Solution 1

(a)

- High lapse rates – antiselection since better risks tend to lapse
- Substandard reduction and removal of ratings
    - If permitted upon evidence of insurability, then improved risks will be removed
- Conversion privilege – right to trade term for permanent without evidence of insurability
    - Less healthy lives removed
- Term bought to cover short-term need will be continued by unhealthy lives
- Ability of more healthy insureds to re-write their coverage at lower rates
    - Remaining insureds will have worse mortality
- Unclear communication between actuaries and underwriters regarding mortality expectations for different ratings
    - Pricing assumptions need to be the same assumptions used by underwriters
    - Classification and pricing of substandard policies is imprecise

(b) Methods to reflect substandard risks

(1) extra premium
- various levels of table ratings – used when increased mortality is an increasing percentage of standard; used for medical impairments like diabetes, heart disease; for example, mortality expressed as 125% of standard
- flat extra premiums – used when mortality is a level percentage of standard mortality or can be expressed as an extra number deaths per 1000 lives. Used for temporary impairments expected to last a short time until recovery.
- Flat extra premiums are very common

(2) age rate-up / increase
- issue policy with an issue age based on the same life expectancy as the insured.

(3) Return of premium during first X years of policy

(4) Lean method

(5) Exclusions named in policy such that benefits will not be paid for death by certain causes such as a dangerous avocation

(6) Credits can be given for favorable personal history to try to negate an unfavorable circumstance. Credits may not prevent policy from being issued as substandard but could reduce the rating.

Solution 1 (continued)

(c)

(i) obesity with diabetes
- Permanent table rating
- Such as Table E
- Mortality is an increasing percentage of standard

(ii) recovery from temporary impairment
- Flat extra charged for certain number of years or to a certain age
- Impairment must be temporary

(iii) Hazardous occupation
- 2 choices
  - exclusion of death if caused by occupation; deaths from all other causes covered. This is the most common approach.
  - flat extra premium charged while insured is at dangerous occupation; can be removed upon retirement

(iv) give insured credits for favorable personal history – may be able to reduce rating caused by the unfavorable family history of coronary artery disease.

Solution 2

(a)

- Surrender charges are too high: SNL formula uses 87.5% of gross considerations. Suggest surrender charge should not be more than 12.5% of premium
- First year surrender charge is O.K. because there is return of principal, but may not be O.K. for later years.
- The annual fee of $75 is too high. SNL allows $50 per year
- Insurer must grant a paid-up annuity upon cessation of payment or upon written request
- Any CSV or paid-up annuity value must be greater than the minimum nonforfeiture (NF) value at that time
- High premium admin load (6%) may threaten ability to meet minimum; should not exceed state premium tax rate.

(b)

Minimum NF value = accumulation of (net consideration – withdrawals
- $50 annual policy charge – premium taxes)
- indebtedness

Net consideration = 87.5% of gross consideration

Accumulation interest rate = lesser of
- 3%
- max (1%, 5 year CMT – 1.25%)

= 3% for 2005 to 2008

= 2.75% for 2009

Yr 1 = (87.5% * 50,000 – 50 – 2% * 87.5% * 50,000) * 1.03 = $44,109.75

Yr 2 = (44,109.75 – 50) * 1.03 = $45,381.54

Yr 3 = (45,381.54 – 50) * 1.03 = $46,691.49

Yr 4 = (46,691.49 + 87.5% * 5,000 – 50 – 2% * 87.5% * 5,000) * 1.03 = $52,456.86

Yr 5 = (52,456.86 – 10,000 – 50) * 1.0275 = $43,573

Solution 3

(a)

Integrated reserve = a + b + c

a = cumulative NAR paid to those that die, assuming drop and recovery
b = cumulative AV paid to those that die, assuming no drop and recovery
c = unreduced CSV paid to those that survive, assuming no drop and recovery

- Reserve is max PV at all t of the sum of a, b, and c
- Drop and recovery rates depend on type of investment
- Recovery rate is net of asset charges

(b)

Reduced AV(0) = Initial AV * (1-drop percentage)
= 1500 * (1-.14) = 1290
Reduced AV(1) = Reduced AV(0) * (1 + Recovery Rate – Net Asset Charge)
= 1290 * (1 + .14 - .01) = 1457.70

Minimum Death Benefit (0) = 1750
Minimum Death Benefit (1) = MDB(0) * (1 + rollup percentage)
= 1750 * (1 + .05) = 1837.50

NAR paid in year 1 = Average Minimum Death Benefit – Average Reduced AV
= (1750 + 1837.5)/2 – (1290 + 1457.7)/2
= 1793.75 – 1373.85
= 419.90

PV NAR = 419.90 * 0.017192 * (1/1.055)^(0.5) = 7.03

Unreduced AV(0) = 1500
Unreduced AV(1) = 1500 * (1 + 0.55 + .01) = 1567.50
Average AV = (1500 + 1567.50)/2 = 1533.75

PV Unreduced AV paid upon death = 1533.75 * 0.017192 * (1/1.055)^(0.5)
= 25.67

CSV(0) = 1500 – (1750 * .07) = 1377.50
CSV(1) = 1567.50 – (1750 * .06) = 1462.5

PV CSV for survivors = 1462.50 * 0.9828 * (1/1.055) = 1362.41

Solution 3 (continued)

A + B+ C at time 1 = 7.03 + 25.67 + 1362.41 = 1395.11

Integrated reserve = max of reserve at all time periods

Thus, integrated reserve = 1425.54

Solution 4

(a)

Product Planning
- review of the overall product development strategy including idea generation and screenin
Conprehensive Business Analysis
- research to determine the feasibility and marketability of the proposed product
Technical Design
- writing the policy, setting assumptions, project budgeting and scheduling
Implementation
- creating the administrative and legal structures/processes to take a product to market
Sales Monitoring and Review
- review the pd process, sales, budget, schedule and ongoing review of financial results

(b)

Corporate Growth Strategy - Intensive Growth - uses current markets
or products to grow sales and market potential
Intensive Growth Strategy - Product Development - same market,
related new product
Marketing Strategy - Build Strategy - Saturn seeks to grow market share
by sacrificing immediate earnings
Innovation - Product Modification - the characteristics of a product are
changed to give it a competitive advantage over similar products and increase its sales

(c)

Level of SC
Qualified vs Non-qualified
Taxes
Distribution Incentives
Per deposit SC
Investment /policy performance
Distribution channel
Product design
Lower lapses - more investment options provides opportunity
for relatively higher investment performance
Lower lapses - existence of guarantees, especially if in the money
Higher and lower lapses - lower for larger contracts, higher for small contracts
The health of the policyholder - a rich Death Benefit may be perceived as having
little value if policyholder in good health

Solution 4 (continued)

(d)

Sales in year t = sales in year t-1 x (1 + increase rate)
Current sales in year 1 = 240 x 1.1 = 264
Current sales in year 2 = 264 x 1.1 = 290.4
Current sales in year 3 = 290.4 x 1.1 = 319.4
New product sales in year 1 = 240 x 3.1 = 744
New product sales in year 2 = 744 x 1.6 = 1190.4
New product sales in year 3 = 1190.4 x 1.1 = 1309.4
After-tax PV of Profits in year T from additional Sales in year T = (1%) x additional Sales @ time T
After-tax PV of Profits in year 1 from sales in year 1= (1%) x (744 - 264) = 1% x 480 = 4.80
After-tax PV of Profits in year 2 from sales in year 2= (1%) x (1190.4 - 290.4) = 1% x 900 = 9
After-tax PV of Profits in year 3 from sales in year 3= (1%) x (1309.4 - 319.4) = 1% x 990 = 9.9
After -tax Break even sales year will occur when the cumulative sum of the After-tax PV of Profits @ in year T from Sales in year T and earlier exceeds 10
After-tax Beak even sales year occurs in year 2 since the 4.8 + 9 = 13.8 and exceeds 10

Solution 5

(a)

(i) Affordable option budget = 1-PV (GMAV +expenses + commissions)

PV GMAV = future GMAV / (1+earned rate)^6

$= .9(1.03)^{(6)} / (1.055)^{(6)}$
$= (1.07465) / (1.055)^{(6)}$
$= .78$

PV(Exp, Profit) = .05
PV (comm.)= .04

Affordable option budget = 1-.78-.05-.04
= .13

(ii) Reduce Index Period – reduces risk and allows for cheaper index options
Use different (lower) GMAV Calculation – e.g. 87.5% of premium
Lower GMAV rate – 1.5% instead of 3%
Add margin – reduces index-based interest
Add cap – maximum on index-based interest
Reduce participation rate below 100%
Use averaging method to calculate index returns (55-60% of point to point)

(b)

Index -based interest funded by call options
With increased volatility the cost of options to hedge index based interest increases
Volatility increases with time to maturity

(c)

(i) Set PVFP(n)=Profit(n)
for t=n,n-1,.....,2,1 start with last policy year and work backwards one year at a time, calculating PV future profits
If PVFP(t)>0, then PVFP(t-1)=(PVFP(t)/(1+i(t)) + Profit(t-1);
otherwise, PVFP(t-1) = (PVFP(t)/(1+j(t)) + Profit(t-1)
solve for the value of i that results in the PV of profits equal to 0

Solution 5 (continued)

PV(5) = 12 + (-70)/ 1.05 = -54.67
PV(4) = 42 + (-54.67)/1.05 = -10.06
PV(3) = 0 + (-10.06)/1.05 = -9.58
PV(2) = 0 + (-9.58)/1.05 = -9.13
PV (1) = 60 + (-9.13)/1.05 = 51.31
PV(0) = -25+ 51.31/ (1+i) = 0
i = 51.31/25 - 1
i = 105%

(ii) Mercury's cost of capital is 10%
Mercury demands an ROI >10%
105%>10% so the product is viable

(iii) If large profit following initial small loss, the results may be unrealistic
If profit sign changes more than once, multiple ROIs generated
If profits are greater than 0 in all years, ROI can't be found
Using same interest rate to accumulate/discount positive/negative profit will be unsatisfactory for shareholders/ policyowners

(d) Mercury Life's target market is affluent (retired and pre-retired) – good fit

Consider Market size and growth
EIA market size will be large and it's growing

Market Attractiveness
Affluent have money to buy product

Company goals and resources
Consistent with company's long term profit goals
Appropriate finance, technology and HR

Solution 6

(a) Min Cash Surrender Value = Accumulated Premium
less Unamortized Unused Expense Allowance
less Accumulated
- Benefits
- Acquisition Expenses = Initial Acq Expense – Average Expense over yrs 2-20
- Average Maintenance Expense yrs 2-20
- Actual Expenses all other years
- Service charges
- Partial withdrawals

Unamortized Unused Expense Allowance = Unused Expense Allowance x a_{x+t}/a_x

If rider has CSV, make sure total base and riders = what would be if individual

(b) Determine assumption needed – lapse

Determine structure of assumption
- Experience classes – same structure of benefits/charges. Similar product, continuous time period. Same underwriting/marketing objectives.
- Permanent policies could include whole life. Need to just use UL experience or UL experience from another company. Make sure same structure of charges. WL could be very different

Analyze data
- Trends, credibility, sensitivity testing
- Look at experience over longer period to earn credibility but can't do here. So look at similar product or industry experience
- Source of data – relied on others?
- acquired business mixed in with current business – inappropriate
- Evaluate quality of data
- Lack of product differentiation in data - less comprehensive
- Sensitivity test lapses
  - Especially for UL product
- Need to distinguish between fixed and flexible UL products – different load structures and target market

Solution 6 (continued)

- Can use confidence intervals to test credibility
- If industry uses lower lapses, consider lowering for you as well. Adjust industry experience for company factors: underwriting provisions, target markets, distribution channel.
- If industry is seeing trend downwards it is reasonable to reflect this.
- Check for reasonability, accuracy, consistency. Compare to other products
- Reflect company experience and external factors
- Document – what assumption is, data underlying , purpose, use.

Provision for Adverse Deviation

- Degree of conservatism recognized in PAD
- Widening gap in reserves and CSVs makes for larger PAD at later durations
- Consider sensitivity and uncertainty of assumption. More sensitive leads to higher PAD
- Bigger impact on profitability leads to higher PAD
- If using industry data then PAD might have to be larger
- Don't make PAD unreasonable
- For lapses, hard to tell if increasing or decreasing more conservative – test to see

(c)

Old lapse method and New 2005 method are blended until year-end 2005.

The lapse MfAD is additive margin to the best estimate. This can be a subtraction also if the liability is higher.

Split the group into 2:

- Increase lapses will increase liability
- Decrease lapses will increase liability

For level COI the MfADs tend to be subtractive,i.e., lapse supported
For ART, MfADs are additive.

MCCSR Component Factor = 15%

Level COI: B. 1% (1 – 0.1) and determine reserve
A: 1% (1 – 0.1 – 0.15) and recalculate reserve
MCCSR component = A – B

Solution 6 (continued)

ART: B. 8% (1 + 0 15) and determine reserve
A: 8% (1 + 0.15 + 0 15) and recalculate reserve
MCCSR component = A – B

Solution 7

(a) Hurdle rate consists of a risk-free rate of return, average return on equities, and the business risk factor beta
ROR = R_f + beta * (R_e – R_f)
12% = 4% + 2 * (R_e – 4%), so R_e = 8%

(b) Static validation: Compare reserves and inforce premiums in model to actual amounts
Dynamic validation: Project back one year, compare model cash flow items to actual prior year premiums, death and surrender benefits, expenses

(c) Value-based (V-B) first year earnings are > 0 since pricing IRR > ROR
Level ROE earnings are zero, so are < V-B
PPM earnings may be < or > V-B, depending on PADs and V-B risk discount rate
PPM may be < or > Level ROE = 0, depending on PADs

XYZ has higher premiums so should have higher PPM and V-B earnings
Both company Level ROE earnings are equal to zero

Solution 8

$$\text{Commission} = \sum_{t=1}^{3} r_t * p_t * (1 - O_t) * v_{t-1}$$

current comm. $= 3\% * 1 * 1 + 3\% * 0.9 * 1.03^{-1} + 3\% * 0.8 * 1.03^{-2}$

$= 3\% + 2.62\% + 2.26\%$

$= 7.88\%$

proposed comm. $= 5\% * 1 + 5\% * 0.95 * (1-0.05) * 1.03^{-1} + 5\% * 0.9 * (1-0.1) * 1.03^{-2}$

$= 5\% + 4.38\% + 3.82\%$

$= 13.2\%$

profit = prem – comm – expense

current = $10 * (1 - 7.88\% - 10\%) = 8.212$

proposed = $10.5 * (1 - 13.2\% - 10\%) = 8.064$

Therefore, select the current commission schedule.

Solution 9

(a)

1 Company Records
- Examine for cross selling opportunities
- Survey clients
- Look for internal replacement activity

2. Industry Surveys
- By ACLI & LIMRA
- Same questions over time to view trends
- Data on distribution system
- Separate Studies for Fixed Annuities
- Available for single premium & regular premium
- Quarterly Reports

3. Buyer's studies/Focus Groups
- Consumer attitudes towards insurance

4. Field force surveys
- Insight into company products
- Insight into public needs
- Helpful to interview agents with low and high sales

(b)

1. Can existing product be modified to increase sales?
- Change promotional efforts?
- Change commission scales?
- Is our cost structure uncompetitive?
- Can we change features to incorporate popular features in competitor's products

2 Will withdrawal hurt our market position?
- Is this product needed in our target market?
- Will withdrawal help sales of remaining products (Vas)?
- Will withdrawal hurt sales to giving opportunities to competitors?
- Will withdrawal hurt company image?

Solution 9 (continued)

3. Are profitability goals being met?

4. Can savings be realized?
   - Over what period

5. How will agents react?

6. Does the product fit company's strategic objectives?

Solution 10

(a)

brokerage distribution system could create conflicts with company field agents
-morale of the field staff may decline
-good field agents may leave
-field agents productivity may decline
service levels may become strained by big influx of broker business

brokers can use excellent brand value and name recognition to help
make term sales and get Mercury into the term market
strong financial strength will attract good brokers/help brokers make sales
brokers could help increase sales in the younger market where Mercury is not well known
brokerage could assist Mercury in becoming more competitive with distributions
systems that competitors may develop

(b)

appropriate pricing objective is competition-orientated
price to beat the competition
Advantages
-more quickly gain market share
-increase name recognition in the market
Disadvantages
-to be competitive may have to have lower profit margin
-need higher sales volume to make profit goals
-may lose competitive edge if competitors lower their rates
-may have to change prices frequently to remain competitive

(c)

use a non-price competition pricing objective
-use marketing factors other than price
-promote company customer service
-promote special features of the product
Advantages
-higher customer loyalty
Disadvantages
-price may have to be higher making the product less competitive

Solution 11

(a)

- the seller must have a use for the capital that will be raised by the sale
- perhaps not the time to sell if sale simply adds to excess capital
- sale must be likely to improve seller's earnings
- seller should carefully consider the price available for the block
- would the company be better off waiting for when the business is more attractive, thereby generating more competition
- what effect will the sale have on the remaining staff

(b)

- assumption reinsurance
  - company that issued the policies is removed from liability after the block is sold
  - under assumption, the seller has no right to recapture under any conditions
- indemnity reinsurance
  - with transfer of administration to the buyer
  - company that issued the policies is not removed from liability
  - seller of the block relies on the buyer to reimburse the seller for all benefits paid
  - the seller is ultimately liable for any benefits or other amounts not paid by the reinsurer
  - since the seller is still under contractual liability to the policyholders
  - under indemnity, the seller has no right to recapture the block unless the reinsurer does not perform its obligations

(c)

- goodwill is an intangible asset that cannot be directly calculated
- future new business
- intellectual capital
- brand name
- reputation
- for stockholding accounting, goodwill is the balancing item that forces assets to equal liabilities at purchase date
- goodwill is normally not allowed or statutory accounting
- goodwill is a risky asset
- in most countries, goodwill is amortized and brought into the income statement in a straight line
- amortization of goodwill reduces earnings
- goodwill will have a major effect on the attractiveness of the acquisition
- depending on how quickly it is amortized
- and in its tax deductibility
- common to include the estimated value of no more than 3 to 5 years of future business in purchase price

Solution 12

(a)

- experience emerges differently than expected (mortality, persistency....)
- non deferral of some acquisition expenses
- if earnings rate on surplus is low, pulls down overall
- income tax rate may be nonlevel, also deferred taxes may impact
- release of PAD's may defer recognition of income (GAAP uses best estimates with PADs)
- rate used to amortize DAC will influence amount of DAC amortized, will impact GAAP earnings
- ROE calculated each year as net GAAP income/GAAP equity, while ROI is IRR over pricing horizon
- stockholder dividend practice will impact GAAP equity, impacting ROE
- relative size of in force and new business as well as the profitability of the mix of business will impact earnings
- age of the existing block
- there might be changes in accounting practice over time

(b)

	(in $mm)
premium	9.97
expense allowance	35.06
net death benefits	<2.42>
operating expenses	<41.77>
product cash flows	1.44

product cash flows	1.44
investment income	.49
IIRC	2.75
taxes	<.26>
increase in reserves	<1.18>
increase in DAC	5.05
GAAP earnings	8.29

Solution 12 (continued)

GAAP earnings	8.29
increase in Risk Capital	<2.14>
increase in DAC	<5.05>
GAAP free cash flow	1.10

(a) back out coinsurance ceded premium
.9 x $20.8M = 18.72

back out coinsurance expense allowance
10% of prem = <18.72>

add in YRT premium ceded
.55 x .9 x $8.7B = <4.31>

no expense allowance on YRT = 0

adjustment to reserves

$8.7B/1000 \times .9 \times (.60 - .71) = <.86>$
total impact <5.17>

Solution 13

(a) Misrepresentation – Agent doesn't tell the truth about policy features
-or about Company's financial condition
-says he is financial planner instead of agent
danger – high – may say 12% rate guaranteed for longer than 1 year
-or bonus guaranteed – not contingent

Twisting and Churning
-twisting – Agent lies about policy to get customer to replace existing policy
churning – Agent get client to repeatedly replace policy
danger – high – no chargeback – high commission and bonus
Rebating – giving customer back a portion of the commission
danger- high first year premium and bonus are 120% of the premium (no chargeback)

(b) Advantage – Flexible premium gives policyholder more choice in paying
-fixed has vanishing pay option – but depends on interest rate
Disadvantage - policyholder more comfortable with fixed premiums
- more confident about benefit level with fixed
- may lead to better persistency

(c) Credited return equals earned rate less spread
-haven't considered competitor's rates - difference may cause lapses
-decreasing rate – earned rate will lag the market and be higher
- leads to lower lapses
-surrender charge will decrease lapses but spike when they run out
-drop from 12% may cause some to lapse

Credited return equals market rate less spread
-policyholder is getting market rate – may not find better rate around
-so lower rates may not cause lapses
-depending on competitor's spread
depends on level of surrender charges
-again drop from 12% may disappoint – cause some lapses

Solution 13 (continued)

(d)

i. Change in rate environment risk – no factor – risk passed on to policyholder

ii. Asset default risk
-assets segmented into subgroups matching policy fund indices
-experience of subgroup and fund tracked over 52 weeks
-calculate correlation factor CF= A x (B/C) for each subgroup
-A = correlation between fund and subgroup returns
-B = MIN(std dev of fund returns, std dev of subgroup returns)

-C = MAX(std dev of fund returns, std dev of subgroup returns)
-C-1 cap factor is 1-CF or 15% if less
-calculated quarterly – use highest cap factor of last 4 quarters
-apply to market value of subgroup
-for new funds of 3 quarters or less use 15%

Solution 14

(a)

- Major Innovation – a product that has never been offered and meets a need that has never been addressed
- Start-up Business – a product that has never been offered before but there are existing products that meet the same basic need
- New products for currently served markets – new product for company
- Product Line Extension – new product added to existing product line
- Product Modification – update features of a product to make it more competitive
- Style Change – altering the appearance of the product (example New marketing materials)

(b)

Indeterminate Premium product is a traditional product with a dual premium structure. There is a guaranteed maximum premium and a non-guaranteed current premium.

Advantages

- Lower current premium makes the product more competitive
- Guaranteed premiums can be used to avoid deficiency reserves
- Company can raise premium rates if experience is worse than expected

Disadvantages

- Product is subject to regulatory requirements including filing any premium changes
- More expensive to administer due to two sets of premiums
- More complicated administration system requirements

(c)

- Underwriting Standards
- Target Markets
- Distribution Channel
- Anti-selection from anti-selective lapses
- Reinsurance quotes
- Underwriting criteria for preferred and substandard risks

Solution 14 (continued)

(d)

Unitary Method: Set Valuation Net Premium as a level percentage of gross premium over the entire benefit period. Then reserves are calculated based on the entire benefit period. A steep premium pattern can avoid deficiency reserves.

Contract Segmentation Method: The policy is broken into segments and the reserves are calculated separately for each segment. A new segment begins each time the Gross Premium ratio (GP_t/GP_{t-1}) is greater than the Mortality Ratio (q_t/q_{t-1}). Within each segment, the Valuation Net Premium is calculated as a level percentage of gross premium.

Solution 15

(a)

(i) Exact matching
- Purchase asset cash flows that exactly match future liability cash flows
- start with matching last cash flow and work backwards

(ii) Duration matching
- match duration of assets to duration of liabilities
- use either Macaulay or modified duration

(iii) Horizon matching
- hybrid between exact matching and duration matching
- use exact matching in early years and duration matching thereafter

(iv) Product cash flow matching
- Use cash flows from one product to offset opposite cash flows of another product

(b)

$$\text{Modified Duration} = \frac{\sum t v^{t+1} CF_t}{\sum V^t CF_t}$$

$$= \frac{1\times V^2\times 25 + 2\times V^3\times 25 + 3\times V^4\times 100 + 4\times V^5 x100}{V\times 25 + V^2\times 25 + V^3\times 100 + V^4\times 100}$$

$$= \frac{576.71}{203.12} = 2.84$$

$$\text{Convexity} = \frac{\sum t(t+1)V^{t+2} CF_t}{\sum V^t CF_t}$$

$$= \frac{\left(1\times 2\times V^3\times 25\right) + \left(2\times 3\times V^4\times 25\right) + \left(3\times 4\times V^5\times 100\right) + \left(4\times 5\times V^6\times 100\right)}{203.12}$$

$$= \frac{2342.52}{203.12} = 11.54$$

Solution 15 (continued)

(c)

(i) Although the modified durations of the assets and liabilities match, there is a big mismatch of cash flows

(ii) Could improve by including matching of convexity as well as duration
- also may consider exact cash flow matching or horizon matching

Solution 16

(a) Loss Ratio Test

- used for group insurance and accident and health policies
- used for short duration risks (1 year or less)

Gross Premium Valuations

- compare gross premium reserve to statutory reserve (V – GPV)
- positive result indicates reserve exceeds best estimate reserve for benefits and expenses

Claim Runoff Tests

- look at claims by incurral years
- look at sum of claims paid and claim reserve
- sum of two should remain constant through all years
- if reserves plus claims paid constant through years, reserves are sufficient
- if reserves plus claims paid decline by duration, reserves are conservative

(b)

- Create table of accumulated claims paid to end of the calendar year, by incurral year:

Cal yr	IY 2000	IY 2001	IY 2002	IY 2003	IY 2004
2000	5				
2001	15	6			
2002	19	18	7		
2003	22	25	21	7	
2004	23	27	23	20	6

- Then create table of claims reserves plus the table above:

Cal yr	IY 2000	IY 2001	IY 2002	IY 2003	IY 2004
2000	20				
2001	25	22			
2002	27	23	24		
2003	27	29	27	25	
2004	27	30	28	26	23

- The columns are typically increasing by calendar year.
- This implies that claims paid plus reserves held are not sufficient using the current reserving method.

Solution 17

(a) The following are some of the features of UL that provide flexibility for the customer:

The customer has a choice of a fixed death benefit or one that pays a fixed amount plus the account value. Some companies offer a variation that pays the fixed benefit plus paid premium.

After the purchase the customer can increase the death benefit (with evidence of insurability), decrease the benefit (subject to policy minimum), or change the death benefit option fixed to increasing or increasing to fixed.

Premium payments are very flexible. As long as basic minimum premiums are paid in the early years, the amount and timing of premium payments are subject only to overall maximum premium limits. The plan allows premium to stop and start as long as minimum account values are maintained.

Partial withdrawals may be taken. There may be a small administration charge and account value and death benefits will be reduced.

Policy loans are also available. Interest rate charge is defined in the policy form and the account value supporting the loan may be subject to a reduced crediting rate.

A range of Riders is usually available to the customer such as disability waiver benefits, ADB, Additional Insured, and others.

Although some traditional nonforfeiture options are not included, UL can work like extended term or reduced paid-up insurance often with current COI charges that are lower.

(b) Premium load is too high. Usual range is between 0-10%. Reduce to level in this range

The guaranteed interest rate is too high. Current interest rate could be 5% or higher, but it is not guaranteed. Guaranteed rate should be reduced to 3 – 4%.

Surrender Charges usually run for 10 to 20 years. For a first UL product use at least 15 years

A Policy Fee of $5 per month is right in the middle of the typical range of $3 to $6 per month.

The purpose of the UL product is to allow flexible premium payments. Fixed premium is not acceptable.

Solution 17 (continued)

Nearly all companies offering UL have riders available. At the very least offer a Waiver of Charges benefit.

The crediting rate for loans needs a 1 –2% margin.
Most companies do not guarantee bonus interest. Some states do not allow. At the least, the bonus should not be guaranteed.