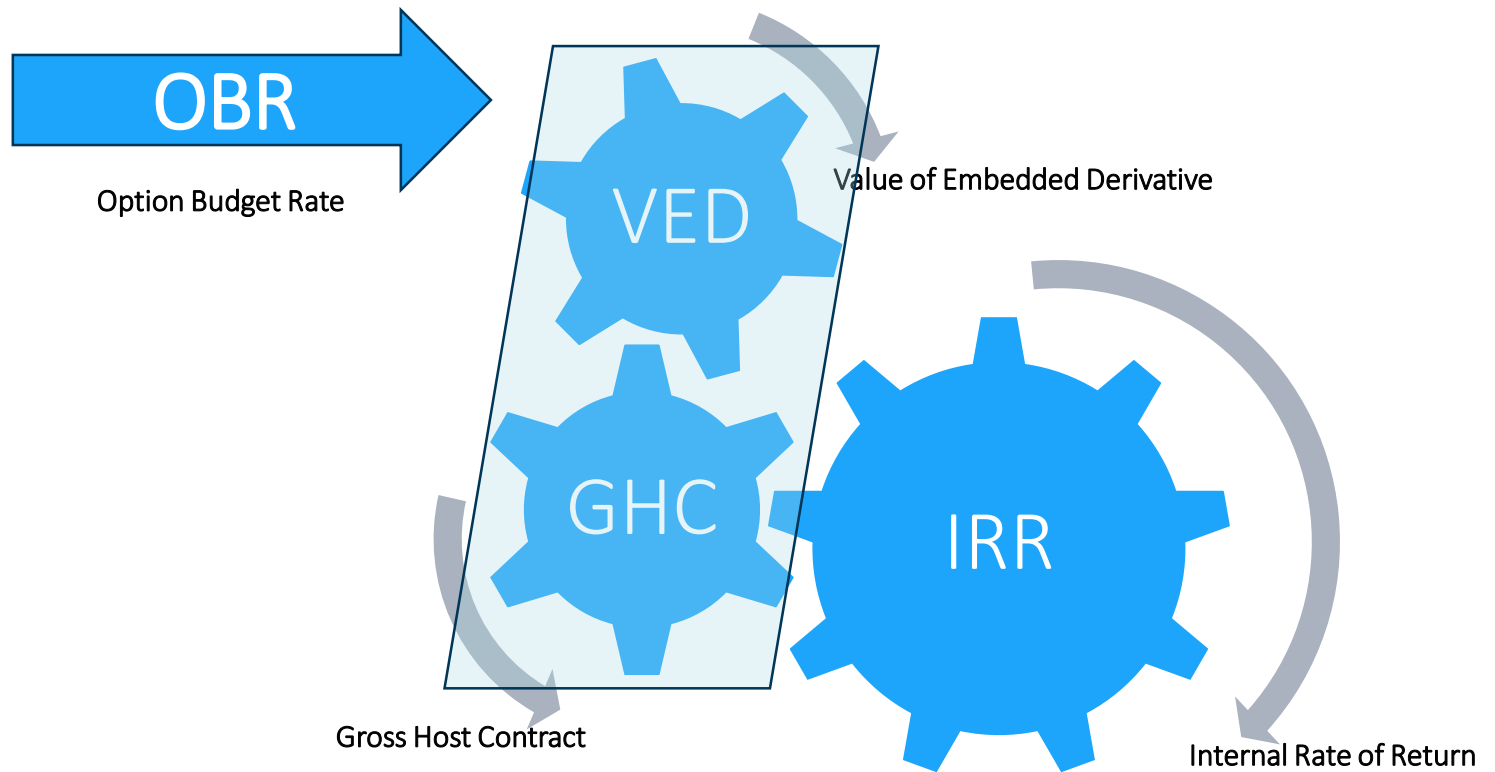


# Hybrid Instruments

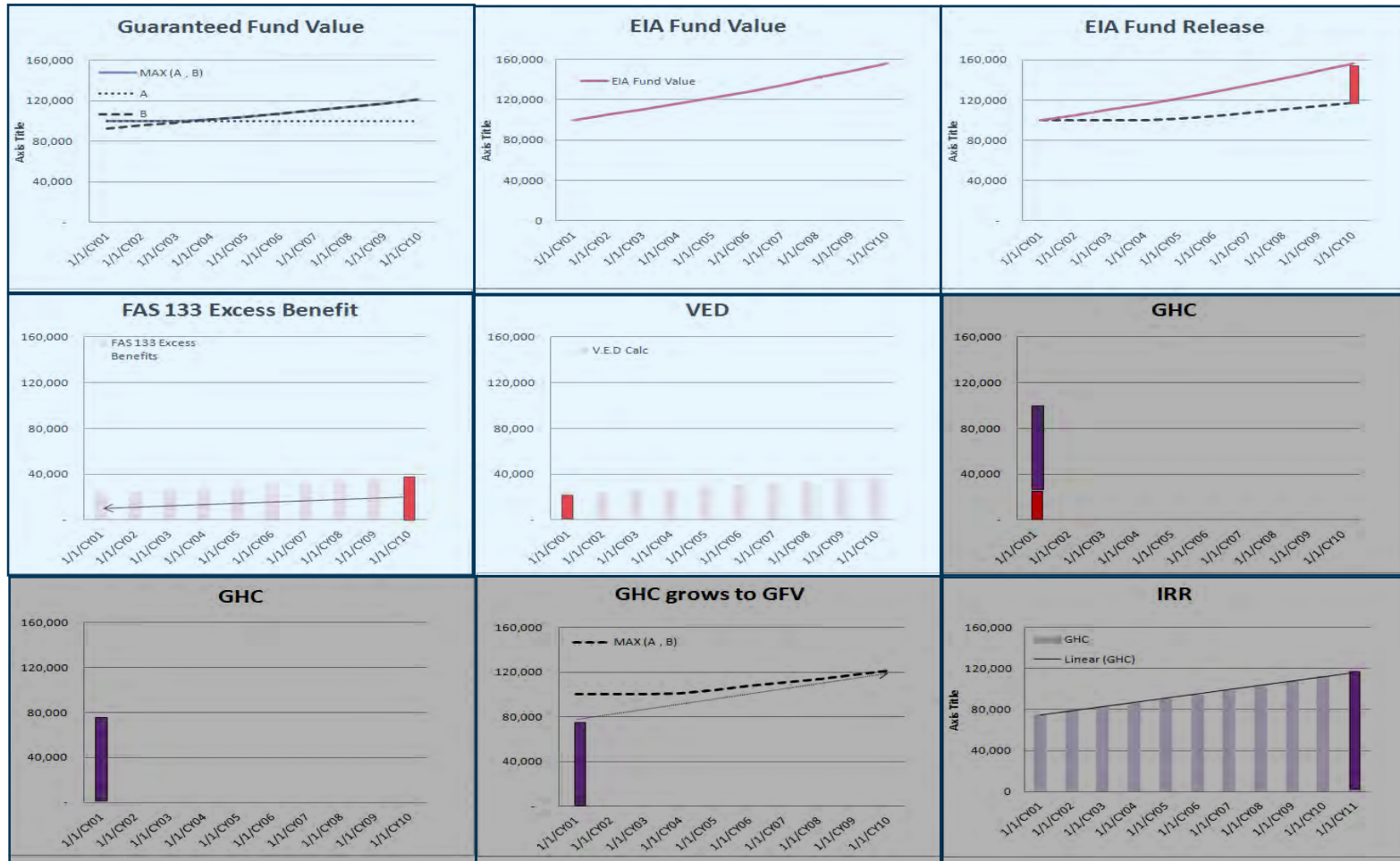
- An embedded derivative shall be separated from the host contract and accounted for as a derivative instrument
- **Statement 133 implementation issue No. B1**
  - The economic characteristics and risks of the embedded derivative are not clearly and closely related to the host contract.
  - The hybrid instrument is not re-measured at fair value under otherwise applicable GAAP as they occur.
  - A separate instrument with the same terms as the embedded derivative would be a derivative instrument.



# Bifurcation Process Flow



# Process Flow



# Hedging Budget



# Fundamental Hedging Issue

- An insurance company that sells an option or other derivative embedded in their products to a policyholder is faced with the challenge of managing its risk.
  - If the option happens to be the same as one that is traded on an exchange, the insurance company can neutralize its exposure by buying on the exchange the same option as it has sold.
  - But, when the option has been tailored to the needs of a client and does not correspond to the standardized products traded by exchanges, hedging the exposure is far more difficult...



# Factors Affecting Option Prices (Black Sholes Formula)

Option	Call (European)	Put (European)	Call (American)	Put (American)
Stock Price	+	-	+	-
Strike Price	-	+	-	+
Time to expiration	?	?	+	+
Volatility	+	+	+	+
Risk-free rate	+	-	+	-
Dividends	-	+	-	+

$$C(S, t) = N(d_1)S - N(d_2)Ke^{-r(T-t)}$$

$$d_1 = \frac{1}{\sigma\sqrt{T-t}} \left[ \ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)(T-t) \right]$$

$$d_2 = \frac{1}{\sigma\sqrt{T-t}} \left[ \ln\left(\frac{S}{K}\right) + \left(r - \frac{\sigma^2}{2}\right)(T-t) \right]$$

$$= d_1 - \sigma\sqrt{T-t}$$

Note:

C = call premium

S = Current Stock Price

K = Strike price

N = Cumulative standard normal distribution

r = risk free rate

t = Time until option exercise

BS Option Model

Current Index (S)	1000
Strike (K)	1000
Time until maturity	1
Risk Free Rate ( $r_f$ )	5.00%
Dividend Rate (d)	1.50%
Volatility Rate ( $\sigma$ )	14.00%
Participation	70.00%

$d_1$	0.32
$d_2$	0.18
$N(d_1)$	0.63
$N(d_2)$	0.57
C (S, t)	72.65
Cap at participate	50.85
Unit (notional amount)	100
Hedging Value	5,085.36
OBR	5.09%



# Product Sensitivity



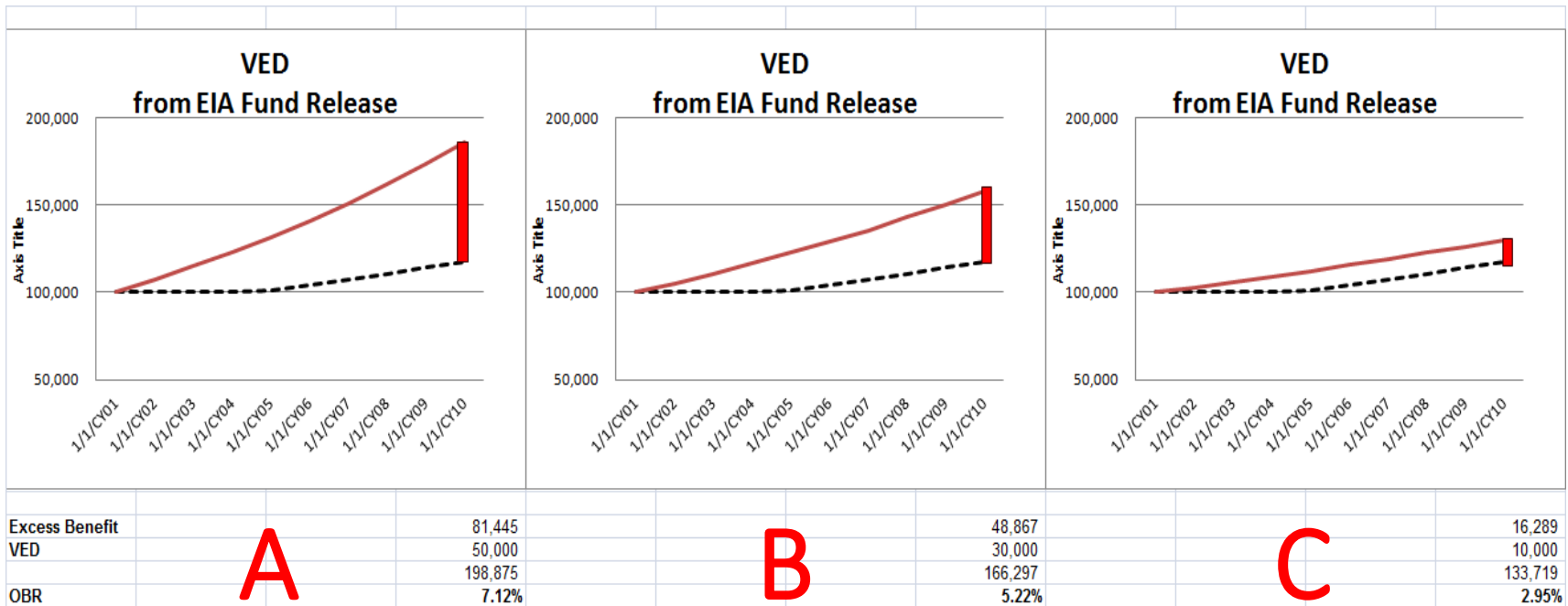


# Factors Affecting FIA Value

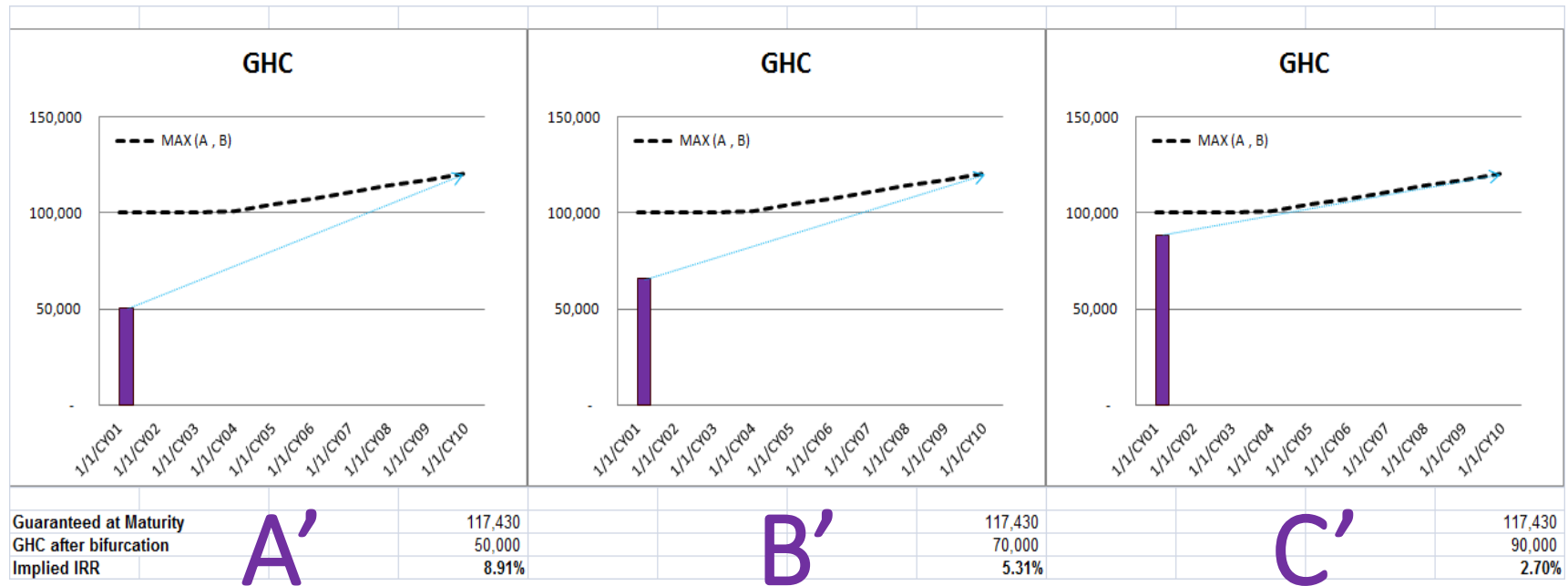
EIA	Opt Bdg Rate	VED	GHC	IRR
Time to maturity	+	+	-	+
Idx participating ra	+	+	-	+
Risk-free rate	+	+	-	+
Contract guar rate	Ind	-	+	+
Age	Ind	-	+	-
Lapse	Ind	-	+	-



# Explicit budgeted for VED



# Implicit Guaranteed in GHC

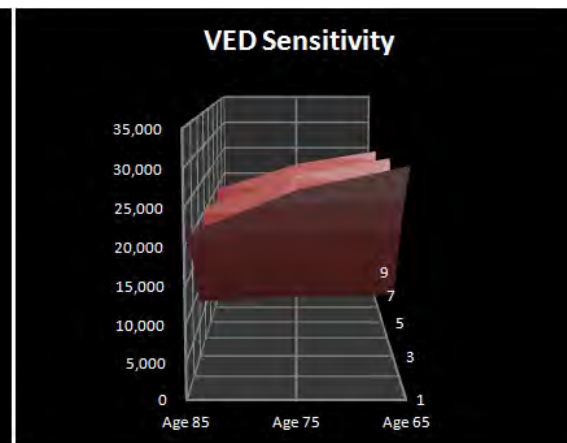
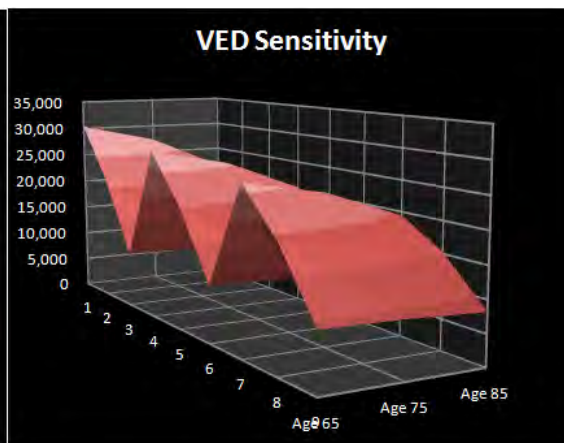
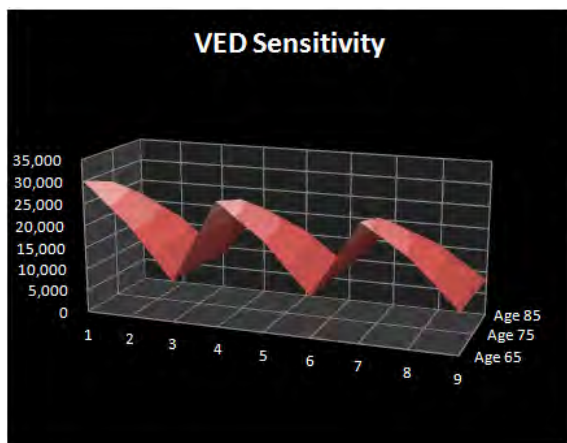


# Risk Management

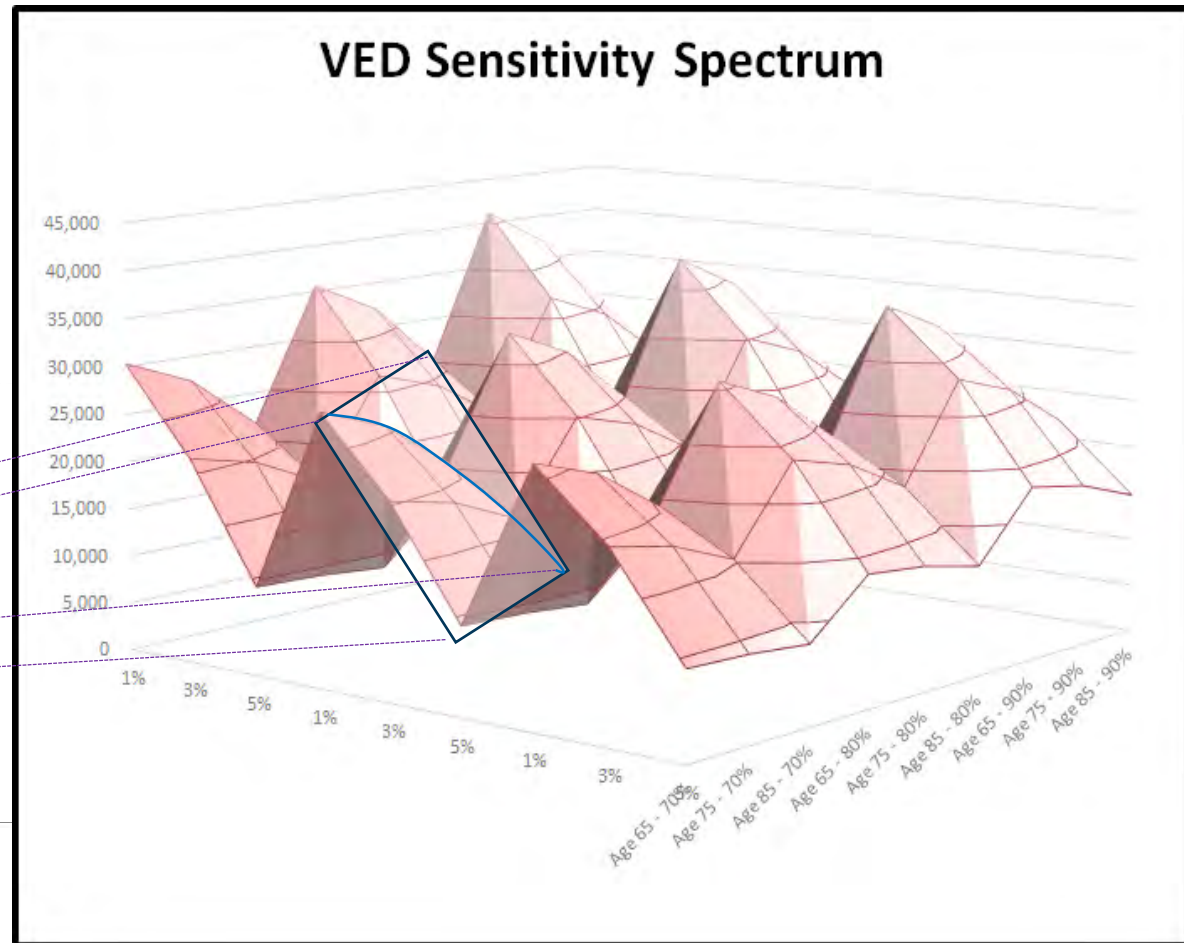
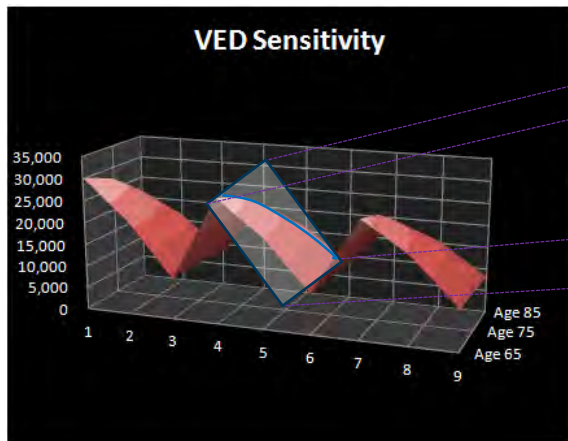


# Risk Analysis VED

<b>VED</b>		Participant Rate		70%		
		Age		65	75	85
		Opt Value		4,937	5,642	6,347
		Opt Budg Rate (VED)		4.94%	5.64%	6.35%
1 Year	Base -50%		1%	30,331	27,346	21,622
			3%	21,382	19,720	16,407
			5%	9,240	8,967	8,315
	Base		1%	28,177	25,559	20,469
			3%	20,333	18,840	15,821
			5%	9,195	8,922	8,273
	Base +50%		1%	26,273	23,973	19,435
			3%	19,397	18,050	15,288
			5%	9,148	8,877	8,230

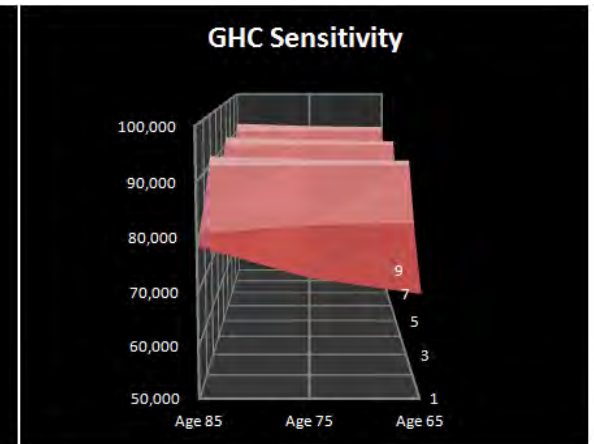
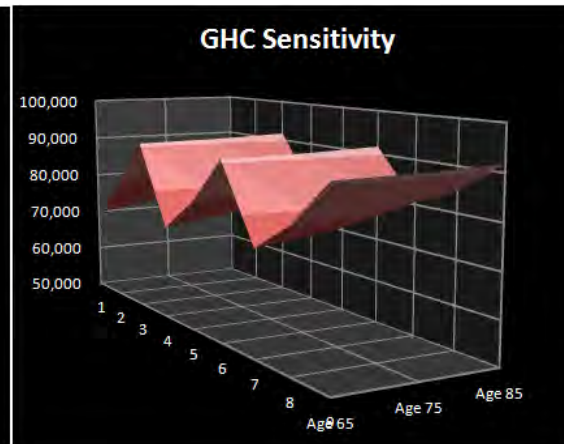
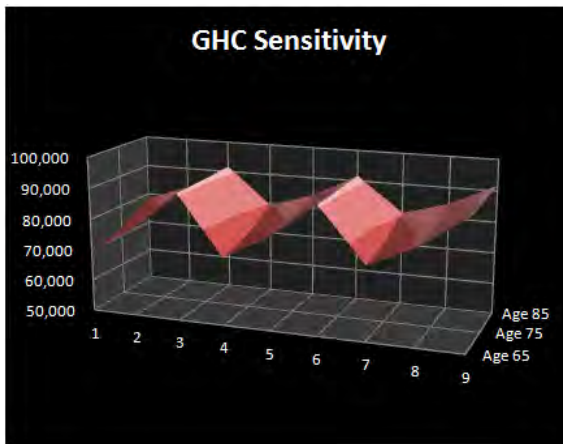


# Risk Analysis VED



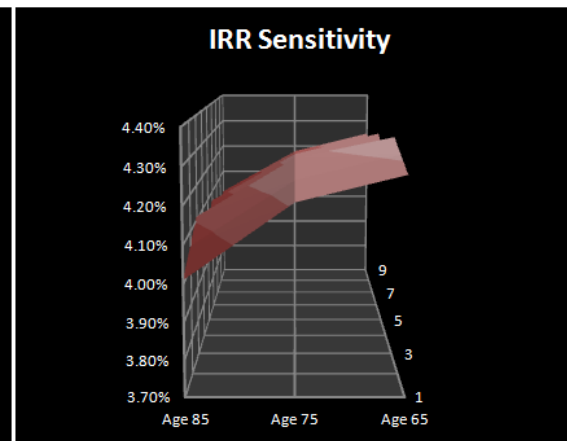
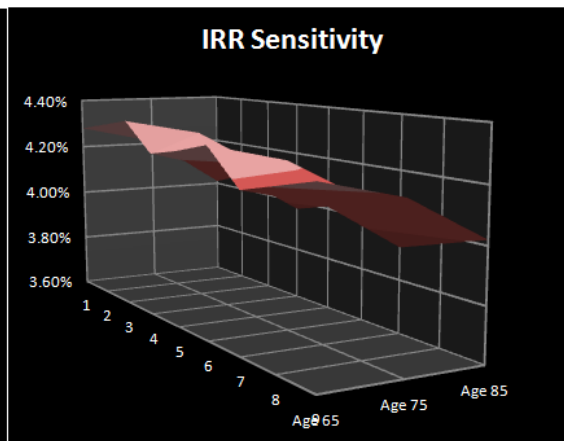
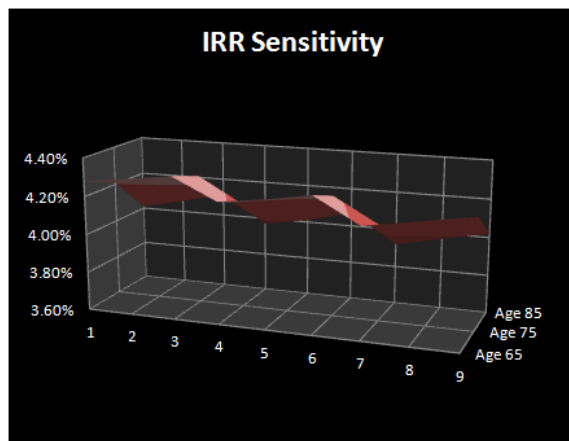
# Risk Analysis GHC

GHC		Participant Rate		70%		
		Age		65	75	85
		Opt Value		4,937	5,642	6,347
		Opt Budg Rate (VED)		4.94%	5.64%	6.35%
1 Year	Base -50%		1%	69,669	72,654	78,378
			3%	78,618	80,280	83,593
			5%	90,760	91,033	91,685
	Base		1%	71,823	74,441	79,531
			3%	79,667	81,160	84,179
			5%	90,805	91,078	91,727
	Base +50%		1%	73,727	76,027	80,565
			3%	80,603	81,950	84,712
			5%	90,852	91,123	91,770



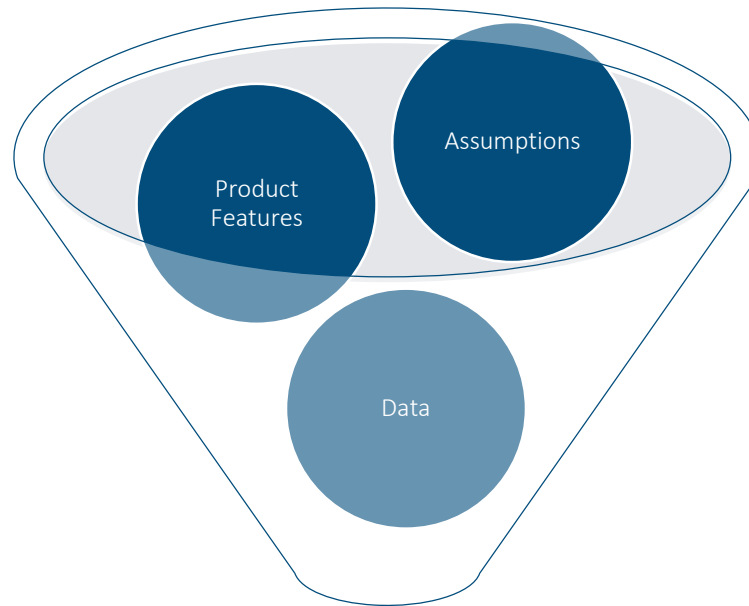
# Risk Analysis IRR

IRR		Participant Rate		70%		
		Age		65	75	85
		Opt Value		4,937	5,642	6,347
		Opt Budg Rate (VED)		4.94%	5.64%	6.35%
1 Year	Base -50%		1%	4.28%	4.21%	4.01%
			3%	4.31%	4.24%	4.06%
			5%	4.34%	4.28%	4.11%
	Base		1%	4.23%	4.15%	3.97%
			3%	4.26%	4.19%	4.01%
			5%	4.30%	4.23%	4.07%
	Base +50%		1%	4.17%	4.10%	3.92%
			3%	4.21%	4.14%	3.97%
			5%	4.25%	4.18%	4.02%





# Where do risks come from?



Bundled Together

# Questions?





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# SOA Valuation Actuary Seminar

## Session 11: GAAP Income Statement Analysis (Part 2)

Joshua Liu FRM, FSA, MAAA  
Financial Reporting & Valuation - FIA  
10/19/2017



SOCIETY OF  
ACTUARIES

# Introduction



# Components of the Income Statement

- Revenues
- Expenses
- Net Income
- Federal Income Tax

# GAAP Income Statement



# GAAP Rollforward by LOB

				B	A
				GHC Host	VED Option
Beginning Reserve	Subsidiary	Fixed		7,676,300,000	1,036,725,000
+ Premiums	-	25,750,000		-	-
+ Contract Enhancement	-	89,000		-	-
+ Spousal Continuation	-	-		-	-
+ Net Transfers	-	28,750,000	(20,500,000)		(8,200,000)
- Expense Charges/Loads					
- Risk/Mortality Charges		5,000			45,000
- Surrenders	11,000	45,750,000	30,750,000		5,750,000
- Surrender Charges	-	90,000	3,000,000		110,000
- MVA Fees	-	-	-		-
- Reserves Released/1	-	10,100,000	10,200,000		1,600,000
+ Annuitization Adjustment					
+ Calculated Interest	5,000	7,995,000	11,000,000		
+ Net Growth					30,970,000
+ Untraced	0	515,000	200,000		30,000
Ending Reserve	730,000	3,227,654,000	7,623,000,000		1,052,000,000





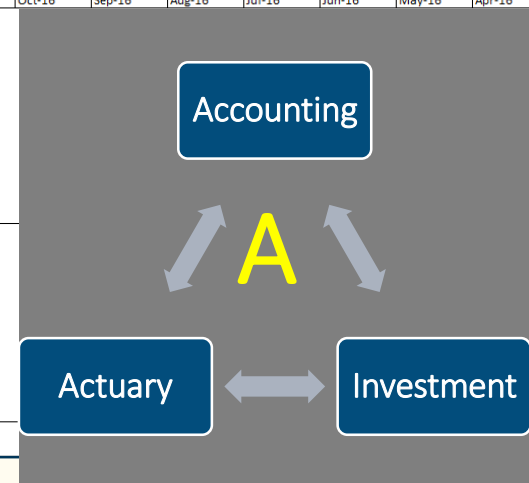
# GAAP Statement of Operation by LOB

## Statement of Operations by LOB

Total Internal GAAP - ABC Life Insurance Company  
Fixed Indexed Annuity  
For the Period Ended January - 2017  
(in Thousands,000)

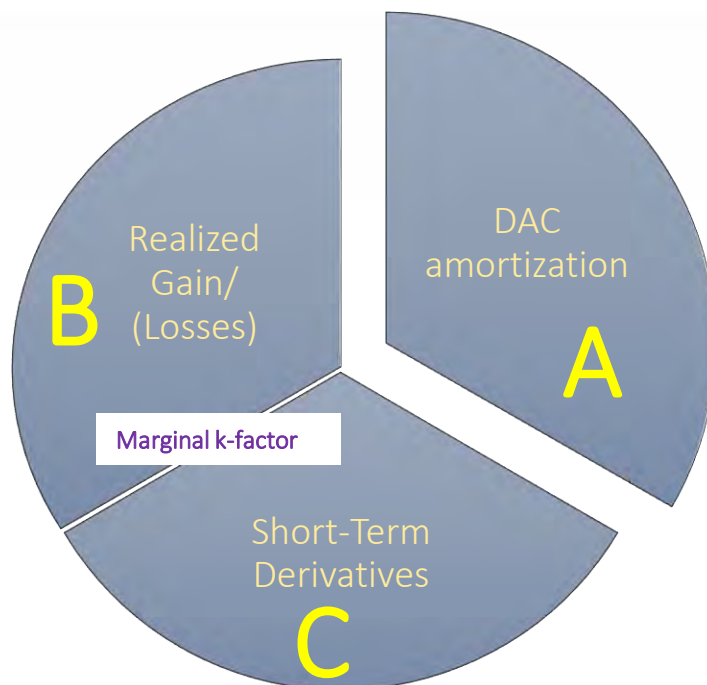
B

	Actual Jan-17	Plan Jan-17	YTD Actual vs Pla variance	Actual Jan-16	Actual vs YOY variance	Actual	MTD Plan		Actual Jan-17	Actual Dec-16	Actual Nov-16	Actual Oct-16	Actual Sep-16	Actual Aug-16	MTD Actual Jul-16	Actual Jun-16	Actual May-16	Actual Apr-16	Actual Mar-16	Actual Feb-16
<b>Revenue</b>																				
<u>Investment Income:</u>																				
Adjusted Net Investment Income									43,000											
Interest Credited on Deposit Liabilities									19,000											
Spread Income									24,000											
<u>Fee Income:</u>																				
Surrender Charges									3,200											
Variable Fees									50											
Total Fee Income									3,250											
<b>Total Revenue</b>									<b>27,250</b>											
<b>Benefits and Expenses</b>																				
Increase in reserves									350											
Other policy holder benefits									850											
Commissions									1,900											
General and administration expenses									3,000											
Taxes, license, and fees									400											
Deferral of acquisition commissions and expenses									(1,900)											
Amortization of deferral acquisition costs									6,505											
<b>Total Benefits and Expenses</b>									<b>11,105</b>											
<b>Pretax Income from Operations</b>									<b>16,145</b>											
<b>Short-Term Fluctuations:</b>																				
Freestanding Derivative MV									24,000											
Embedded Derivative MV									(31,000)											
Equity Hedge Gain (Loss)									(7,000)											
DAC Amortization Relating to equity hedge									770											
Realized Investment Gains/(Losses)									1,500											
DAC Amortization Relating to (Gains)/Losses									(165)											
<b>Pretax Income including short-term fluctuations</b>									<b>11,250</b>											
Income Tax Expense									4,500											
<b>Net Income</b>									<b>6,750</b>											



# Amortization of Deferred Acquisition Cost

Realized Gains / (Losses)		
Accounts	C2. LOB	MTD
REALIZED_GAIN_LOSS	TERM	66,000
REALIZED_GAIN_LOSS	LOG_60	34,000
REALIZED_GAIN_LOSS	ULTM	110,000
REALIZED_GAIN_LOSS	UL	29,000
REALIZED_GAIN_LOSS	SPWL	81,000
REALIZED_GAIN_LOSS	DIR	1,500
REALIZED_GAIN_LOSS	LOG_97	32,000
REALIZED_GAIN_LOSS	VL	1,000
REALIZED_GAIN_LOSS	REIN	0
REALIZED_GAIN_LOSS	SPDA	735,000
REALIZED_GAIN_LOSS	FIA	1,500,000
REALIZED_GAIN_LOSS	REALIC_60	570,000
REALIZED_GAIN_LOSS	EAA	0
REALIZED_GAIN_LOSS	PF	50
REALIZED_GAIN_LOSS	EA	20,000
REALIZED_GAIN_LOSS	VA	391,000
REALIZED_GAIN_LOSS	FLEX	90,000
REALIZED_GAIN_LOSS	GIC	61,000
REALIZED_GAIN_LOSS	CORP	350,000
<b>Total</b>		<b>4,071,550</b>



Actuarial GAAP Reserves & DAC for INL					
YTD as of January 31, 2017					
(000's omitted)					
	Beg DAC	Comm	Acq Expense	Amort	End DAC
<b>Net*</b>					
SPDA (non-SIA)	345,000	1,700	20	3,720	343,000
SPDA (SIA)	125,000	1,000	-	1,000	125,000
FPDA	22,000	0	-	300	21,700
ELI-Immediate Annuity	-	-	-	-	-
FIA-Deferred Annuity	252,700	1,800	10	4,915	249,600
FIA-SIA	49,200	90	-	990	44,300
VA (non-SIA)	8,150,500	55,500	300	(118,700)	8,325,000
VA (SIA)	41,500	300	-	4,100	37,700
VA GMAB	548,000	-	-	5,700	542,300
VA GMAB	(300)	-	-	(50)	(350)
VA CMIB	(123,000)	-	-	(1,400)	(121,600)
VA GMWB	755,000	-	-	138,000	617,000
EA	375,000	5,000	70	8,570	371,500
EAA	-	-	-	-	-
SPWL	7,500	-	-	150	7,450
Ultimates	46,000	-	-	500	45,500
Dibs	-	-	-	-	-
Universal Life	127,000	60	-	560	126,500
Variable Universal Life	3,500	-	-	50	3,550
Subtotal FAS 97	10,713,600	65,450	400	48,400	10,731,050
GIC	-	-	-	-	-
Term Ins (FAS 60)	32,800	(10)	-	390	33,400
Term - Squire RE (XXX)	(19,400)	-	-	(400)	(19,000)
Corp	(129,000)	-	-	1,400	(130,400)
<b>Grand Total (US GAAP)</b>	<b>10,588,000</b>	<b>65,440</b>	<b>400</b>	<b>49,790</b>	<b>10,614,050</b>

FIA Short-Term Derivatives DAC		
	YTD	January
Equity call options	24,000	24,000
FIA embedded deriv	(31,000)	(31,000)
Subtotal - equity	(7,000)	(7,000)
DAC on equity deriv	770	770
Total FIA equity he	(6,230)	(6,230)
K-Factor	-11.00%	-11.00%



# GAAP Statement of Operation (actual vs. planned)

## Statement of Operations by LOB

Total Internal GAAP - ABC Life Insurance Company  
Fixed Indexed Annuity  
For the Period Ended January - 2017  
(in Thousands ,000)

	Actual Jan-16	Plan Jan-16	YTD Actual vs Plan variance	Actual Jan-16	Actual vs YOY variance	Actual	MTD Plan		Actual	Actual Dec-16	Actual Nov-16	Actual Oct-16	Actual Sep-16	Actual Aug-16	MTD Actual Jul-16	Actual Jun-16	Actual May-16	Actual Apr-16	Actual Mar-16	Actual Feb-16
<b>Revenue</b>																				
<u>Investment Income:</u>																				
Adjusted Net Investment Income	43,000	44,000	(1,000)						43,000											
Interest Credited on Deposit Liabilities	19,000	20,000	(1,000)						19,000											
Spread Income	24,000	24,000	0						24,000											
<u>Fee Income:</u>																				
Surrender Charges	3,200	2,500	700						3,200											
Variable Fees	50	25	25						50											
Total Fee Income	3,250	2,525	725						3,250											
<b>Total Revenue</b>	<b>27,250</b>	<b>26,525</b>	<b>725</b>						<b>27,250</b>											
<b>Benefits and Expenses</b>																				
Increase in reserves	350	0	350						350											
Other policy holder benefits	850	1,000	(150)						850											
Commissions	1,900	3,500	(1,600)						1,900											
General and administration expenses	3,000	4,000	(1,000)						3,000											
Taxes, license, and fees	400	300	100						400											
Deferral of acquisition commissions and expenses	(1,900)	(3,000)	1,100						(1,900)											
Amortization of deferral acquisition costs	6,395	6,500	(105)						6,395											
<b>Total Benefits and Expenses</b>	<b>10,995</b>	<b>12,300</b>	<b>(1,305)</b>						<b>10,995</b>											
<b>Pretax Income from Operations</b>	<b>16,255</b>	<b>14,225</b>	<b>2,030</b>						<b>16,255</b>											
<b>Short-Term Fluctuations:</b>																				
Freestanding Derivative MV	24,000	3,000	21,000						24,000											
Embedded Derivative MV	(31,000)	(5,000)	(26,000)						(31,000)											
Equity Hedge Gain (Loss)	(7,000)	(2,000)	(5,000)						(7,000)											
DAC Amortization Relating to equity hedge	770	110	660						770											
<b>Realized Investment Gains/(Losses)</b>	<b>1,500</b>	<b>500</b>	<b>1,000</b>						<b>1,500</b>											
DAC Amortization Relating to (Gains)/Losses	(165)	(55)	(110)						(165)											
<b>Pretax Income including short-term fluctuations</b>	<b>11,360</b>	<b>12,780</b>	<b>(1,420)</b>						<b>11,360</b>											
Income Tax Expense	4,544	5,112	(568)						4,544											
<b>Net Income</b>	<b>6,816</b>	<b>7,668</b>	<b>(852)</b>						<b>6,816</b>											



# GAAP Statement of Operation (trending)

## Statement of Operations by LOB

Total Internal GAAP - ABC Life Insurance Company  
Fixed Indexed Annuity  
For the Period Ended January - 2017  
(in Thousands ,000)

	Actual Jan-16	Plan Jan-16	YTD Actual vs Plan	Actual Jan-16	Actual vs YOY variance	Actual	MTD Plan	variance	Actual	Actual Dec-16	Actual Nov-16	Actual Oct-16	Actual Sep-16	Actual Aug-16	MTD Actual Jul-16	Actual Jun-16	Actual May-16	Actual Apr-16	Actual Mar-16	Actual Feb-16
<b>Revenue</b>																				
<b>Investment Income:</b>																				
Adjusted Net Investment Income	43,000	44,000	(1,000)	x,xxxx	x,xxxx	43,000	44,000	(1,000)	43,000	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
Interest Credited on Deposit Liabilities	19,000	20,000	(1,000)	x,xxxx	x,xxxx	19,000	20,000	(1,000)	19,000	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
Spread Income	24,000	24,000	0	x,xxxx	x,xxxx	24,000	24,000	0	24,000	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
<b>Fee Income:</b>																				
Surrender Charges	3,200	2,500	700	x,xxxx	x,xxxx	3,200	2,500	700	3,200	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
Variable Fees	50	25	25	x,xxxx	x,xxxx	50	25	25	50	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
Total Fee Income	3,250	2,525	725	x,xxxx	x,xxxx	3,250	2,525	725	3,250	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
<b>Total Revenue</b>	<b>27,250</b>	<b>26,525</b>	<b>725</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>27,250</b>	<b>26,525</b>	<b>725</b>	<b>27,250</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>
<b>Benefits and Expenses</b>																				
Increase in reserves	350	0	350	x,xxxx	x,xxxx	350	0	350	350	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
Other policy holder benefits	850	1,000	(150)	x,xxxx	x,xxxx	850	1,000	(150)	850	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
Commissions	1,900	3,500	(1,600)	x,xxxx	x,xxxx	1,900	3,500	(1,600)	1,900	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
General and administration expenses	3,000	4,000	(1,000)	x,xxxx	x,xxxx	3,000	4,000	(1,000)	3,000	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
Taxes, license, and fees	400	300	100	x,xxxx	x,xxxx	400	300	100	400	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
Deferral of acquisition commissions and expenses	(1,900)	(3,000)	1,100	x,xxxx	x,xxxx	(1,900)	(3,000)	1,100	(1,900)	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
Amortization of deferral acquisition costs	6,395	6,500	(105)	x,xxxx	x,xxxx	6,395	6,500	(105)	6,395	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
<b>Total Benefits and Expenses</b>	<b>10,995</b>	<b>12,300</b>	<b>(1,305)</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>10,995</b>	<b>12,300</b>	<b>(1,305)</b>	<b>10,995</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>
<b>Pretax Income from Operations</b>	<b>16,255</b>	<b>14,225</b>	<b>2,030</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>16,255</b>	<b>14,225</b>	<b>2,030</b>	<b>16,255</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>
<b>Short-Term Fluctuations:</b>																				
Freestanding Derivative MV	24,000	3,000	21,000	x,xxxx	x,xxxx	24,000	3,000	21,000	24,000	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
Embedded Derivative MV	(31,000)	(5,000)	(26,000)	x,xxxx	x,xxxx	(31,000)	(5,000)	(26,000)	(31,000)	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
Equity Hedge Gain (Loss)	(7,000)	(2,000)	(5,000)	x,xxxx	x,xxxx	(7,000)	(2,000)	(5,000)	(7,000)	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
DAC Amortization Relating to equity hedge	770	110	660	x,xxxx	x,xxxx	770	110	660	770	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
<b>Realized Investment Gains/(Losses)</b>	<b>1,500</b>	<b>500</b>	<b>1,000</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>1,500</b>	<b>500</b>	<b>1,000</b>	<b>1,500</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>
DAC Amortization Relating to (Gains)/Losses	(165)	(55)	(110)	x,xxxx	x,xxxx	(165)	(55)	(110)	(165)	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
<b>Pretax Income including short-term fluctuations</b>	<b>11,360</b>	<b>12,780</b>	<b>(1,420)</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>11,360</b>	<b>12,780</b>	<b>(1,420)</b>	<b>11,360</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>
Income Tax Expense	4,544	5,112	(568)	x,xxxx	x,xxxx	4,544	5,112	(568)	4,544	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx	x,xxxx
<b>Net Income</b>	<b>6,816</b>	<b>7,668</b>	<b>(852)</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>6,816</b>	<b>7,668</b>	<b>(852)</b>	<b>6,816</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>	<b>x,xxxx</b>

# Rollforward Process



# What items need to be considered in liability side?

- Interest Credited to Policyholders
- Untraced & Other Policyholders Benefits

# Interest Credited to Policyholders

- Determination of interest Rate

- Issue Year and Duration
- Contract Types

The final rate is a weighted average weighted on the GAAP reserve amount.

- Interest credited per policy

- $$\left[ \text{Beginning reserve} + (\text{premium} - \text{surrenders} - \text{released on death} + \text{annuitized}) / 2 \right] * \left[ (1 + \text{rate})^{(\# \text{days} / 365)} - 1 \right]$$
- Exception

The final interest credited is the sum over all the policies



# Untraced & Other Policyholders Benefits

- One off
  - Data issues (spousal continuation, stretch policy,...)
  - Timing issues (paid or pending death claims, value adjustment)
  - Processing issues (operation, IT, inforce file, ... )



# DAC Amortization



# What makes DAC Amortization challenge?

- Present Value of Gross Profits (projected)
- DAC Amortization
- True-Up and Unlocking (FAS97)



# Risk Management



# Who are stakeholders and what are their concerns?

- Address inquiries for audited financial results
- Identify inconsistency and explanations financial results

# Questions?





**SOCIETY OF  
ACTUARIES**

# 2017 Valuation Actuary Seminar

## Session 11: GAAP Income Statement Analysis

Paul Vogel, FSA, MAAA  
October 19<sup>th</sup>, 2017

# Outline

- Typical income analysis
- Commission Deferral Challenges
- Aggregation Techniques
- Whole Life FAS 60 Products
- Term FAS60 Products
- Questions?



# Typical Income Analysis

- Plan vs. actual analysis
  - Keeping senior management informed
- Revenue
  - Premiums – Direct & Ceded
  - Investment Income
- Benefits
  - Death Claims, Surrenders
  - Ceded Benefits
  - Increase in Reserves

# Typical Income Analysis (cont.)

- Expenses
  - Deferred vs non-deferred
  - Commission Expenses
  - Other Expenses
- Amortization
  - Other Expense Deferrals
  - Commission Deferrals

# Commission Deferral Challenges

- Possible difference of methods between projection system and valuation system
  - Aggregation of deferrals
    - Distribution
    - Product
    - Company
  - Calendar year vs. Issue Year
  - Capturing Actual Deferrals
    - Bonuses
  - Capitalization Differences
    - As premiums paid vs. annual premium
    - Contra-DAC

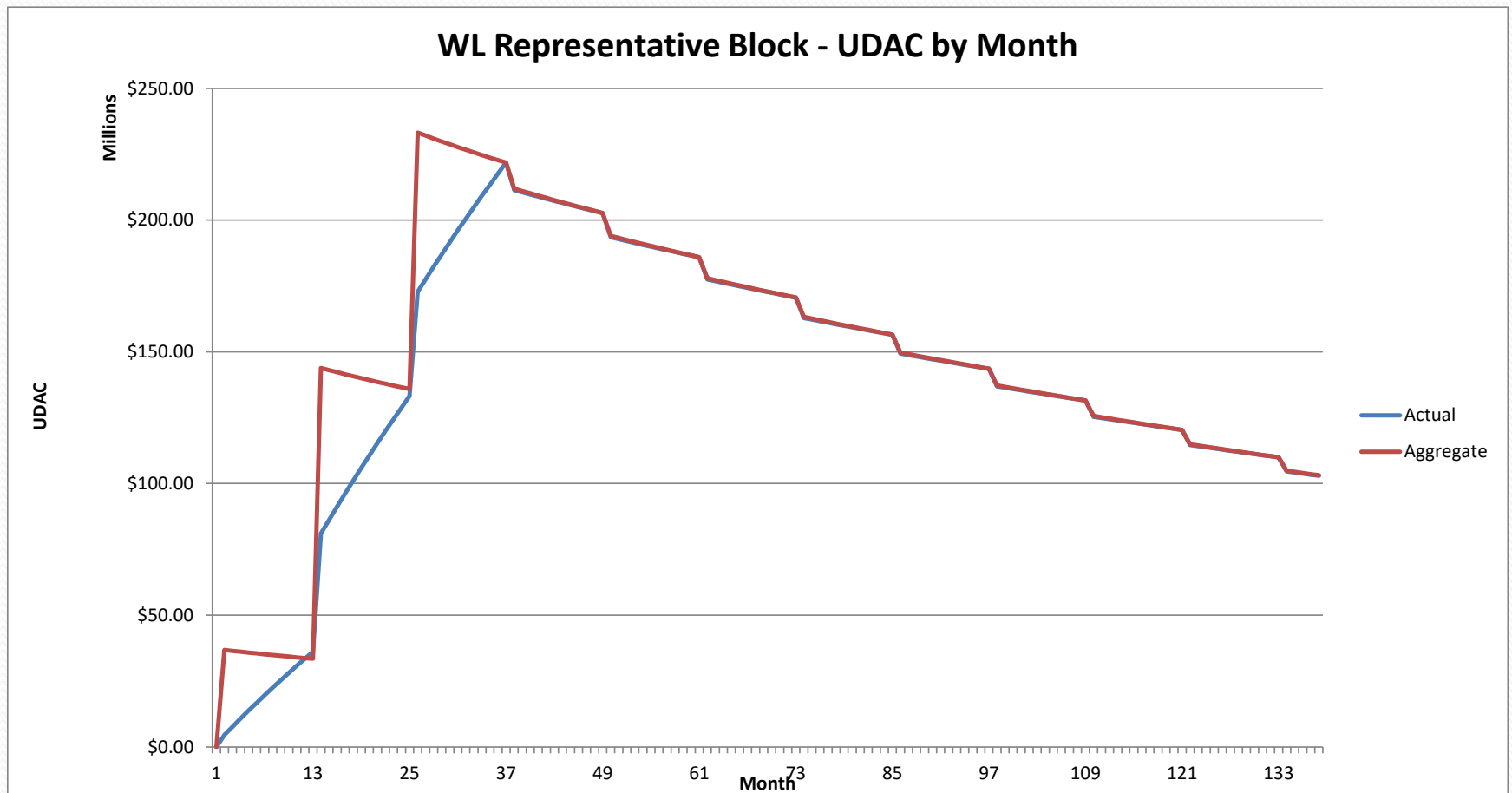
# Aggregation Techniques

- Why?
  - To capture actual deferrals for valuation
  - Simplicity/speed updating valuation models
  - Net out reinsurance expense allowances
- How?
  - $\text{Commission Deferral \%} = \text{Net Deferrals} / \text{Premiums}$
  - Apply to calendar year annualized premium
  - Aggregate similar products, distributions, modes
  - 1<sup>st</sup> year commission only

# Whole Life FAS 60 Products

- Aggregation vs. actual commission rates
  - Whole Life Product pays 100% 1<sup>st</sup> year commission
    - No other commission paid – 100% is deferred
  - Aggregation of commissions is 85% of calendar year annualized premium
  - How does this work?
    - Obviously annual paying premium policies do not defer only 85%. Thus in the aggregation approach, deferrals associated with annual policies get applied to other modes within the same product.
    - Next page graph demonstrates 3 years of business capturing deferrals properly

# Whole Life FAS 60 Products (cont.)



# Whole Life FAS 60 Products (cont.)

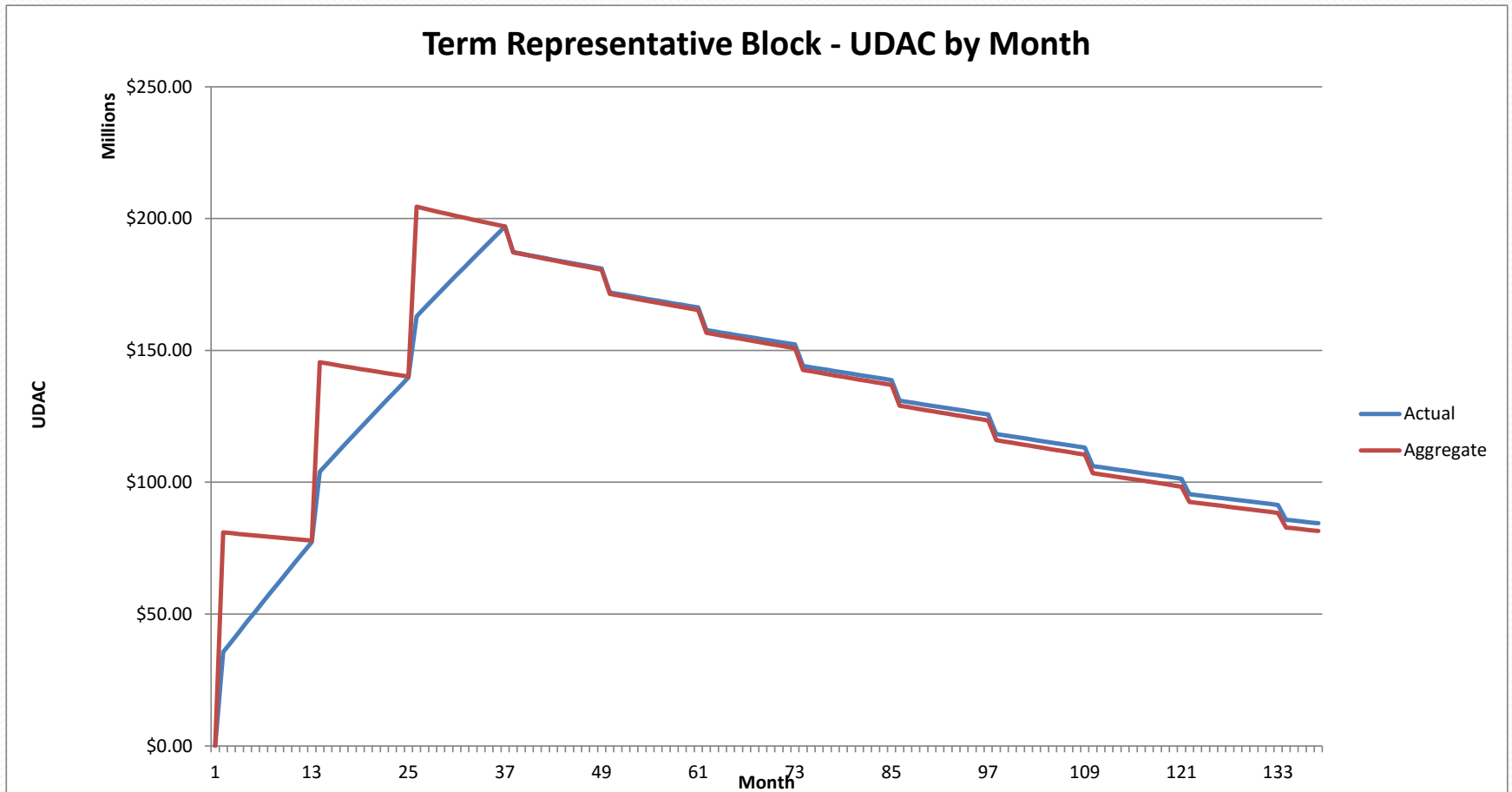
- WL Represented Block Policies
  - Standard Whole Life Product
  - 3 years issued new business with equal UDAC after 3 years
  - 20% Annual Prem Mode, 80% Monthly Prem Mode
  - No deviation in expected mortality or lapse rates
  - Potential Concerns?
    - Assuming plan models calculate deferrals based on actual premiums, if future lapse rates deviate between monthly modes and annual models of premium, UDAC with either amortize faster or slower than originally expected
    - Timing of amortization between calendar deferrals and actual deferrals
    - Did plan model accurately capture bonuses and all deferrals

# Term FAS60 Products

- Aggregation vs. actual commission rates
  - More complex than Whole Life
    - Aggregate over various term periods?
      - 10T, 15T, 20T, 30T
    - Renewal Commissions, upfront commission
  - 1<sup>st</sup> year term commissions
    - 80% 10T, 90% 15T, 105% 20T, 115% 30T all 100% deferrable
  - Aggregation of commissions is 95% of calendar year annualized premium
  - Graph on next page is similar example to Whole Life and assumes no renewal commissions paid



# Term FAS 60 Products (cont.)



# Term FAS60 Products (cont.)

- Term Represented Block Policies
  - Standard Term Life Product
  - 3 years issued new business with equal UDAC after 3 years
  - 20% Annual Prem Mode, 80% Monthly Prem Mode
  - Various ages and term lengths
  - Potential Concerns?
    - Similar concerns with whole life products
    - Addition concerns ... aggregation of different term lengths, higher deferrals added to 10T which amortizes faster than 30T
    - Addition concerns ... what about renewal commissions?



# Questions?