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ILA 101
Pricing and Introduction To Valuation and Risk Management Course Study Manual

2nd Edition

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An SOA Exam

Actuarial & Financial Risk Resource Materials

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NOTES

This study guide is designed to assist candidates preparing for the SOA Exam **ILA101: Pricing and Introduction to Valuation and Risk Management**. It summarizes, in outline form, all the required books, study notes, and articles listed in the official syllabus. Within each topic, outlines are organized according to syllabus order.

The major topic areas covered include:

- Individual Life and Annuity Product Design and Pricing
- Assumption Development and Experience Studies
- Product Management
- Introduction to Life and Annuity Valuation Concepts
- Introduction to Assets and Risk Management

To help candidates assess their understanding and prepare for the actual exam, a full-length practice exam is included. This mock exam mirrors the structure of the official exam (3 hours, 50 points). Both the questions and their assigned point values are representative of what candidates can expect. Complete solutions are provided for all questions to support self-assessment.

While every effort has been made to ensure the accuracy of the material, errors may remain. If you notice any issues or have suggestions for improvement, please contact us at support@actexlearning.com.

Best of luck in your studies and on exam day!

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Contents

Section A INDIVIDUAL LIFE AND ANNUITY PRODUCT DESIGN AND PRICING 1

1 ILA101-100-25 Life Products and Features 3

2 ILA101-101-25 Annuity Products and Features 55

3 Structured Settlement Annuities 95

4 Pension Risk Transfer in Canada and the u.s. 101

5 Registered Index-Linked Annuities 105

6 Life Insurance Acceleration Riders 115

7 LFV-815-13 Understanding Profitability in Insurance 119

8 ILA101-103-25 Life Insurance Products and Finance (Atkinson & Dallas) Chapter 9 - Taxes 131

9 ILA101-104-25 Life Insurance Products and Finance (Atkinson & Dallas) Chapter 11 - Profit Measurement and Analysis 139

10 ILA101-105-25 Life Insurance and Annuity Nonforfeiture Practices 145

Section B ASSUMPTION DEVELOPMENT AND EXPERIENCE STUDIES 157

11 ILA101-106-25 Experience Assumptions for Individual Life Insurance and Annuities 159

12 ILA101-107-25 Lapse Supported Insurance Analysis 181

13 CIA Educational Note Selective Lapsation for Renewable Term Insurance 187

14 Premium Persistency Executive Summary 197

15 Variable Annuity Glb Utilization 201

16 Term Conversions: Pricing and Reserving 211

17 Predictive Models on Conversion Studies for Level Term Plans 213

18 Credibility Methods 221

19 Table Development 233

20 Experience Study Calculations 253

Section C PRODUCT MANAGEMENT 283

21 Life Insurance in the Digital Age 285

22 Art and Science of Life Distribution Chapter 3 - The Primary Life Insurance Distribution Channels 291

23 The Art and Science of Life Insurance Distribution Chapter 4 - The Functions of Distribution in the Life Insurance Business 297

24 The Art and Science of Insurance Distribution Chapter 6 - Distribution Compensation 301

25 The Art and Science of Life Insurance Distribution Chapter 7 - The Economics of Life Insurance Distribution 305

26 The Art and Science of Life Insurance Distribution Chapter 10 - The Future of Insurance Distribution 309

27 ILA101-108-25 Life Insurance and Modified Endowments, Chapter 1 311

28 ILA101-108-25 Life Insurance and Modified Endowments, Chapter 2 325

29 ILA101-116-25 the Taxation of Insurance Policies Canadian Insurance Taxation 351

30 Overview of Nonguaranteed Elements (Nge) 367

31 Market Trends and Product Design 379

Section D INTRODUCTION TO LIFE AND ANNUITY VALUATION CONCEPTS 383

32 Statutory Valuation Chapter 1, Overview of Valuation Concepts Chapter 2, Product Classification 385

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33 Statutory Valuation, Chapter 11 Valuation Methodologies and Approximations 389

34 ILA101-110-25 Fundamentals of the Principle Based Reserve Approach to Statutory Reserves for Life Insurance 399

35 U.S GAAP, Chapter 1 GAAP Objectives and Their Implications to Insurers 415

36 U.S GAAP, Chapter 5 Non-Participating Traditional Life Insurance 431

37 ILA101-111-25 Insurance Contracts First Impressions 461

38 Regulatory Capital Adequacy for Life Insurance Companies a Comparison of Four Jurisdictions 481

Section E INTRODUCTION TO ASSETS AND RISK MANAGEMENT 507

39 ILA101-112-25 Revisiting the Role of Insurance Company Alm Within a Risk Management Framework 509

40 ILA101-113-25 Derivatives Markets 513

41 ILA101-114-25 CH 16 of Alm Management of Financial Institutions 521

42 An Introduction to Computational Risk Management Chapter 1 - Modeling of Equity Linked Insurance 527

43 Introduction to Comprehensive Risk Management CH. 4 Pricing and Valuation 535

44 LA101-115-25 Simulation of a Guaranteed Minimum Annuity Benefit 553

45 Handbook of Fixed Income Securities, CH 10 Corporate Bonds 559

46 Handbook of Fixed Income Securities, CH 21 an Overview of Mortgages and the Mortgage Market 573

47 Life, Health and Annuity Reinsurance Chapter 1 - Basic Terms and Concepts 585

48 Tillers, 4^{th} , Chapter 4 Basic Methods of Reinsurance 599

49 Tillers, 4^{th} , Chapter 5 Advanced Methods of Reinsurance 613

Section PEQ: Practice Exam Questions **623**

Section PES: Solutions to Practice Exam Questions **633**

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Section A

INDIVIDUAL LIFE AND ANNUITY PRODUCT DESIGN AND PRICING

2

ILA101-101-25
ANNUITY PRODUCTS AND FEATURES

I. Fixed deferred annuities

A. Annuity is an insurance contract which provides a series of payments over the lifetime of the annuitant or for some other period

1. During the accumulation phase

a. An individual makes contributions to the insurance company

b. The insurance company credits these contributions to an account, credits interest to the account and periodically deducts charges

c. Interest earnings are deferred from taxation and contributions may be excluded from an individual's taxable income until funds are withdrawn

d. The insurance company often gives the contract holder the right to surrender the contract and receive the balance in the account at any time less the surrender charges

e. Proceeds not previously taxed are taxed on surrender

2. During the annuitization phase

a. The insurance company sends payments to the annuitant typically monthly or annually

b. The payments continue for the lifetime of the annuitant or joint annuitant, for specified time period, or some combination of the two

c. To the extent annuity payments representing income that has not been taxed, the payments are taxed when paid

3. Tax laws are designed to encourage the accumulation of funds during an individual's working lifetime to meet retirement needs: annuities provide a tax deferred vehicle to accumulate these funds

B. Characteristics of fixed deferred annuities

1. Single premium deferred annuities

a. Sold in the qualified and nonqualified markets by stockbrokers, financial institutions, brokers and agents

b. Minimum size: $5,000, but $10,000 is becoming more common; lower limits of $2,000 for qualified annuities

c. Front end loads or periodic fees

i. Front end loads may be charged, but they are not popular

ii. The account value is the single premium less loads accumulated at interest

d. Surrender charges

i. Back-end surrender penalties are charged on surrender

ii. These charges decline uniformly over the surrender charge period and are typically expressed as a percentage of the annuity account value

iii. Some contracts may express the charge as a forfeiture of excess interest credited to the contract over the last 6 to 12 months

iv. The surrender charge compensates the insurer for terminations occurring before the initial acquisition costs have been fully recovered

v. The surrender charge usually bears a close correlation with the level of commissions or other acquisition expenses

vi. Surrender charges may be limited by regulation and competition

e. Interest rates and interest guarantee periods

i. Interest rate guarantees

a) Single Premium Deferred Annuity (SPDA) contracts have a minimum guaranteed interest rate on the account value

b) Contracts guarantee a higher rate for a number of years

c) The minimum rate is subject to regulation; it is subject to current interest rates and must be between 1% and 3%

ii. Redetermination provision

a) A company may have a redetermination provision in the contract which recalculates current interest rates at specified durations

b) Redetermination was a compromise between companies that wanted low guarantees after surrender charges and regulators looking to protect customers

iii. Renewal rates after the guarantee period

a) Determined according to current investment and interest rates, marketing and profit goals

b) They are a blend between new business rates and current net yield on assts less target pricing spread

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c) Renewal rates can be guaranteed for one year or the same as the initial guarantee period

iv. A variation is the calendar year guarantee

a) The rate is guaranteed to the end of the current year and the following year or

b) The interest rate can be guaranteed for a whole number of years

2. Flexible premium deferred annuities

a. Front end loads and periodic fees

i. A front-end load may be charged

ii. A Flexible Premium Deferred Annuity (FPDA) levies an annual policy maintenance charge

iii. These charges are less than an interest sensitive life product because administrative systems are less complex for deferred annuities

b. Surrender charges

i. FPDAs may have back-end surrender charges

ii. Common designs are

a) Surrender charge expressed as a percentage of premium grading down over time; partial withdrawals are assessed a surrender charge on a first in/first out basis

b) Surrender charges expressed as a percentage of total annuity account value ($5\% - 20\%$) with surrender charges extending 5-15 years; they do not grade off uniformly, but have plateaus and cliffs

iii. FPDA product designs sometimes include surrender charges expressed as

a) A level percentage of the sum of the premiums paid for a period of x months

b) A level percentage of the lesser of the account value or the last x years premiums

c. Interest rates and interest guarantee periods

i. Fixed FPDA contracts have a minimum guaranteed interest rate on the account value

ii. The guaranteed rate level must consider the possibility of additional deposits

iii. The current initial interest rate and renewal interest rate are guaranteed for one year to avoid potential adverse selection at renewal

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iv. If a rate has a longer rate guarantee, it only applies to the current contract year

3. Variations in design

a. CD annuities

i. Annuities have competed against certificates of deposit

ii. Two principal characteristics of a CD annuity are

a) The surrender charge and the current interest rate guarantee period are the same

b) At the end of the interest rate guarantee period, the contractholder has a period of 30 to 60 days in which to surrender the contract without penalty

iii. During the three-to-six-year interest guarantee period, there is a surrender penalty designed to mimic the early termination penalties of certificates of deposit

iv. The surrender charge is often expressed as

a) The loss of six months excess or total interest

b) The loss of all excess interest credited since the beginning of the interest rate guarantee period

c) A level percentage of account value equal to 1/2 the current annual interest rate; this may approximate the interest forfeiture while being easier to administer

v. The contractholder has the option of renewing the contract at the current interest rate guarantee for the same or a different guarantee period with renewal for the same period

a) Generally, the automatic option is for the same period

b) Surrender charges typically apply to any surrenders during the renewal guarantee period

c) At the end of the renewal guarantee period, the contractholder will again have the option to surrender without penalty or renewal for another guarantee period

vi. Initial commissions vary by the length of the interest rate guarantee period, increasing for the longer guarantee periods; however, commissions on CD annuities are generally lower than those paid on other types of deferred annuities

b. Market Value Adjusted annuities (MVA)

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i. Contract values are based on both a surrender charge and the market value adjustment formula

ii. The market value adjustment formula reflects changes in current interest rate levels since beginning of the interest guarantee period

a) If market interest rates have risen since the start of the guarantee period, the market value adjustment is downward

b) If market interest rates have declined, the market value adjustment is upwards

c) The market value adjustment is intended to reduce the insurer's disintermediation risk, enabling them to credit higher rates

iii. MVA annuities have longer current interest rate guarantee periods than a typical single premium deferred annuity

iv. At the end of the guarantee period, there is no market value adjustment; however, there may be a surrender charge which would grade down to zero over time

v. A common market value adjustment formula is

$$((1+a)/(1+b+c))^{n-t}$$

n is the years of the current interest rate guarantee period

t is the years since beginning of the current interest rate guarantee

a is the interest rate currently guaranteed on the contract

b is the current interest rate being offered on products for an interest guarantee period of ($n-t$) years

c is a constant factor

vi. Surrender values

a) If interest rates decrease from the beginning of the interest rate guarantee period, the surrender value increases due to the market value adjustment

b) If interest rates increase from the beginning of the interest guarantee period, the surrender value would be reduced due to market value adjustment

c) An adjustment can be made so that the contractholder does not receive an increase in surrender value unless the interest rate declines by more than some value, such as 25 basis points

vii. MVA annuities are attractive because they reduce the interest rate risk assumed by the insurance company resulting in more favorable statutory reserves and required capital

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viii. MVA annuities are expected to credit higher interest rates than the similar single premium deferred annuities

c. Two tiered annuities

i. Two tiered annuities are sold in the tax qualified market

ii. The contract accumulates two account values simultaneously based on two different sets of interest rates

a) The account value, credited with a higher interest rate, is the amount available for annuitization

b) The lower account value, credited with a lower interest rate, is the amount available on surrender either with or without a surrender penalty

iii. The difference between the two account values increases over time and represents an implicit surrender charge which can become large; some product designs cap the difference after a number of years

iv. The design is intended to

a) Encourage contractholders to keep their funds within the insurance company and

b) To maintain equity between terminating and persisting policyholders by charging the costs associated with the availability of book values surrenders to the terminating policyholders by the reduced lower tier credited interest

v. Criticism of the two-tier design are that

a) Contract holders do not understand the difference between the two tiers and

b) Sales illustrations may be misleading; there is a potential for a company to assess a surrender charge on the second tier by the use of guaranteed settlement option rates at the time of annuitization

d. Non-surrenderable annuities

i. A non-surrenderable annuity eliminates or significantly curtails the contractholder's ability to surrender the contract except at specific points in time such as annuitization

ii. There may be a limited penalty free withdrawal provision

iii. Non-surrenderable annuities have loan provisions that charge current market rates to provide some liquidity

iv. There are no surrender charges; either the account value is paid in full or is not available at all

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v. The design limits disintermediation risk, but insurers perceive these as less marketable than market value annuities due to their reduced liquidity

4. Other product features

a. Bailout provisions

i. This provision waives the surrender charge if the declared renewal interest rate drops below a defined benchmark, called the bailout rate

ii. This allows the policyholder to surrender the annuity contract for the full account value without a surrender charge

iii. The surrender charge waiver may be for a defined window, may remain in effect until the renewal rate in excess of the initial rate is declared, or may be permanent

iv. The bailout rate is calculated as the contract's initial credited rate less a spread stated in the contract or can be defined in terms of an index or the renewal rate

v. Once triggered, contracts that do not exercise the right to surrender without penalty either have

a) The bailout provision continue as it is

b) The bailout provision continues but the bailout rate is reset by reference to the renewal rate, or

c) The bailout provision is terminated

b. Medical bailouts

i. This benefit waives surrender charges when the annuitant is confined to a nursing home or long-term care facility or if the annuitant is terminally ill

ii. The SPDA market is primarily an audience age 50 and above who value this benefit

iii. The cost of this benefit is relatively low (10 bp) provided the definition of the conditions that trigger the bailout are not subjective, not easily abused, and easily administered

c. Penalty free withdrawal provisions

i. This provision enables a contractholder to surrender a portion of the annuity's account value without incurring a surrender charge

ii. One penalty free withdrawal is permitted each year; a variation allows multiple withdrawals provided they do not exceed a specified amount in total

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iii. The amount is generally limited to 10% of the annuity account value at the time of withdrawal; variations may use 10% of the premium paid or the interest credited to the contract during the policy year

iv. On full surrender, the penalty free portion of the account value reduces the effective surrender charge percentage as a percent of the account value (a 10% free surrender reduces a 7% surrender charge to an effective 6.3% rate)

v. Another variation is to allow the unused portion of the penalty free partial withdrawal amount to be carried forward and added to the next year's available amount; this generally has secondary limitations such as the amount withdrawn cannot exceed 50% of paid premiums

vi. This had marketing appeal, but the disintermediation risk was more costly than originally anticipated

vii. Other limitations include a minimum withdrawal amount or a minimum account value remaining after withdrawal

d. Return of principal guaranty

i. This guarantees the amount paid on surrender will never be less than premiums paid adjusted for partial withdrawals, even if the amount is greater than the cash surrender value in the contract

ii. This is relevant in the early contract years before the surrender charges are offset by the effect of interest credited to the contract

iii. US statutory reserves on a contract with this guarantee will be higher than comparable designs without the guarantee until the cash surrender value is greater than the premium

iv. This benefit was originally introduced in periods of high interest rates; low rates make it more costly to add to a base policy

v. Unless there is a commission chargeback at surrender, an agent can take advantage of the design through repetitive sales followed by quick surrenders

e. Death benefits are equal to the account value; where allowed by law, it can be the surrender value

f. Waiver of surrender charge on annuitization

i. This feature may have reserve issues

ii. No or low commissions are paid on annuitization because the company recoups acquisition expense over the annuitization period

iii. Contracts that waive surrender charges on annuitization require a minimum annuitization period, such as 10 years

g. Guaranteed settlement rates

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i. Conservative settlement rates are included in SPDA and FPDA annuities which may impact reserve calculations

ii. As mortality improves, companies rely on interest rate margins to achieve profitability

iii. In low interest rate environments, mortality margins are used in the form of an age setback that varies by duration

iv. Higher settlement rates are provided at annuitization; they are adjusted to reflect expense and commission savings

h. Account value enhancements

i. Annuitization bonuses-encourage maturing funds to stay with the company

ii. Persistency bonuses-encourage long term persistency without regard to annuitization

iii. Bonuses on large account values-encourages larger contributions and recognize expense that does not vary by size; the most common bonus is the annuitization bonus which applies an additional percentage to the account value when the contract annuitizes, reflecting no commission

i. Other types of account enhancement

i. An additional 15 to 25 basis points payable on account values in excess of a dollar amount

ii. An additional 15 to 25 basis points payable on account values after a specified duration

iii. A bonus can be expressed as a percent of account value or percent of each deposit credited at some future duration

iv. These bonuses are generally lower than offered on life contracts but are generally payable earlier

v. Some bonuses are designed to attract new funds by crediting an additional bonus in the first policy year only with a long-term investing schedule for the bonus amount

C. Pricing considerations for fixed deferred annuities

1. C-3 risk

a. C-3 risk is the risk that assets arising from a product will be insufficient to fund the product liabilities due to changes in the interest rate environment (other than the risk of asset default)

b. Insurers selling fixed annuities in a competitive and volatile interest rate environment are susceptible to C3 risk

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c. The deferred annuity contractholder has the option of selecting the insurance company

i. When crediting rates, the contractholder can surrender their contract and select a higher rate from competitors or treasury bonds

ii. The insurer incurs a loss on the sale of assets backing the annuity

iii. Surrender charges prevent this antiselection

2. Interest spread

a. Target interest spread

i. The pricing goal is to determine the target interest spread required to meet the profit objectives given the product design and assumptions

ii. Spread can differ by duration, recognizing the need to invest shorter as the surrender charges expire

iii. The target interest spread is used to set current interest rates on new business as well as renewals

iv. Target spreads are modified by competition, which come from other insurance carriers and alternative fixed income investments

v. Target spreads on annuities range between 125 to 200 basis points; however, actual spreads realized can be lower due to competitive pressures and changes in the interest rate environment

vi. Actual spreads tend to increase in a declining environment and decrease in a rising environment

b. Components of target pricing spread; spread is required to cover

i. Investment, acquisition, and maintenance expenses

ii. Features such as bailouts

iii. Charges for asset defaults, disintermediation, and duration mismatch

iv. Expected profit margin

c. Pricing must use realistic provisions for

i. The cost of features such as bailouts

ii. The cost of interest rate risks assumed

iii. Withdrawal, expense, and mortality

d. The target spread will be inadequate, and the profit margin will not be achieved, if the risks in product design adversely deviate from the underlying assumptions

3. Crediting strategy

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a. The interest spread is the difference between the net portfolio yield on the underlying assets and the credited interest rate paid on those assets

b. Initial pricing determines the interest spread necessary to amortize the cost of commissions and other acquisition expenses, cover product features, cover the cost of asset risks, and provide a profit margin

c. Pricing includes not only a target spread in setting the initial credited rate but also the most effective ongoing crediting strategies for realizing the targeted spread over the pricing horizon

d. Concerns with the application of the yield less spread formula

   i. In a declining interest rate environment, a new money rate will lag the net yield of the asset portfolio; a renewal interest rate will be greater than a competitive fair market interest

   ii. In a rising interest rate environment, the net yield of the asset portfolio will lag the net new money rate used to price new issues; the renewal interest rate will be below rates offered by competitors which may cause lapses

e. When lapses occur the profit objectives are not being made even though the target spread is being met, because the targeted spread required to produce a given profit margin is dependent on the pricing assumptions, especially lapse

f. For the majority of deferred annuity contracts, excess lapses will result in the profit margin not being met because the cost of excess lapse is generally much higher than the benefit of lower than expected lapses

g. Withdrawal rates need to be based on a formula that relates the magnitude of withdrawal to the competitiveness of the credited rates derived by the crediting strategy and the magnitude of the current surrender charges

h. Formulas for withdrawal rates that reflect competitor rates and surrender charges are

$$a*(j-i-b)*(SV/AV)+c \quad \text{OR} \quad a*(j-i)^b - c*\text{SC} + d$$

   - i is the current credited rate
   - j is the competitor rate on new business
   - SV is the surrender value
   - AV is account value
   - SC is the surrender charge expressed as a percent of the account value
   - a, b, c and d are constants which depend on other factors affecting the magnitude of the excess withdrawal rates, such as contractholder demographics, contract marketing, and the perceived financial strength of the insurer

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4. Withdrawal
    a. Withdrawal is the most significant pricing assumption for deferred annuities
    b. The targeted spread determined in pricing is dependent on the anticipated pattern and magnitude of the annuity account values in the profit test, which are dependent on the withdrawal rates
    c. Withdrawal rates experienced by deferred annuity contracts are affected by surrender charges (incidence and magnitude), credited interest rate (level and competitiveness), the distribution system, the interest guarantee periods (length and expiration), age and economic status of the contract holder, and the perceived financial strength of the insurance carrier
5. Partial withdrawal provisions
    a. A partial withdrawal provision requires an assumption as to the amount of cash value that would be withdrawn; this is a function of both the utilization of the partial withdrawal feature and the magnitude of the average withdrawal
    b. Partial withdrawals are assumed to be no greater than the available amount free of surrender charge
    c. Deferred annuities can be priced by increasing the full withdrawal rates to provide for the cash value assumed withdrawn by partial withdrawals; while the predicted revenue stream is valid,
        i. It understates the number of contracts in force and therefore the expenses associated with the contract
        ii. It overstates the amount of surrender charges collected
    d. Penalty free partial withdrawals should be incorporated in pricing
6. Mortality
    a. Mortality is generally not a significant factor in pricing deferred annuities because the death benefit is relatively low, generally decreasing with the net amount of risk (the excess of the account value over the surrender value)
    b. Mortality tables
        i. An annuity mortality table is not appropriate during the accumulation phase of an annuity because it is based on the low mortality during the payout phase due to self-selection
        ii. A select and ultimate experience table applicable to life insurance is not an appropriate table since deferred annuity contractholders do not undergo underwriting
        iii. There is little guidance for an appropriate mortality assumption during the accumulation phase; company experience can provide guidance as to the appropriate mortality multiple

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c. Mortality is an important consideration at older ages around 75 and 85 when the mortality rate represents 5% to 8%

i. The annual decrement of the inforce for death and lapse at the older ages makes amortizing commission and acquisition expenses difficult over a reasonable time

ii. Even though the death benefit is relatively insignificant, it is paid out on a significant portion of contracts at older ages, adversely affecting profitability

iii. This is addressed by setting a maximum issue age between 75 and 85 or reducing commissions between ages 70 and 75

d. Mortality is more important if death benefits in excess of cash value are paid on both the death of the new annuitant and the death of a non-annuitant owner

i. Maximum age limitations typically apply only to annuitants, not the contract owner

ii. This allows age limitations to be circumvented by naming a spouse or grandchild as annuitant and making the over age person the owner

7. Commissions and other marketing expenses

a. Commission rates on SPDAs range from 3% to 8% depending on the distribution system; today, marketing expenses are more consistent between different distribution systems

b. There is greater variability in commission scales paid on FPDAs than on SPDAs; a typical FPDA pattern is front loaded with 7% of first year commissions and 3% of renewals

c. Levelized commission approaches have been attempted but they are more typical in the nonqualified FPDA contract due to the uncertainty of the renewal premium stream

d. Some companies have a trailing asset-based commission on SPDAs paid in renewal years in lieu of a portion of the initial commission; a 25-basis point trailing commission is roughly 11/2 to 2% of upfront commission

e. CD annuities pay renewal commissions on the account value at the end of the interest guarantee on contracts that renew; the amount may be a full first year commission or a lower amount

8. Expenses

a. Acquisition expenses are low because there are no underwriting costs, only marketing and policy issue expense

b. Marketing is included in commission expense

c. Maintenance expenses are low reflecting simpler administration

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9. Effect of competition on expenses and compensation levels
    a. There are significant non-insurance competitors
    b. Differences reflect
        i. Expense and commission structures which are lower than for insurance companies
        ii. Asset durations and credit quality
    c. An insurer must be an efficient administrator to cover expenses
    d. Expenses should not increase unless a competitive advantage increases
10. Surplus strain
    a. Deferred annuities can deplete surplus if significant volumes are written; surplus is a critical, limited resource
    b. Most surplus strain comes from two sources–first year commissions and reserve increases
        i. First year commissions: some companies try to reduce commission expense by leveling commissions or using an asset based trailing commission as part of first year commissions
        ii. Reserve increases: the initial reserve liability is the main source of surplus strain
    c. Surplus strain on average is 4% to 5% of premium, but depends on product design, reserve method, and commissions
    d. A minimum amount of additional surplus is required for solvency purposes and maintain adequate ratings; required surplus is 3% to 6% of annuity reserves depending on product design and investment strategy
    e. Annuity pricing can use distributable earnings as the profit measure
    f. The internal rate of return on distributable profits is lower than when calculated using book profits; however, it is a more appropriate indicator of total capital return because capital held as target or required capital cannot be used to produce new business
    g. Return on equity
        i. Equity is the surplus to issue the product and the sum of DAC plus required capital plus excess stat reserves over GAAP reserves
        ii. It can be calculated on a discounted or undiscounted basis
        iii. The undiscounted return on equity will generate the pricing ROE assuming all pricing assumptions are valid
11. Bailout pricing

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a. Two pricing considerations

i. The possible additional surplus strain from product design due to statutory surplus requirements

a) A product with a bailout will have a lower internal rate of return if surrender charges cannot be used in the reserve calculation

b) The bailout product will require a greater spread than a non-bailout product to meet profit objectives

ii. The value of the option, the cost of excess lapses and loss of surrender charges when a bailout is triggered and possibly supporting a renewal rate to avoid a bailout

a) Dynamic interest rate scenarios are used to determine the cost of the bailout

b) The cost of the bailout is determined by the spread from the median profit test scenarios generated by dynamic scenarios are equal to the profit objectives from a deterministic scenario

c) Most companies price assuming renewal rates will not trigger a bailout; lapse behavior when a bailout is triggered is more expensive than the cost of artificially high renewals

iii. A rough approach to estimate the cost of a bailout provision (other than surplus cost) is to multiply the average lost surrender charge, the assumed excess lapse rate, and the probability of trigger; this ignores the lost profits from excess lapse

a) Results vary significantly with minor changes in the components

b) If the trigger is over the life of the policy, it must be equated to an increment of annual spread

c) If the trigger is annual, the result approximates the annual cost of required spread

iv. The total cost of the bailout provision is the cost of the option and the cost of the additional surplus for the bailout

v. Bailout costs perceived by the marketplace cannot be used to price a bailout provision due to the wide range of bailout definitions, investment and crediting strategies

vi. The additional cost of a bailout feature should be passed on to the policyholder without loss of competitive advantage because it adds value; however, there is a gap between the cost perceived by the contractholder and the cost to the insurer

12. Pricing CD annuities

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a. Two issues must be considered

i. Withdrawal rates at the end of the interest guarantee period can be high; the profit margin should not depend on profits after this period

ii. Renewal commissions paid on renewal; on renewal, the proceeds are easily moved by the agent

b. Companies pay either a full commission or lower commission to the agent on renewal; the lower commission is justified by the less effort to renew than to make a new sale

c. Company control over distribution is a factor in setting renewal commission

13. Interest scenario pricing

a. The deterministic test (using level interest rates and spreads) produces more favorable results than the median results from interest scenario pricing; this is caused by not measuring interest rate risks in the deterministic profit test

b. Interest scenario pricing allows the costs of interest rate risks and policyholder options to be quantified

c. Alternatively, deterministic scenarios can be used (such as the NY seven required scenarios) to determine risk/reward strategies

d. The cost of assumed interest rates and policyholder optionality are used in pricing spreads and product management to avoid serious financial risk

14. Profit objectives

a. Common profit objectives for annuities are

i. Profit margin, which is the present value of statutory book profits or distributable profits expressed as a percentage of the present value of premiums, either on a pretax or post tax basis

ii. Internal rate of return–the interest rate at which the present value statutory book profits or distributable profits equals z

iii. The break-even year with respect to reserves, which is the first year in which the excess of accumulated statutory book profits over reserves is positive and remains positive in all subsequent years

iv. GAAP ROE

b. Pricing standards under a set of stochastic scenarios capture both the expected return and likely distribution using the

i. Mean return

ii. Percent of returns below some defined level

iii. Percent of non-negative scenarios above some defined level

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c. The product will be sold through an interest rate cycle, so the worst outcome is mitigated over time

d. Multiple profit measures should be monitored to understand the profitability profile

i. A product with a high profit margin but a low internal rate of return has high surplus strain and has an unacceptable profit profile for shareholders

ii. A product with a high internal rate of return but a low profit margin indicates thin profit margins subject to significant adverse deviation

e. The breakeven year is more important for annuities than life products

i. A product should break even by the end of the surrender charge period or the window period for CD annuities

ii. Depending on later year profits is risky unless withdrawal assumptions are low based on experience

15. Pricing horizons

a. The pricing horizon for deferred annuities are much shorter than life insurance products

b. A typical life product is 20-30years; annuities are 10-20 years, with shorter periods for SPDAs and non-qualified FPDAs, and longer periods for qualified FPDAs

II. Variable deferred annuities

A. The variable annuity

1. A variable annuity contract provides benefits that vary according to the investment experience of assets supporting the contract which are held in a separate account

2. A variable annuity does not have interest guarantees; the contractholder bears the investment risk and receives the investment return actually earned on invested assets less charges assessed by the insurance company

3. The general account of an insurance company is restricted by law to the type and quality of investments that it may hold; these investments must offer safety of principal and a predictable income stream and therefore are high quality debt instruments

4. Separate accounts have few restrictions; income gains and losses on separate accounts are credited to and charged against the separate account and are separate from the rest of the company's business

5. Protection of retirement income from inflation is a crucial goal of a retirement savings program

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a. Variable annuities fill this demand with riskier vehicles but with more longterm income predictability than guaranteed insurance products

b. Contractholders take greater risk in hopes of achieving greater returns

6. The variable annuity eliminates C3 risk found in fixed deferred annuities

7. In certain economic, regulatory, and competitive environments, the variable annuity is an attractive vehicle for insurance company to sell; however, pressure for a fixed annuity product may not make the variable annuity as attractive to potential purchasers

B. Characteristics of variable deferred annuities

1. Types of variable contracts

a. Variable deferred annuity contracts may be FPDAs or SPDAs, but predominantly SPDAs

b. Variable annuities are frequently offered under combination contracts which offer a fixed account through the insurer's general account in addition to investment options in separate accounts

c. Contractholders may have funds in both fixed and variable accounts; however, transfers of funds between fixed and variable accounts are restricted; allowing transfers out of the fixed account exposes the company to the risk of antiselection and timing when the general account assets are depressed in value

d. Companies offer more than one variable annuity product to reflect differences in expense levels for marketing, agent compensation, or administration

2. Product guarantees

a. Variable annuities provide guarantees at death least payment of the full accumulated value with no surrender charges and may provide for return of premiums less withdrawals at no additional charge; optional riders guarantee that payment at death will be at least equal to some other stipulated minimum if higher

b. Death benefit guarantees are

i. The highest account value on any anniversary less any subsequent withdrawals (step up)

ii. Premiums accumulated at some specified rate of interest adjusted for withdrawals and capped at two times premium or future growth is stopped at some age

iii. The greater of the step up and a roll up

iv. A percentage of the gain in the contract at death; this is less common

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c. The insurance company bears investment risk for the contingency of death

d. Companies competed on the basis of more valuable benefits, but pricing was less sophisticated and many benefits were underpriced; there was also no experience as what policyholders would do in a down market and other guarantees were considered

e. Forms of guaranteed living benefits

i. Guaranteed Minimum Income Benefit (GMIB)

a) This provides a minimum guaranteed amount that is used to calculate an annuitization benefit

b) The amount is generally premiums accumulated with interest, less withdrawals for a minimum period of time before it could be exercised

c) Upon exercise of the GMIB, the amount is converted to a fixed monthly income using annuitization rates guaranteed in the contract

d) The use of guaranteed annuitization rates with long elimination periods serve as a risk mitigation for the company

ii. Guaranteed minimum accumulation benefit (GMAB)

a) GMABs do not require surrender or annuitization of the contract to receive the benefit; if the benefit is in the money at the time it becomes payable, the account value is increased to the GMAB amount

b) The rates associated with a GMAB are lower than rates for the GMIB

iii. Guaranteed Minimum Withdrawal Benefit (GMWB)

a) GMWB's provide a guaranteed income in the form of withdrawals even if the account value is zero

b) The GMWB for life provides a specific withdrawal amount to be taken each year as long as the policyholder lives regardless of the account value

c) The amount is a defined percentage of the account value as of the time of the first withdrawal; the percentage increases by age at the first withdrawal to recognize lower longevity at the higher ages

d) GMWBs contain both equity and interest rate risk; changes in equity or interest rates affect the contract liability

e) To avoid volatility in reported GAAP earnings, companies hedge the GMWB benefit with capital market instruments such as options and swaps

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f. Variable annuity contract holders are assessed expense charges and mortality and expense risk charges to cover administrative expenses and the risk that assumptions as to future mortality and expenses are wrong; they are often guaranteed to remain level for the lifetime of the contract

g. The contract stipulates the annuity purchase rate used to determine the initial annuity payment is the base for all future annuity payments

h. If annuity payments are changed only for investment return, an expense guarantee is present along with a mortality guarantee

3. Product charges

a. Front end load: a percentage deducted from considerations prior to crediting them to the contractholder's account; it may also be a fixed dollar fee

b. Rear end load or surrender charge

i. A deduction made at the time of withdrawal of funds from the contract; it may be percentage of all or a portion of accumulated value or a percentage of certain considerations with an additional fixed fee

ii. Most contracts allow some amount of withdrawals (generally 10%) free of surrender charges

iii. Fixed fees are less common

c. Percentage of asset charges: A deduction from gross investment return in calculating the return to be credited to the contract holder; it is also a deduction of a percentage of the contract holder's account balance

d. Other fees: Each contract may be assessed a periodic fee that is often waived if the account value is above a specified amount

e. Old variable annuity contracts had

i. Substantial front end loads to cover sales expenses which decreased based on premiums

ii. Investment expenses, mortality, and expense guarantees were covered through asset charges

iii. Administrative expenses were covered by policy fees

f. Back-end loads are now more generally used

i. Surrender charges range from 3% to 12% of accumulated value or premiums; the charge declines gradually until it decreases to zero

ii. Annual fees are waived if the account value exceeds a specified amount

iii. Asset charges range from 50 basis points to 175 basis points per year

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Overview of The Actuarial Faculty Development Program

The AFDP is a pilot program developed by ACTEX to strengthen actuarial teaching staff in low-middle income countries with a program of live virtual classes and education resources. This program is supported by the UNDP-Milliman Global Actuarial Initiative (GAIN).

Actuarial Education Bootcamp

Virtual live lectures focused on:

1. Actuarial Science Program Development
2. Insurance principles and the actuarial profession
3. Technical actuarial skills
4. Actuarial Pathways
5. Professionalism and Ethics

Curriculum Resources

Recommendations for curriculum and access to resources to provide in the classroom:

1. Open access to digital resources provided through the Bootcamp
2. Academic GOAL bundles including student access for one academic year

Community of Practice

Online platform for members of the program to pose questions, interact with international community of actuarial science faculty, and receive inspiration.

Mentorship

Direct mentorship with experience university faculty to provide ongoing support.

ACTEX Academic GOAL Bundles

As part of the program, the participants will have access to ACTEX Academic GOAL bundles for the duration of the program (1 academic year). ACTEX Academic GOAL provides instructional videos, textbooks and manuals, as well as an actuarial science database of hundreds of questions to both students and teachers, equipping them with additional teaching content.

Benefits of Academic GOAL

- Allows editing capabilities to customize any question or solution(s)
- Build course assignments effectively
- Automated grading (for Multiple Choice questions) with autonomy to when grades and solutions are released to students
- Simple enrollment with one shared access code per class
- Analyze performance in multiple ways – by student and/or assignment

ACTEX Academic GOAL Resources

- Digital access to textbook or study manual (choice of instructor) covering entire syllabus with step-by-step explanations of concepts as well as hundreds of examples exercises
- Academic GOAL database for assignments and student independent study
- Instructional video library for independent study or flip classroom options
- Flashcards and formula sheets to support student exam prep
- Academic Resource Center providing centralized online resource library
- Access to Actuarial University which includes hub of definitions and access to student forums

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Key Highlights of The Actuarial Faculty Development Program

Program Cost

An estimated fee of:
- $375 early bird registration
- $675 regular admissions

Participant will be charged by ACTEX for the participation in this program. The fee is used to offset operational costs (including the development of program, learning portal and royalties of study materials) involved in administering the program.

Program Duration

The Bootcamp Component will be 6 months with the program set to run for 1 year per cohort. This period includes access to a community of practice, curriculum resources and mentorship directly provided and organized by the program.

Program Structure

Fully Virtual

Size of Cohort

Minimum 5, Maximum 25

Bootcamp Instructors

- Volunteer actuarial practitioners from Milliman GAIN and other companies
- Professors with extensive actuarial science teaching experience
- ACTEX eLearning specialists

Program Timeline

- Apr 2025 – Early bird enrollment of participants
- May to Jun 2025 – Regular enrollment of participants
- Jul 2025 – Live teaching component commencing
- Jun 2026 – Cohort graduation

Certificate

At the end of the program, the participants will receive a certifcate recognizing their participation.

How You May be Able to Support

Encourage and support academic staff at your university to participate in the AFDP. If you are an academic staff and would like to participate in this program, please contact us to get in touch with you.

Support as a Volunteer to:

- Sponsor a participant to cover their program cost to support faculty and student development
- Teach the live virtual classes for the Bootcamp
- Develop course materials
- Become a mentor / community champion in the CoP
- Provide resources and reference teaching materials / curriculum.

Talk to Us

Reach out with any questions!

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