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GI 302
General Insurance in the U.S.
Study Manual

1st Edition

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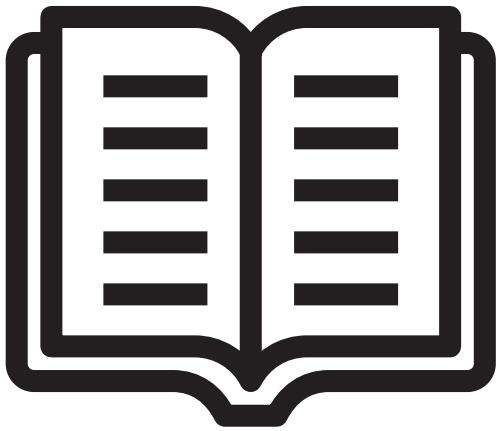

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NOTES

This study manual is written with the purpose of assisting the candidates for the SOA exam GI302 General Insurance in the U.S. In most cases, the readings covered in this manual is in the order as they appear in the syllabus.

Relevant practice questions and answers are provided at the end of each reading. Past exam and answers have been taken from SOA's GIFREU (**up to 2020 spring, and relevant question numbers for 2020 fall, 2021 spring/fall and 2022 spring/fall**), which are identified with "(SOA GIFREU Year Spring/Fall Qi)" in the manual. When there is insufficient exercise, past exams and answers of the CAS exam 6US are included. All the past exam questions and answers are copyrighted by the Society of Actuaries and Casualty Actuarial Society. I appreciate the SOA for its permission to use this material. The SOA, however, is in no way responsible for the structure or accuracy of the manual. SOA will publish relevant past exam questions in July 2025, and the mapping for 2023–2025 exams are therefore excluded. Note that for some readings, especially chapters of the SOA textbook *General Insurance Financial Reporting Topics* (GIFRT), past exam questions may cover syllabus of both GI201 and GI302. To maintain the completeness of the questions, they are included in the manual. Readers should be aware that some may be out of the scope of GI302.

The last part consists an original practice exam, with questions based on the required study materials. Many of those questions are inspired by the past SOA GIFREU and CAS exam 6US. Although I have made a conscientious effort to eliminate mistakes in questions and answers, errors may exist. I encourage candidates who find errors to bring them to my attention. You can send your comments to my email address - syl9810@gmail.com. Any other feedback is also warmly welcome.

As a final suggestion, practice is important! Among all the reasons for failures, not taking past exams seriously is the No.1 issue. In addition to my mock exam, candidates are strongly encouraged to at least attempt the relevant past year questions published officially by the SOA to achieve the maximum likelihood of passing.

I would like to thank Stephen Camilli, FSA and the former President of ACTEX Learning, for his insightful comments.

Best of luck with your studies!!!

Part II

General Insurance Regulation

Chapter 2

IR: Development of Insurance Regulation

Syllabus

2a) Describe the functions of key regulatory bodies in the U.S. including the NAIC and SEC.

2b) Describe the historical development of general insurance regulations in the United States.

2c) Describe and interpret the current state of general insurance regulations in the United States

§2a Development of insurance regulation

§2a(i) Pre-1944: Developments Before the SEUA Decision

Early Years of Insurance Regulation

- 1752: First insurer chartered – Philadelphia
- Early 1800s: states felt pressure to protect domestic insurers
- New York is a leader in regulating insurance: it established process for managing insurer liquidation, imposed 10% retaliatory premium tax, and created first department of insurance (DOI) in 1859

Paul v. Virginia

- In 1869 U.S. Supreme Court review constitutionality of Virginia license law
- Paul applied to become licensed insurer in VA for NY insurers, but VA denied this because insurers had not deposited required foreign insurer bond
- Paul sold policies anyway and was arrested
- Paul appealed conviction to U.S. Supreme court
- Consequences:
    - Insurance is a contract delivered locally thus insurance contract not interstate commerce
    - States could continue to regulate own insurance market without violating Constitution
    - Use of bureau rates are allowed

National Insurance Convention

- In mid-1800s, more insurers operating in several states
- National Insurance Convention (NIC) formed in 1871 and took following actions:

- Developed a constitution setting forth the regulators' goals
- Designed a uniform accounting statement
- Adopted guidelines for insurer taxation
- Adopted first model law which covered items such as Commissioner's duties, regulation of fire, life, and marine insurers

- Early 1900s, insurers began writing auto insurance in addition to property
  - New York amended laws and allowed package policies
  - NIC Fire Insurance Committee defined and determined underwriting profits, earned premium, investment income and reasonable underwriting profits.
  - In 1930s regulators began to see the need for multiline insurers, which were not allowed until after 1945

Pre-SEUA Decision

- Early to mid-1800s, the industry was facing fierce competition and many insolvencies
- Compacts and associations were formed to control rates
- 2 thoughts were prevalent: compacts deter open and free competition; compacts were in the best interests of the public, if it prevented insolvencies
- Late 1800s, antitrust sentiments raised, leading to Sherman Antitrust Act in 1890
  - However, it did not directly apply to insurers because insurance not interstate commerce
  - Nevertheless, it gave states motivation to pass own antitrust laws against controlling rates
- In 1923, NCIC passed resolution to bring about repeal of state anticompact laws

Table 2.1: Timeline of insurance regulation development

1752	First insurer chartered – Philadelphia
Early 1800s	Sporadic state insurance regulation
1869	Paul vs. Virginia
1871	National Insurance Convention
1890	Sherman Antitrust Act
1914	Clayton Antitrust Act
1936	Robinson-Patman Act
1944	South-Eastern Underwriters Association decision
1945	McCarran-Ferguson Act
1972	NAIC: Unfair Claims Settlement Practices and Unfair Trade Practices Act
1999	Gramm-Leach-Bliley Act

§2b SEUA Decision and the McCarran-Ferguson Act

§2b(i) SEUA Decision

- Federal government conducted investigation and criminal indictments for the following activities of SEUA
  - Continuing agreement and concert of action to take control of 90% fire market

- Fixing premium rates and agents' commissions
- Using boycott and other forms of coercion and intimidation to force non-SEUA member to comply
- Withdrawing rights of agents to represent SEUA members if they also represented non-SEUA companies
- Threatening insurance consumers with boycott and loss of patronage if they didn't purchase insurance from SEUA members

- On court, 2 key questions were considered when making the decision:
  - Did Congress intend the Sherman Act to prohibit insurer's conduct of restraining/ monopolizing business?
  - Do insurance transactions across state lines constitute "commerce among several states", which will subject them to Congressional regulation?
- Regarding the 2nd question, the following arguments were made to support it
  - Insurance is not a business that is distinct in each of the states; it is interconnected and interdependent among the states
  - Only 18 out of more than 200 SEUA members were domiciled in only 1 of the 6 SEUA states
  - Intangible products, such as electric impulses of telegraph transmissions, were subject to Congressional regulation
  - Other businesses make sales contracts in states where they do not have headquarters, and these are subject to the Commerce Clause
  - Not a single business conducting business across state lines is beyond the regulatory powers of congress, and insurers should not be an exception

§2b(ii) Reaction to the SEUA Decision

- The immediate effect: Federal legislation now applied to insurance
  - The **Sherman Act** (1890): it prohibited collusion in attempts to gain monopoly power (e.g. Use of bureau rates are not allowed)
  - The **Clayton Act** (1914): it identified and made illegal practices that lessened competition or created monopoly power, including:
    - Price discrimination: **Robinson-Patman Act** required price differences to be justified by reduced operating costs
    - Tying: this required purchase of 1 product to purchase another
  - Necessary cooperation was supported, such as establishing statistical base for adequate rates
  - Consequently, subcommittee on Federal Legislation recommended the following items:
    - Congress must be pressured to enact legislation under Commerce Clause which allows states to continue to regulate insurance
    - Sherman Act and Clayton Act must be amended to allow cooperative arrangements to establish adequate rates and coverages
    - FTC Act and Robinson-Patman Act must be amended to exclude insurance

§2b(iii) McCarran-Ferguson Act (1945)

- This act essentially gave the NAIC and insurance industry what they wanted
- It returned regulation of insurance back to states under the justification that it was in the public interest

- 3 exceptions, which lead to intervention of Federal government:
  - States are not regulating the activities
  - Sherman Act continues to apply to the use of boycott, coercion, or intimidation
  - When Congress passes law that applies only to the insurance industry, it will supersede any state regulation

§2b(iv) Post-McCarran-Ferguson Act

- NAIC and state legislatures began developing and implementing insurance laws to allow cooperation in setting rates and keep Congress from interfering
- Principal concerns for NAIC: promoting equitable ratemaking and preventing unfair trade practices
- 2 model rate regulation bills were approved to support them, to ensure that rates not excessive, unfairly discriminatory, and were adequate; to allow cooperation in setting rates, as long as it didn't hinder competition (i.e. bureau ratemaking is allowed as long as it was regulated by the states)
- To achieve the 2 purposes, the 2 bills did the following:
  - Required prior approval of rates
  - Explained how to file rates
  - Described the role of rating organizations
  - Recommended anti-rebating laws, which prohibits insurers from returning portions of premiums and producers from returning portions of commissions to persons who purchase insurance
- In 1947, NAIC adopted the Act Relating to Unfair Methods of Competition
- Its purpose was to preempt application of the FTC Act to insurance industry
- According to this act, certain activities deemed to be unfair and deceptive:
  - Misrepresentation and false advertising of policies
  - False information and false advertising in general
  - Defamation
  - Boycott, coercion, and intimidation
  - False financial statements
  - Unfair discrimination
  - Rebating

§2c Regulation After McCarran-Ferguson

- 3 types of market failures and imperfections were particularly concerned by the regulations
  - Insurer insolvencies
  - Unavailable and unaffordable insurance coverages
  - Inequitable treatment of insurance consumers

§2c(i) Insurer Insolvencies

- 1969: Guaranty Association Model Act passed, all states currently have guaranty funds

- 1971: NAIC implemented Early Warning Tests program (IRIS), with the goal to prevent need for guaranty fund assessments by taking over insurers and returning them to active operation or merging them with other going concerns
- 1989: NAIC adopted accreditation program to create similar financial solvency regulation standards in all states

§2c(ii) Unavailable and Unaffordable Insurance Coverages

- For availability
  - FAIR plans were formed to construct insurance pool through which private insurers collectively address an unmet need for property insurance on urban properties (e.g. riot or civil commotion)
  - Making laws governing captive insurance organizations
  - Buyers' guides explaining standard policies and option
- For affordability
  - 1968: National Flood Insurance Act
  - 2002: Terrorism Risk Insurance Act (TRIA)
  - 1981: Risk Retention Act (for commercial insurance)

§2c(iii) Surplus lines

- Those insurances are obtained from nonadmitted insurers when protection is not available from admitted insurers
- They provide coverage for risks that are unique, require high limits, or have difficult underwriting characteristics
- By doing so, it helps make unique coverages available and affordable
- Surplus lines are still regulated, although it does not follow same pattern as traditional licensed market
  - Only specially licensed producers are permitted to place surplus lines business
  - Licensee must make placement with unauthorized/nonadmitted insurers that meet specified financial and managerial requirements
  - Before placement can occur, risk must be declined by admitted market through a "diligent search" of state's admitted insurance market
- Key characteristic: rates and forms not regulated; and flexibility to adjust and quickly meet insured's needs
- The role of state surplus lines laws:
  - License producers: typically only available to those who already have P&C license
  - Set forth the financial and other eligibility requirements for nonadmitted insurers
  - Domiciliary jurisdiction also review those insurers for solvency
  - Eligible producers must place business with insurers with adequate capital and surplus
  - Producers must conduct a "diligent search" of licensed market
- Greatest concern for regulators: lack of guaranty fund protection for surplus lines insurers

§2c(iv) Gramm-Leach-Bliley (GLB) Act

- It addressed issue of state vs. federal regulation: each segment of financial services business is regulated separately; states continue to have primary authority over insurance
- GLB Act prohibits state actions that would prevent bank-related firms from selling insurance on same basis as insurance producers
- GLB treats underwriting different from sales and marketing
- Hence, national banks can't form subsidiaries to underwrite insurance, although they can arrange financial holding companies to create insurance affiliates
- Information-sharing among banks and insurance affiliates leads to privacy concerns, which is addressed by requiring banks to disclose information-sharing policies and practices
- GLB also compels states to facilitate insurance producers' ability to operate in more than one state (Producer Licensing Model Act by NAIC)
- GLB creates the following concerns
    - Privacy of personal financial information
    - Ability of state regulation to serve an integrated and global financial services market adequately
    - Consumers' desire or need for integrated financial services

Practice questions

1. The immediate effect of the Southeast Underwriters Association decision was that federal legislation now applied to insurance. Briefly describe the purpose of Sherman Act and Robinson-Patman Act.
2. A recurring issue in insurance regulation has been whether insurance should be regulated by state governments or the federal government. Summarize each of the following events and explain its impact on insurance industry regulation and practices.

   a. Paul v. Virginia

   b. South-Eastern Underwriters Association Decision
3. (CAS exam 6US, 2013 Q4) A multi-line insurer that writes business in multiple states is trying to increase its homeowners market share. The company has proposed the following new strategies:

   - Boycotting insurance agents who also represent other insurers
   - Requiring the purchase of a homeowners policy with the purchase of an auto policy

   a. Describe the impact of the Clayton Antitrust Act on the insurance industry.

   b. Explain how each of this insurer's actions would be addressed under the Clayton Antitrust Act.

   c. Describe the impact of the McCarran-Ferguson Act on the regulation of insurance.

   d. Explain how each of this insurer's actions would be addressed under the McCarran-Ferguson Act.
4. (GIFREU 2014 fall Q18 (a)) Explain why the McCarran-Ferguson Act was necessary to affirm the right of states to regulate insurance.
5. (GIFREU 2016 spring Q4) a. Identify two other Congressional acts that the business of insurance was subject to after the SEUA decision that the insurance industry believed would change normal industry practice.

   b. Identify two activities by insurers that are prohibited by the NAIC's Act Relating to Unfair Methods.

   c. Explain how GLB affected regulation of the business of insurance.
6. (GIFREU 2017 fall Q14 (b)) Identify the Act of Congress that was enacted in 1945 as a reaction the Supreme Court's U.S. vs. SEUA decision.
7. (GIFREU 2019 fall Q14) (a) Describe the case of Paul v. Virginia in 1869 with respect to its effect on U.S. insurance regulation.

   In 1942, the South-Eastern Underwriters Association (SEUA) was charged with rate-fixing.

   (b) Explain how the ruling in Paul v. Virginia was used by the SEUA in response to these charges.

   In 1944, the lower court ruling in the SEUA case was appealed to the Supreme Court of the United States (SCOTUS).

   (c) State the SCOTUS decision on the SEUA case.

   In 1945, Congress passed the McCarran-Ferguson Act in response to the SEUA decision.

   (d) Describe the effect of this act on U.S. insurance regulation.

   (e) Describe two exceptions specified within this act.

Solutions to practice questions

1. Sherman Act: to prevent collusion and attempts to gain monopoly power

   Robinson-Patman Act: amended the Clayton Act; limit price discrimination to price differentials that could be justified on the basis of actual operating cost difference due from competing in good faith.

2. a. Paul vs. Virginia: ruling that insurance wasn't interstate commerce and therefore not subject to laws affecting interstate commerce. Impact: regulation of insurance through states, use of bureau rates, ratemaking in concert.

   b. South-Eastern Underwriters Association Decision: ruling that insurance was interstate commerce and therefore subject to federal regulation. Impact: Sherman Antitrust Act applied to insurance and bureau ratemaking not allowed

3. a. Clayton Anti-Trust made illegal activities that lessened competition or created monopoly power.

   b. Boycotting: it is not explicitly addressed by Clayton Act, whereas it is explicitly prohibited by the Sherman Act.

   Requiring purchase of both homeowners & auto policies: this is tying of purchases, which is explicitly prohibited by Clayton Act.

   c.

   - Returned insurance to the states.
   - Federal regulations still apply in boycotting, intimidation and coercion per Sherman Act.
   - Bureau ratemaking is allowed, as long as it was regulated by the states.
   - Federal regulation still takes precedent in any law specifically regarding insurance and to the extent not regulated by the states.

   d. Boycotting: Explicitly prohibited by Sherman Act which is still applicable per McCarran-Ferguson Act.

   Requiring purchase of both homeowners and auto policies: Not explicitly addressed by Sherman Act. It is addressed by the Clayton Act or would be handled by state insurance law/statutes.

4. In the SEUA case in 1944, the U.S. Supreme Court determined that insurance was commerce under the Constitution's Commerce Clause and was subject to federal regulation (including antitrust laws). The McCarran-Ferguson Act moved regulation back to the states. It was deemed to be in the public interest to have state regulation of insurance.

5. a. Sherman Antitrust Act, Clayton Antitrust Act, Robinson-Patman Act

   b. Misrepresentation and false advertising of insurance policies, false financial statements, unfair discrimination

   c.

   - GLB prohibits state actions that would prevent bank-related firms from selling insurance on the same basis as insurance producers.
   - GLB compels states to facilitate insurance producers' ability to operate in more than one state.

6. McCarran-Ferguson Act

7. (a) Paul applied to become a licensed insurance agent in Virginia to represent foreign insurers. Virginia denied his application. Paul proceeded to sell the policies and was then arrested and convicted. He appealed his conviction.

   The Supreme Court affirmed the lower court's ruling, holding that insurance is not interstate commerce. States were responsible for regulation of insurance.

(b) The SEUA contended only that it was not subject to the Sherman Act because of the ruling in Paul v. Virginia that insurance is not interstate commerce and not subject to Congressional regulation under the Commerce Clause. The state court dismissed the case based on this position.

(c) The Supreme Court accepted the argument that insurance was interstate commerce and subject to federal antitrust laws (Sherman Act, Clayton Antitrust Act, Robison-Patman Act).

(d) The law exempted insurance from federal antitrust rules if it was covered by state regulation.

(e) 1 The Sherman Act applies to insurers' antitrust activities; that is, the federal government has regulatory power over insurers' use of boycott, coercion, or intimidation.

2 Any federal law that applies exclusively to the insurance industry, as opposed to business in general, supersedes any state regulation in the areas addressed by the federal legislation.

Part III

U.S. GI Financial Reporting and Financial Health Measurement

Chapter 20

GIFRT Ch15: Federal Income Taxes for General Insurers

Learning Outcomes

3a) Demonstrate knowledge of U.S. GAAP, U.S. statutory accounting and U.S. tax accounting for general insurance companies.

3b) Describe the elements of the NAIC Annual Statement.

3c) Complete and interpret NAIC Annual Statement pages/schedules (as referenced in the resources).

§20a US Tax law and 2017 reforms

- Tax Cuts and Jobs Act (TCJA) reforms
  - Change in the corporate tax rate from 35% (with a 20% alternative minimum tax (AMT) rate) to a corporate tax rate of 21% (and the elimination of the AMT); affected all industries
    - In most cases, this should result in a reduction of taxes paid
    - However, other reforms in TCJA may offset some of the tax reductions from this reform
  - Introduction of the Base Erosion and Anti-abuse Tax (BEAT); affected all industries (with foreign operations)
    - A new add-on minimum tax for U.S. domiciled companies
    - Intended to minimize the use of offshore operations for the purpose of reducing U.S. income tax
    - The add-on minimum tax is equal to the excess of (10% of modified taxable income (determined without regard to amounts paid, or accrued, to a foreign related party)) over the regular tax
  - Change in the interest rate used for discounting loss reserves from federal midterm rates to high quality bonds; affected GI
  - Lengthening of the payment patterns used for discounting loss reserves (increasing from 15 years to 24 years for some long-tailed lines of business); affected GI
    - Both of these changes will lower the discounted value of reserves
    - This will affect the timing of taxes paid, shifting the tax paid to be sooner than before the reforms
    - Insurers may need to consider the effect of this on DTAs

  - Elimination of the option a company previously had to use its own payment patterns for discounting reserves; affected GI
    - This will affect only those companies that used their own payment patterns
    - The effect will be company-specific
    - This change will ensure consistency in the discount factors used by insurers in computing discounted loss reserves for tax purposes
- US insurers don't receive the full exemption for dividend income because of the proration provision
  - TCJA reduced the corporate tax rate from 35% to 21 %
  - But the rate used in the proration formula increased from 15% to 25%
  - Effective tax rate of 5.25% for dividend income is retained
- Overall, TCJA should reduce taxes
  - With the introduction of the BEAT, these changes will tend to benefit US-based multinational and US domestic insurers over foreign multinational insurers
  - GI need to reorganize company structure to optimize tax benefits

§20b Taxable income for insurers

- For insurers, taxable income includes adjustments to reported income for premium revenue and loss accounting
  - Premium revenue accounting depends on 3 items
    - Whether expenses are deferred and matched to premium income or are written off when they are incurred
    - When WP are recorded
    - When premiums are earned
  - Loss accounting depends on 3 items
    - The valuation rate at which unpaid losses are discounted
    - What potential additions to or offsets to unpaid losses are recognized upfront
    - Whether tax liabilities on the investment income on assets backing unpaid losses are offset by tax refunds on the unwinding of the implicit interest discount on the unpaid losses
- For US insurers, taxable income is derived by adjusting reported statutory income
- TA often prescribes faster recognition of written and earned premiums and longer expense deferral, thereby increasing current taxable income
- DTA/L is created by timing differences between SAP and tax accounting (TA)
  - Statutory income = EP - commission
  - TA income = statutory income + revenue offset (20% change in UEP)
  - DTA = $\tau\times$ (TA income - statutory income)
- TA differs from SAP
  - Premium revenue
    - Revenue offset adjusts premium for a 20% implicit deferred acquisition cost (DAC)
    - WP is booked at the policy effective date, not when it is billed
    - EBUB and ARP are estimated at the policy effective date, not when audits and retrospective adjustments are done

- Incurred losses
  - Statutory statements use full-value loss reserves, taxable income uses (tax-basis) discounted reserves
  - SAP uses the insurer's own anticipated salvage and subrogation, whereas TA adds the insurer's own anticipated salvage and subrogation and deducts a provision using industry factors
  - The incurred loss offset to taxable income is reduced by the operation provision

- Tax liability and DTA affect distributable earnings used for pricing long-tailed, reinsurance and claim commutation
- Recognition of deferred tax depends on regulatory system
  - Admitted DTA is capped at 0 for low RBC ratio and 30% for high RBC ratios

§20b(i) Revenue offset in US TA

- For short-duration GI contracts, EP is revenue for GAAP, SAP and TA income
- Expense is deduction from income, and timing of expense determines pattern of income
- Loss is incurred at the same rate as premium is earned
  - GAAP/SAP earn premium as insurance protection is provided
- Expenses occur before premium is earned, but GAAP defers part of expenses, slowing pattern of income recognition
  - This matches expense with revenue, better reflecting economic value, but doesn't reflect value of insurer should it cease operations
  - In contrast, SAP is more focused on liquidation value, not economic value
    - GAAP has DAC: revenue = WP - change in EP $\times$ (1-prepaid expense ratio)
    - SAP has no DAC: expense is subtracted from income and coded as a liability in UEPR, reflecting value of insurer if it should cease operations, not its going-concern value
- For TA, all expenses are written off when occur, and 20% of UEP is added back to revenue
  - Premium revenue is

    WP - 80% $\triangle$ UEPR = WP - $\triangle$ UEPR + 20% $\triangle$ UEPR = statutory EP +20% $\triangle$ UEPR
- Recognition of WP independent of EP doesn't affect GAAP or statutory income, but affects TA income
  - Change in WP with no change in EP affects TA income but not statutory income
- Tax computation is indirect, deriving tax revenue from statutory EP
  - Direct method replaces statutory UEPR with an estimate of PV of future CF as 80% of UEPR

Example 1
WP is 10 million; UEPR is 3 million at the beginning of the year and 3.5 million at the end of the year. Statutory EP = 10 million - (3.5 million - 3 million) = 9.5 million. Tax basis EP is computed directly as (1) WP - 80% $\times$ $\triangle$ UEPR or indirectly as (2) statutory EP + 20% $\times$ $\triangle$ UEPR

(1) Direct method: 10 million - 80% $\times$ (3.5 million - 3 million) = 9.6 million

(2) Indirect method: 9.5 million + 20% $\times$ (3.5 million - 3 million) = 9.6 million

§20c Tax basis incurred loss

- CY incurred loss = paid loss + $\triangle$ L/LAE reserves
- TA uses incurred loss = paid loss + $\triangle$ discounted L/LAE reserves

- US TA discounts reserves using Schedule P data; IRS reserve discount factors are by schedule P lines and may be based on data from industry
- For long-tailed casualty business, SAP shows underwriting loss during policy term when accidents occur and shows investment income as claims settle
  - This is conservative and requires more capital, but doesn't reflect economics of business
- Using discounted loss as offset to TA income, IRS taxes economic profit margin, not the statutory underwriting profit margin
- As loss settles, investment income on asset backing the loss reserve offsets amortization of interest discount in reserves
  - Full expected gain/loss realized during the policy term, with in expected gain/loss in subsequent years

Example 1
A policy written on Jan. 1, 20X4, for a premium of 10,000 has one loss on Dec. 31, 20X4, that is paid for 11,576 on Dec. 31, 20X6. Assume that the term structure of interest rates is flat at 5% per annum, the IRS loss payment pattern is the same as the actual loss payment pattern, and the IRS discount rate is 5% per annum.

Statutory accounting shows an underwriting loss of 1,576 in 20X4 and 0 in 20X5 and 20X6.

- The investment income is 10,000 $\times$ 5% = 500 in 20X4, 10,500 $\times$ 5% = 525 in 20X5, and 11,025 $\times$ 5% = 551 in 20X6; the total investment income is 1,576.

- If we assume a 2-year IRS loss payment pattern and a discount rate of 5% per annum, the discounted reserves are 1 1,576 / 1.05^2 = 10,500 at Dec. 31, 20X4. The tax basis underwriting income of -500 offsets the 500 of investment income, and the 20X4 tax liability is 0.

In 20X5, investment income is 10,500 $\times$ 5% = 525.

- The discounted loss reserve on Dec. 31, 20X5, is 11,576 / 1.05 = 11,025. The underwriting loss (or the offset to underwriting income) for tax year 20X5 is the amortization of the interest discount on the reserves, or 11,025 - 10,500 = 525.

- The underwriting loss offsets the investment income, and the 20X5 tax liability is 0.

In 20X6, investment income is 11,025 $\times$ 5% = 551.

- The incurred loss offset to taxable underwriting income in 20X6 is the paid loss plus the change in the discounted loss reserve, or 11,576 (paid on Dec. 31 , 20X6) + (0 - 11 ,025) = 551.

- This is the amortization of the interest discount on the Dec. 31, 20X5 reserve. It offsets the investment income in 20X6, and the tax liability is 0.

§20d US tax: IRS procedure for Tax basis loss reserves

- IRS tax basis discounted loss reserves are determined from
  - Undiscounted loss reserves (Schedule P)
  - Tax basis loss reserve discount factors by line of business, promulgated each year by the IRS based upon
    - An interest rate selected annually by the IRS based upon the corporate bond yield curve
    - Loss payment patterns by line of business derived from industry Schedule P data, as selected by the IRS
- If loss reserve in Schedule P part 1 is discounted, then loss may be grossed up before applying IRS discounting procedure
  - The adjustment is normally for tabular discounts, as Schedule P part 1 is gross of non-tabular but net of tabular discount

- Discounted IRS loss reserves may not be $>$ loss reserves shown in AS (as permissible discount rate for SAP is rarely $>$ that used for IRS)
  - Exception is workers compensation prior year row

§20d(i) IRS interest rate for loss reserving discount

- IRS interest rate varies by AY, not CY, and the rate is fixed and applies to that AY's loss in all future CY
  - Under the TCJA, the interest rate is now based on a higher-yield corporate bond yield curve (on investment-grade corporate bonds with varying maturities)
  - The duration for this rate has not yet been specified
  - This change will increase the IRS interest rate for loss reserve discounting, thus lowering the reserves and increasing the current tax liability
  - The interest rate used to set the pre-TCJA factors was 1.46%, as published in the Revenue Procedure 2018-13, comparing with an estimated corporate bond yield of 3.5% over the same time
- IRS perspective is that the insurer uses the premium CF to purchase fixed income securities during the PY to fund future loss payments
  - The yield on the fixed-income securities is fixed at the date of purchase
  - If the duration of the assets backing the reserves matches the duration of the loss liabilities, the losses will be paid from the coupon income and the principal repayment from these securities
  - As such, the yield during the AY is viewed as the relevant investment yield throughout the life of the policies

§20d(ii) IRS loss payment patterns for loss reserve discounting

- Reserve discounting use CY payment patterns for AY reserves
- IRS uses annual periods, assumes payments on July 1 each CY
- Thus, discounted loss reserves are full value loss reserves multiplied by

$$p_1/(1+r_f)^{0.5} + p_2/(1+r_f)^{1.5} + p_3/(1+r_f)^{2.5}$$

  where p_i are % paid in subsequent CY$_i$, and r_f is the risk-free rate
- Pre-TCJA, IRS procedure limited loss payment patterns to 10 years because it was based upon Schedule P data (limited to 10-year loss triangles)
  - Pre-TCJA IRS procedure provided for a 5-year extension beyond 10 years for some long-tailed lines
  - TCJA now extends the loss payment pattern to 24 years in total for some long-tailed lines

General approach for selecting loss payment patterns

- p_x across the payment years for a future AY represents the expected loss payment pattern, which is unknown and needs to be estimated
- There is no one standard actuarial methodology for selecting expected loss payment patterns
- 2 approaches are typically used
  - A triangle of paid-to-ultimate ratios using the paid loss triangle divided by the estimated ultimate losses by accident period
  - The inverse of the paid-loss-development factor at each stage of development (taking successive differences to get the p_x values)

- Considerations in the selection by CIA
  - Within a grouping, payment patterns may vary by accident or underwriting period to reflect, for example, changes in legislation, mix of business, reinsurance or claims settlement practices
  - Timing of expected salvage, subrogation, reinsurance recovery, and loss transfer amounts would be considered in the selection of payment patterns
  - Gross, ceded, and net payment patterns are likely to be the same for a given line of business if the insurer's reinsurance is in the form of quota-share reinsurance

Illustration: general approach to select loss payment patterns and discount

Background Consider a relatively homogeneous line of business with the following paid loss development and estimated ultimate incurred information as of year-end 20X5:

Accident Year	*Years of Development*					*Estimated Ultimate Incurred*
	1	*2*	*3*	*4*	*5*	
20X1	137,000	251,200	306,200	335,600	353,400	355,000
20X2	135,800	250,200	306,400	348,800		374,600
20X3	142,000	256,000	324,800			382,100
20X4	138,600	266,600				381,100
20X5	160,800					421,600

From the information given we can produce a triangle of paid-to-ultimate ratios from which we can select the loss payment pattern. For this illustration, we assume that there is no paid development beyond 5 years.

Accident Year	*Percentage Paid by Years of Development*				
	1	*2*	*3*	*4*	*5*
20X1	0.386(=137,000/355,000)	0.708	0.863	0.945	0.995
20X2	0.363	0.668	0.818	0.931	
20X3	0.372	0.670	0.850		
20X4	0.364	0.700			
20X5	0.381				
Average	0.373	0.686	0.844	0.938	0.995
Selected	0.373	0.686	0.844	0.938	1.000

The Percentage Paid by Years of Development represents the cumulative loss payment pattern. By using the incremental values of the selected amounts, we get the p_x estimates. Here we have:

p_1	p_2	p_3	p_4	p_5
0.373	0.313(=0.686-0.373)	0.157	0.095	0.062

Alternatively, using the inverse of the of the paid loss development approach we have the following:

Accident Year	*Year-to-Year Development*				
	1 to 2	*2 to 3*	*3 to 4*	*4 to 5*	*5 to 6*
20X1	1.834=(251,200/137,000)	1.219	1.096	1.053	
20X2	1.842	1.225	1.138		
20X3	1.803	1.269			
20X4	1.924				
20X5					
Selected	1.851	1.237	1.117	1.050	1.000
Selected Cumulative	2.686	1.452	1.173	1.050	1.000
Inverse of Cumulative	0.372(=1/2.686)	0.689	0.852	0.952	1.000

By using the incremental values of the inverse of the cumulative loss development factors, we get the p_x estimates. Here we have:

p_1	p_2	p_3	p_4	p_5
0.372	0.317(=0.689-0.372)	0.164	0.100	0.048

Now we calculate the discounted unpaid claims estimate for AYs 20X5 and 20X3. We know that the unpaid claim estimate is the ultimate incurred loss less the cumulative paid loss as of year-end 20X5. It follows that we have unpaid claim estimates of 260,800 for AY 20X5 and 57,300 for AY 20X3. We use the p_x estimates from the development factor approach, assume an annual interest rate for discount of 5%, on average claims are paid in the middle of the year, and no risk adjustment is required.

AY 20X5

Developed 1 year at year-end 20X5. We use p_2 to p_5 to calculate the discount factor.

$[(p_2/\sum p_x)\times(1+r)^{-0.5}]+[(p_3/\sum p_x)\times(1+r)^{-1.5}]+[(p_4/\sum p_x)\times(1+r)^{-2.5}]+[(p_5/\sum p_x)\times(1+r)^{-3.5}]$, where x in $\sum$ is from 2 to 5.

This equals [(0.317/0.628)×0.976]+[(0.164/0.628)×0.929]+[(0.100/0.628)×0.885]+[(0.048/0.628)×0.843] = 0.939.

The discounted unpaid claims estimate for AY 20X5 is then 244,962 (=260,800 × 0.939).

AY 20X3

Developed 3 years at year-end 20X5. We use p_4 and p_5 to calculate the discount factor.

$[(p_4/\sum p_x)\times(1+r)^{-0.5}]+[(p_5/\sum p_x)\times(1+r)^{-1.5}]$, where x in $\sum$ is from 4 to 5.

This equals [(0.100/0.148)×0.976]+((0.048/0.148)×0.929] = 0.961.

The discounted unpaid claims estimate for AV 20X3 is 55,060 (= 57,300 × 0.961).

IRS methodology for selecting loss payment patterns

- Logics of IRS methodology
  - If the payment pattern is assumed to be stable, the percentage of AY 2011 losses expected to be paid in 2012 should be the same as the percentage of AY 2008 losses paid in 2009
  - This percentage is derived from the 2009 Schedule P, which is available by year-end 2010
  - Similarly, we have the following table

Historical Percentage of AY	Estimated Percentage of AY
2000 losses paid in 2009 =	2011 losses paid in 2020
2001 losses paid in 2009 =	2011 losses paid in 2019
2002 losses paid in 2009 =	2011 losses paid in 2018
...	...
2006 losses paid in 2009 =	2011 losses paid in 2014
2007 losses paid in 2009 =	2011 losses paid in 2013
2008 losses paid in 2009 =	2011 losses paid in 2012

- IRS method for selecting the loss payment pattern is based on the contents of Schedule P
  - The reasons why IRS is based on Part 1 not Parts 2 or 3
    - Parts 2 and 3 contain only DCC expenses, not AO expenses, whereas Part 1 contains all LAEs
      - † This is not a strong objection to using Parts 2 and 3 of Schedule P
      - † The historical triangles in Schedule P deliberately exclude AO expenses because they are distributed to AYs by an arbitrary formula

- Parts 2 and 3 are not audited; Part 1 is audited
  - This is not a serious objection
  - The entries for Parts 2 and 3 all appear in Part 1, either in the current Schedule P or in the schedules of previous years
  - The NAIC system of cross-checks ensures that the historical figures in the Schedule P triangles match the figures in Part 1 of previous years
- Use of incremental figures from the Parts 2 and 3 triangles may not give 100% as the total
  - If claims settled more (less) quickly in the most recent CY, the total is more (less) than 100%
  - However, this could be corrected through a normalization procedure
  - IRS could have elected to use the Schedule P Parts 2 and 3 triangles to form payment patterns using the general approach that most actuaries use

- IRS procedure uses the difference in the cumulative paid Joss percentages between successive AY from Schedule P Part 1, including all LAEs
- IRS method uses payment patterns by line of business, as developed by US Treasury, based on industry aggregate data from AM Best's Aggregates and Averages
  - Industry loss payment pattern between AY (Millions) (Data from 2016 AS, Schedule P Part 1), an example

AY	Cumulative Paid by 20X9	Ultimate Incurred Losses	Cumulative Paid to Ultimate Incurred Ratio	Incremental Paid %
(1)	(2)	(3)	(4)	(5)
2007	80,084	80,084	1.000	0.004
2008	80,726	81,080	0.996	0.005
2009	85,241	86,090	0.990	0.005
2010	86,252	87,540	0.985	0.006
2011	87,511	89,383	0.979	0.016
2012	88,284	91,676	0.963	0.038
2013	88,212	95,406	0.925	0.071
2014	85,468	100,112	0.854	0.119
2015	80,692	109,863	0.734	0.302
2016	51,542	119,044	0.433	0.433

  - Column (2): cumulative net paid losses at Dec. 31, 2016 by AY (Schedule P Part 1 column 11)
  - Column (3): ultimate net incurred losses at Dec. 31, 2016 by AY (Schedule P Part 1 column 28)
  - Column (4): ratio of cumulative paid to ultimate incurred losses [= column (2) / column (3)]
  - Column (5): incremental difference of the cumulative ratio in column (4) starting with the last row
    - In the last row, the incremental paid from 0 to 12 months is the cumulative paid at 12 months (43.3%)
    - In the second last row, the incremental paid from 12 to 24 months is the cumulative paid at 24 months (73.4% for AY 2015) - the cumulative paid at 12 months (43.3% for AY 2016) = 30.2%

- If the ratios in column (5) did not sum to 100%, the pattern would be incomplete, and a methodology would be required to accommodate this (e.g., extension of payment pattern to 24 years, like in TCJA for some long-tailed lines)

- Further assuming a discount rate at 6%, we have

AY	Incremental Paid/Incurred Ratio	Cumulative % Paid	Undiscounted % Unpaid	Discounted % Unpaid	Loss Reserve Discount Factor
(1)	(2)	(3)	(4)	(5)	(6)
2007	0.44%	100.00%	0.00%	0.00%	100.00%
2008	0.55%	99.56%	0.44%	0.42%	97.13%
2009	0.49%	99.01%	0.99%	0.93%	94.69%
2010	0.62%	98.53%	1.47%	1.35%	91.90%
2011	1.61%	97.91%	2.09%	1.88%	89.80%
2012	3.84%	96.30%	3.70%	3.33%	90.1 1%
2013	7.09%	92.46%	7.54%	6.88%	91.1 8%
2014	11.92%	85.37%	14.63%	13.37%	91.40%
2015	30.15%	73.45%	26.55%	24.20%	91.12%
2016	43.30%	43.30%	56.70%	52.11%	91.90%

- Column (2) shows the expected incremental percentage paid in each year, as calculated previously using industry Schedule P Part 1 data (column (5) in the previous table)
- Column (3) shows the cumulative percentage paid using a downward summation of column (2) starting with AY for the calculation
  - For AY 2014, column (3) is the sum of column (2) for AY 2014 to 2016
- Column (4), the percentage unpaid at the end of AY, is the complement of the cumulative percentage paid = 100% - column (3)
- Column (5) shows the discounted percentage of losses unpaid at the end of AY, assuming that all losses are paid at midyear
  - We use a formula method to calculate this
    - The formula for AY 2016 in the Schedule P exhibit, which would apply to AY 2018 valued at Dec. 31, 2018, is (30.15% / $1.06^{0.5}$) + (11.92% / $1.06^{1.5}$) +(7.09% / $1.06^{2.5}$) + ... + (0.55% / $1.06^{7.5}$) + (0.44% / $1.06^{8.5}$) = 52.11%
    - he formula for AY 2015 in the Schedule P exhibit, which would apply to AY 2017 valued at Dec. 31, 2018, is (11.92% / $1.06^{0.5}$) +(7.09% / $1.06^{1.5}$) + ... + (0.55% / $1.06^{6.5}$) + (0.44% / $1.06^{7.5}$) = 24.22%.
- Column (6), the loss reserve discount factors = column (5) / column (4)

Negative discount factors

- Can result only if incremental amount paid is also negative in some years
- Replaced by linear interpolation using positive factors on both side
- Negative incremental loss payment stems from quirks of IRS loss reserve discounting procedure, not from actual negative loss payment or data errors
- Negative incremental loss payment % (except for the oldest AY in Schedule P) are not changed, whereas discount factors are changed

Example 1
If the computed loss reserve discount factors for years AY+7, AY+8, and AY+9 are +80%, -35%, and +85%, the negative discount factor of -35% is replaced by the interpolated factor of +80% + (1/2) × (85% - 80%) = 82.5%.

If the computed loss reserve discount factors for years AY+6, AY+7, AY+8 and AY+9 are +70%, -35%, -45% and +85%, the negative discount factors of -35% and -45% are replaced by the interpolated factors of +70% + (2/3) × (85% - 70%) = 80% and +70% + (1/3) × (85% - 70%) = 75%.

- Majority of negative incremental loss payments produce positive but unreasonable loss reserve discount factors

Reserve discounting and risk margins

- Discounting must use estimates for patterns of CF and interest rates which are both subject to uncertainty
- Given the additional uncertainty created by discounting, an already inherently uncertain amount gives rise to the notion that there should be some adjustment for risk (i.e., a risk margin)
- However, even though the IRS tax basis reserves are on a discounted basis, risk margins are not permitted

§20d(iii) Anticipated salvage and subrogation

- Loss reserve that is offset to TA income must be net of anticipated salvage and subrogation
- Unless unpaid loss disclosed in Schedule P is net of salvage and subrogation, IRS assumes they are gross of it and requires a reduction for anticipated amount
- IRS discount of anticipated salvage and subrogation must use industry based discount factors

Computational sequence for IRS loss reserves offset

- 6 steps of computational sequence
  1. Start with net losses and expenses unpaid from Schedule P Part 1 column 24
  2. Add anticipated salvage and subrogation from Schedule P Part 1 column 23
  3. Add the tabular discounts for loss reserves from Note 27
     - Schedule P Part 1 loss reserves are already gross of the nontabular discounts in columns 32 and 33
     - After step 3 in the sequence, we have unpaid losses (net of reinsurance) gross of all discounts and gross of all anticipated salvage and subrogation
  4. Discount the amount from step 3 using the industry loss reserve discount factors published by the Treasury
  5. Discount the anticipated salvage and subrogation amount with the Treasury discount factors for salvage and subrogation
  6. Subtract the discounted anticipated salvage and subrogation (from step 5) from the discounted loss reserves (from step 4) to get the discounted net loss reserves for tax purposes
- Tax is based on incurred loss, and change in discounted net loss reserve is offset to TA income

§20e Tax basis investment income

- Investment income for GI may consist of bond income, stock dividends, capital gains, and interest income

- The principles explained here must be combined with the four nation-specific items to derive optimal investment strategy
  - Marginal tax rates for personal versus corporate taxpayers
  - Asset classes under tax law
  - Tax exemptions by asset class for GI
  - Tax exemptions by asset class for all other investors

§20e(i) Municipal bond interest income

- Exempt from federal income tax; however, insurer doesn't receive full exemption
  - Given that the corporate tax rate is 21 %, the effective tax rate on tax-exempt income is 25% × 21% = 5.25%
- GI have high ratios of capital (after-tax funds) to PH reserves (pretax funds), leading to high ratios of tax-exempt securities to taxable securities
- US GI have large investments in municipal bonds, which stems from the following attributes:
  - GI have higher capital-to-asset ratios than other financial sector companies, and their capital is marketable securities that earn investment income
  - Tax law changes in the 1980s effectively prevented banks from investing in municipal bonds, shifting their holdings to GI
- Effect of proration provision depends on elasticity of pre-tax yield on municipal bonds to demand by GI
  - Even with proration, pre-tax yields on municipal bonds are high

Pretax equivalent yields

- Compare pre-tax equivalent yields (PTEYs) are based on stated pre-tax yields and % tax exemption
  - PTEY = pre-tax investment yield × (1-tax rate of asset)/(1-tax rate for taxable investment)
- For fully taxable investments, the PTEY is the nominal pretax investment yield
- For tax-exempt investments like municipal bonds, the PTEY differs by investor type
  - For non-insurance companies, PTEY = the yield × (1 - 0%) / (1 - 21%) = yield × 126.6%
  - For insurance companies, PTEY = the yield × (1 - 5.25%) / (1 - 21%) = yield × 119.9%
- Nominal pretax investment yields are reported in financial reports
  - Converting municipal bond yields to PTEYs is the easiest way to compare their returns with those of other securities
  - The high percentage of municipal bonds held by GI heightens the importance of the proration provision

§20e(ii) Stockholder dividends

- Double taxation: dividends paid from after-tax earnings, and are taxed again as personal income when received by investors
- Triple taxation occurs when insurer receives common stock dividends issued from another firm and then remits the income to shareholders
  - Results in the imposition of two layers of corporate income tax and one layer of personal income tax on the same income stream

- Corporate taxes are paid by the stock issuer, investment taxes are paid by the stock owner (the insurer)
- Personal taxes are paid by the insurer's investors when they are paid stock dividends from the insurer (the stockholders of the insurer)

- Dividends received deduction (DRD) partly exempts stock dividends received by corporate taxpayers from federal tax to offset effect of taxing an income stream multiple times
  - Exemption depends on relation of dividend paying firm with taxpayer
    - Unaffiliated: taxpayer owns less than 20% of the dividend-paying firm (by shares and voting power), and 50% of dividends received are exempt
    - Affiliated: taxpayer owns at least 20% of the dividend-paying firm but less than 80%, and 65% of the dividends received are exempt
    - Controlled: taxpayer owns at least 80% of the dividend-paying firm, and 100% of the dividends received are exempt
- For insurers, proration provision adds 25% of tax-exempt dividends from unaffiliated and affiliated entities (not controlled)

Dividend- Paying Company	Percentage Ownership	Taxation	Effective Tax Rate for Insurers
Controlled	$\geq$ 80%	100% tax-exempt	0%
Affiliated	20% to 80%	65% tax-exempt + proration	((1-65%) $\times$ 21%) + (25% $\times$ 65% $\times$ 21%) = 10.763%
Unaffiliated	$<$ 20%	50% tax-exempt + proration	((1-50%) $\times$ 21%) + (25% $\times$ 50% $\times$ 21%) = 13.125%

  - For unaffiliated
    - 50% is tax-exempt, so the rest (1-50%) is charged for tax (21%)
    - For insurers, out of the part "escaped" tax, or 50%, 25% proration provision will be charged tax (21%)
    - Thus, the total tax charged is [(1-50%) + 25% $\times$ 50%] $\times$ 21% = 13.125%
- For non-insurers, the proration does not apply, so that the effective tax rate for common stock dividends is 7.0% for affiliated companies and 10.5% for unaffiliated companies
- PTEY is similar to that of bond, assuming personal tax of 30% and for unaffiliated firms:
  - For non-insurers, the factor to adjust the dividend yield to the PTEY is (1 - 10.50%) / (1 - 21%) = 113.3%
    - A 2% dividend yield is a 2.27% pretax yield
    - The effective tax rate for the 3 layers of tax (two corporate and one personal) is 1 - (1 - 21%) $\times$ (1 - 10.5%) $\times$ (1 - 30%) = 50.5%
  - For insurers, the factor to adjust the dividend yield to the tax-equivalent yield is (1 - 13.125%) / (1 - 21%) = 110.0%
    - A 2% dividend yield is a 2.2% PTEY
    - The effective tax rate for the 3 layers of tax (two corporate and one personal) is 1 - (1 - 21%) $\times$ (1 - 13.125%) $\times$ (1 - 30%) = 52.0%

DRD limit

- DRD is limited by the DRD tax exemption rate $\times$ min(dividends received, preliminary taxable income)

- Preliminary taxable income refers to taxable income before recognition of any net operating losses, capital loss carrybacks and DRD itself

Example 1
Company A, receives a 200,000 dividend from an unaffiliated company, Company B. Ordinarily, the DRD for Company A would be 50% of the dividend or 100,000. However, if Company A had a preliminary taxable income of only 100,000, the DRD is limited to 50,000 (50% $\times$ 100,000).

- This limit applies to both insurance companies and non-insurance companies
  - Whenever this limit applies, the effective tax rate is greater than what it would have been without the limit

Example 2
An insurer receives a 200,000 dividend a company, of which it has less than 80%, but greater than 20% ownership. Ordinarily, the DRD would be 65% of the dividend, or 130,000. With proration, the insurer's effective tax rate for the dividend received is 10.763%. However, if the insurer had a preliminary taxable income of only 100,000, the DRD is limited to 65,000. This effectively reduces the DRD rate to 32.5% (= 65,000 / 200,000). Considering proration, the insurer's effective tax rate for the dividend received would then be ((1 - 32.5%) $\times$ 21%) + (25% $\times$ 32.5% $\times$ 21%) = 15.881%

- Note: proration provision doesn't apply to DRD, but does apply to the tax part

§20e(iii) Taxation of capital gains

- Realized capital gain is sale of an asset for $>$ ledger value
  - SAP ledger value of bonds is par value if it was bought at par or amortized value otherwise
  - GAAP ledger value (for bonds classified as available for sale) is purchase price
- Personal tax rate for realized capital gains on common stock depends on holding period
  - $>$ 1-year, long-term tax
  - $<$ 1-year, regular tax rate as that for other personal income
- Corporate tax rate is the same as that on operating income, but offset rules differ
  - Long-term capital loss can offset only capital gains, not operating gains
  - Short-term can offset both
- The carryback and carryforward provisions for realized capital losses for corporate taxpayers are similar to the provisions for operating losses
  - Except that net capital losses may be carried back up to 3 years and carried forward up to 5 years

§20f Alternative minimum income tax (AMIT)

- Under AMIT, tax authority sets a lower bound on tax liability that ignores certain tax exemptions preventing firms for individuals from escaping too much tax
- 2 forms
  - Add-on minimum tax: tax liability = regular income tax + add-on minimum tax
    - Add-on minimum tax = (tax preference - any exemption) $\times$ minimum tax rate
    - Minimum tax rate generally $<$ regular rate)
  - Alternative tax calculation: tax liability is max(regular income tax, alternative tax)
    - Alternative tax = [(regular taxable income + tax preference) - any exemptions] $\times$ alternative minimum tax rate

- AMT differ across countries
  - In US, AMT applies to personal taxpayers only and uses an alternative tax calculation
    - TCJA of 2017 eliminated the AMT for corporate taxpayers
    - However, it did introduce the base erosion and anti-abuse tax (BEAT) which acts as an AMT for corporations that "erode" their tax base through payments to foreign related parties
    - BEAT is an add-on minimum tax
  - In Canada, alternative minimum tax applies to personal taxpayers only
  - In India, the minimum alternative tax applies to corporate taxpayers only
  - In Taiwan, the alternative minimum tax applies to both corporate and personal taxpayers
  - In Argentina, there is an asset tax on corporations which acts as an add-on minimum tax
  - In Australia, China, Hong Kong, and the United Kingdom, there is no AMT

§20g Deferred taxes for US GI

- Incurred taxes = taxes paid + change in taxes due - change in tax refunds
  - Incurred taxes appear on IS (both GAAP and SAP), incurred taxes relating to taxes for current year are termed current tax liability
  - Tax refund is admitted asset
- If revenue (or expense) is allocated to a period, taxes paid on those should be allocated to same period
  - GAAP and SAP allocate the prepaid expenses to different periods, and they should allocate the taxes on prepaid expenses to those periods
  - DTA/L align allocation of taxes to allocation of pre-tax income
- Gross DTA/L are same for GAAP and SAP
  - Gross DTA is DTA including both admitted and nonadmitted portions under SAP
- DTA/L are specific to accounting system
  - None exists for TA
  - If the accounting system accrues income faster (slower) than TA, it has DTL (DTA)
- If book income $<$ TA income, DTA = (TA income - book income) $\times\tau$
  - DTA/L will be reversed in the future

Example 1
Suppose a project has total income (i.e., revenue - expenses) of P over the 2-year period covering 20X5 and 20X6. The amount P can be considered to be 100% of total income. Book income, as a percentage of P, is B in 20X5 and 1 - B in 20X6, and taxable income, as a percentage of P, is T in 20X5 and 1 - T in 20X6. The tax rate is given by τ. 2 definitions exist for after-tax income, and deferred taxes reconcile the definitions.

· In theory, after-tax income = pretax income $\times$ (1 - τ), so the after-tax book income, as a percentage of P, should be B $\times$ (1 - τ) in 20X5 and (1 - B) $\times$ (1 - τ) in 20X6

· In practice, financial statements define after-tax income = pretax income - incurred taxes, so the after-tax book income shown, as a percentage of P, is B - T $\times$ τ for 20X5 and (1 - B) -(1 - T) $\times$ τ for 20X6

· If book income is less than taxable income, there is a DTA equal to (taxable income - book income) $\times$ τ

· If book income is greater than taxable income, there is a DTL equal to (book income - taxable income) $\times \tau$

Assume that all income is taxed at a single rate of T and that no tax-exempt income exists. The taxpayer has a DTA, as a percentage of P, the first year of (T - B) $\times \tau$ or a DTL of (B - T) $\times \tau$, which reverses in the second year

- DTA/L is different from tax refunds/due, as they are not future CF
  - DTA/L are accounting entries to align pre-tax income with incurred taxes
  - They are not receivable or payable
  - No tax right or liability exists from them
- Tax accounting differentiates between timing differences and permanent differences
  - Timing differences: between book accounting and TA that reverse in later periods, create DTA/L
  - Permanent: differences in tax rates by source of revenue, don't reverse and won't create DTA/L
- Deferred tax is measured from BS (not IS), which is difference between GAAP/SAP BS and TA BS
  - Thus, unrealized capital gains/loss cause DTA/L, since they are BS values

Unrealized capital gain/loss

- Ledger entries stem from transactions: purchase of bond, or amortization of a bond
- Ledger entries flow through IS, so that they don't give rise to unrealized capital gain/loss
- Change in MV of a bond or stock share is a non-ledger entry
  - For stocks, ledger value is cost and book value is MV
    - Change in MV - cost from previous year to current year is unrealized capital gain/loss
  - For bonds, GAAP ledger value is cost, and SAP ledger value is amortized cost
    - GAAP/SAP book values depend on bond grade
      - † GAAP: MV if the bond is classified as available for sale or held for trading, and amortized cost if the bond is classified as held to maturity
      - † SAP: amortized cost if the bond is investment grade and in good standing, MV otherwise
  - For investment grade bonds, SAP ledger value = book value, so that unrealized capital gain is 0
    - GAAP unrealized capital gain for available for sale bonds are like common stocks
- Unrealized capital gain is admitted on SAP and GAAP, though they don't flow through IS, but direct charges to surplus
- For tax purposes, capital gain/loss is not part of income until realized
  - Unrealized capital gain (loss) creates DTL (DTA), as they increase (decrease) book value

Illustration: deferred tax and capital gain

- In summary
  - When assets are sold, book value = ledger value = 0, as not assets are held
  - Cumulative unrealized capital gain/loss = 0, DTA/L = 0

Background An insurer buys common stock for 50 million on Dec. 31, 20X4. Its MV moves to 40 million on Dec. 31, 20X5, and 60 million on Dec. 31, 20X6. It is sold for 80 million on Dec. 31, 20X7. We calculate for each year the realized and unrealized capital gains and losses and the DTA/Ls.

The accounting entries at purchase in 20X4 are a credit to cash of 50 million and a debit to common stock of 50 million; there is no effect on IS or on surplus.

CY 20X5 The realized capital gain is 0, since the stock has not been sold. The unrealized capital gain(loss) is the change in the difference between MV and book value

- On Dec. 31, 20X4, market value - book value = 50 million - 50 million = 0
- On Dec. 31, 20X5, market value - book value = 40 million - 50 million = -10 million
- Unrealized capital gain/loss = -10 million - 0 million = -10 million; this represents a 10 million unrealized capital loss

Assets have declined by 10 million in value. If the stock were to be sold, the insurer would have an income loss of only 7.9 million (if the capital loss offsets other capital gains), and the company's tax liability would be reduced by 2.1 million. There is a 2.1 million DTA on the 20X5 BS.

CY 20X6 The realized capital gain is 0, since the stock has not been sold. The unrealized capital gainloss) is computed as follows:

- On Dec. 31, 20X5, MV - book value = 40 million - 50 million = -10 million
- On Dec. 31, 20X6, MV - book value = 60 million - 50 million = +10 million
- Unrealized capital gain(loss) = +10 million - (-10 million) = +20 million; this represents a 20 million unrealized capital gain

The company's BS is 20 million stronger than it was a year earlier. However, if the stocks were sold now, the company would realize a gain of only 17.4 million compared to the previous year, since 4.6 million would go to taxes. The change in the DTA/Ls is a credit (a liability) of 4.6 million. Since the insurer began with a DTA (a debit) of 2.1 million, it now has a DTL (a credit) of 2.5 million.

CY 20X7 The company sells the stock for 80 million. The difference between MV and book value of the stock after the sale is 0 (since there is no more stock on the balance sheet). The unrealized capital gain(loss) is computed as follows:

- On Dec. 31, 20X6, MV - book value = 60 million - 50 million = +10 million
- On Dec. 31, 20X7, MV - book value = 0 million (after the stock sale).
- Unrealized capital gain(loss) = 0 million - (+10 million) = -10 million; this represents a 10 million unrealized capital loss

When the stock is sold:

- Cumulative unrealized capital gain is 0
- Realized capital gain, which is the sale price minus the purchase price, is +30 million
- DTAs and DTLs are 0

§20g(i) Admissibility of DTA in SAP

- Expected tax refund has no credit risk, so it is always admitted
- SAP BS shows the same gross DTA as GAAP BS
- Both GAAP and SAP use valuation allowances to reduce DTAs for the portions that will not be realized
    - SAP uses a "more likely than not" rule: a gross DTA must have a probability of 50% or more of being realized

- GAAP has a less onerous rule: the valuation allowance reduces the DTA if it is probable that the DTA will not be realized

- 3 criteria in SAP to recognize DTA, which have value by offsetting other tax liabilities
  - Past taxes paid
  - Financial strength combined with expected reversals
  - DTLs

Admitted DTA: past tax paid

- Tax paid in past years can be offset by DTA within tax carryback period
- Those DTA offset tax already paid, so they can definitely be collected, with 2 limits
  - Tax law limits tax carrybacks: if tax loss will expire at the end of next year, only DTA reverse in 1-year can be admitted
  - SAP limits admission to 3 years: only DTA reverse in 3-years is admitted

Admitted DTA: financial strength combined with expected reversals

- Many DTAs are recurring, offsetting entries
  - If the insurer remains solvent, the reversal of the DTA is offset by a new tax liability
  - If the insurer becomes insolvent in some CY, it will not pay taxes then or offset other tax liabilities
- Admitted DTA varies with 3 items
  - Financial strength of insurer
  - Expected time for DTA to reverse
  - SAP surplus not including DTA
- Insurers are classified by adjusted surplus (= ratio of (RBC adjusted surplus - DTA) / ACL)

NAIC RBC Ratio to ACL	Reversal Time	Ratio to Surplus
More than 300%	3 years	15%
200% to 300%	1 year	10%
Less than 200%	0 years	0%

- Ratio to surplus is the limit on admitted DTA (as a ratio to surplus without DTA)

Admitted DTA: DTLs

- Gross DTAs are admitted if they can be offset by existing DTLs, even if insurer doesn't meet RBC ratio requirement or hasn't paid past tax

DTAs from loss reserve discounting

- Admission of DTA from loss reserve discounting depends on RBC ratio, which depends on reserving risk charge
- Computation of DTA from loss reserve discounting depends on
  - IRS loss reserve discount factors by AY and lines for current and future valuations
  - Loss payment pattern by lines
  - RBC ratio

- For each AY and line, need IRS loss reserve discount factors at the current statement date and next 3 statement dates (those are known with certainty)
    - Also need % of reserves by AY and lines will be paid during next 12 months or 3 years (those are actuarial estimates)
- SAP incurred loss is paid loss + change in undiscounted loss reserves
    - TA incurred loss is paid loss + change in discounted loss reserves
    - Their difference is the timing difference, and gross DTA is 21% of this difference

Illustration: DTA from reserve discount

- In summary
    - Accrued tax is SAP income $\times$ tax rate
    - Tax liability is taxable income $\times$ tax rate
    - Need to know how much DTA is reversed in next year (need to calculate differences between SAP and TA income/expenses in 2 years) to know the admitted portion

Background A policy is issued on Jan. 1, 20X0, for a premium of 1,000 and expenses of 200. Losses of 800 are incurred in 20X0, of which half are paid in 20X0 and half are paid in 20X1. The IRS loss reserve discount factor at 12 months is 90%. For simplicity, we assume the insurer earns no investment income.

- SAP incurred losses in 20X0 are 800 (400 of paid losses + 400 for the change in full value loss reserves)
- SAP income is 0 (1,000 - 200 - 800) and the accrued taxes are 0 (21% $\times$ 0)
- TA incurred losses in 20X0 are 760 (400 of paid losses + 400 $\times$ 90% for the change in tax basis discounted loss reserves)
- TA income is 1,000 - 200 - 760 = 40, and the tax liability is 21% $\times$ 40 = 8.4
- TA income - the income implied by SAP BS is 40 - 0 = 40, for a gross DTA of 8.4 (= 21% $\times$ 40)
    - If the NAIC RBC ratio is at least 200%, the portion of DTA that reverses within 12 months is admitted on SAP BS
    - If the NAIC RBC ratio is 300% or more, DTA that reverses within 3 years is admitted

We examine the statutory income and taxable income for 20X1

- SAP incurred losses in 20X1 are 0 (400 of paid losses plus -400 of change in full-value loss reserves)
    - Premium and expense in 20X1 are 0, so SAP income is 0
    - Accrued taxes are 21% $\times$ 0 = 0
- TA incurred losses in 20X1 are 40 (400 of paid losses plus -360 of change in tax basis discounted loss reserves)
    - Premium and expenses in 20X1 are 0, so taxable income is 0 - 40 = -40
    - Tax liability is 21% $\times$ (-40) = -8.4
- The full difference between statutory and taxable income reverses in 20X1, so the full DTA of 8.4 is admitted on SAP BS as long as the NAIC RBC ratio is 200% or more

For a complete analysis, we must also consider past taxes paid, the size of statutory surplus, and DTLs.

Illustration: loss payment patterns, reserve discount and DTA

For AY 20XX in a given line of business, the loss reserve discount factors are Z_1 at Dec. 31 , 20Y1 and Z_2 at Dec. 31, 20Y2.

- Let R be the held loss reserves for AY 20XX at Dec. 31, 20Y1, the loss reserve discount at Dec. 31, 20Y1, is $R \times (1 - Z_1)$
- Let P be the percentage of AY 20XX reserves paid during CY 20Y2, the loss reserve discount at Dec. 31 , 20Y2 is $R \times (1 - P) \times (1 - Z_2)$. P depends on the company's actuarially estimated loss payment pattern, not the IRS pattern

We compute the gross DTA and the percentage that reverses over the next 12 months for an insurer with an NAIC RBC ratio of between 200% and 300%.

- At Dec. 31, 20Y1 , the difference between statutory and tax basis reserves for AY 20XX is $R \times (1 - Z_1)$, and the gross DTA is $21\% \times R \times (1 - Z_1)$.
- At Dec. 31, 20Y2, the difference between statutory and tax basis reserves for AY 20XX is $R \times (1 - P) \times (1 - Z_2)$, and the gross DTA is $21\% \times R \times (1 - P) \times (1 - Z_2)$
- The admitted portion of the DTA on SAP BS at Dec. 31, 20Y1 is $21\% \times R \times [(1 - Z_1) - (1 - P) \times (1 - Z_2)]$

Background For a given line of business, we have the following information

- AY 20X6 full-value loss reserves at Dec. 31, 20X6, are 165,000
- IRS loss reserve discount factors are 78% at 12 months of development, and 79% at 24 months of development
- Projected paid loss age-to-ultimate factors are 8.0 at 12 months of development, and 5.0 at 24 months of development

At Dec. 31, 20X6

- GAAP and SAP loss reserves (i.e., undiscounted loss reserves) are 165,000
- TA loss reserves are 165,000 $\times$ 78% = 128,700
- The difference between the GAAP and TA loss reserves is 36,300
- The added tax liability from loss reserve discounting is 36,300 $\times$ 21% = 7,623, which is the DTA on GAAP BS

The admitted portion of DTA on SAP BS depends on the portion (estimates) of the loss reserve that will still be unpaid in 1 year's time or 3 years' time. For simplicity, we assume an NAIC RBC ratio of between 200% and 300%.

- At 12 months of development, based upon the projected paid loss age-to-ultimate factors, 12.5% (= 1 / 8.0) of incurred losses are projected to have been paid leaving an estimated 87.5% of incurred losses still unpaid
- At 24 months of development, 20% (= 1 / 5.0) of incurred losses are projected to have been paid and leaving an estimated 80% of incurred losses still unpaid

We expect 91.43% (80% / 87.5%) of AY 20X6 loss reserves at Dec. 31, 20X6, to remain unpaid at Dec. 31, 20X7; this is 165,000 $\times$ 91.43% = 150,857. This times the IRS loss reserve discount factor for AY 20X6 at 24 months is 150,857 $\times$ 79% = 119,179

- The difference between the full-value and tax basis loss reserves at Dec. 31, 20X7, is 150,857 - 119, 179 = 31,678
- The difference that reverses during 20X7 is 36,300 - 31,678 = 4,622
- DTA admitted on SAP BS at Dec. 31, 20X7 is 4,622 $\times$ 21% = 971

DTA from revenue offset

- For annual and semi-annual policies, entire DTA from revenue offset reverse during following year and is admitted on SAP BS for RBC ratios $\geq$ 200%
- DTA doesn't depend on insurer's actual expenses for SAP
- On GAAP, acquisition expense is capitalized on BS and amortized through IS
  - DAC asset depends on actual acquisition expense
  - DTA = (20% - GAAP DAC as a % of WP) $\times$ 21% $\times$ $\triangle$ UEPR
  - if DAC $>$ 20% of WP, GAAP shows DTL

	Prepaid Acquisition Costs		
	$<$ 20% of WP	= 20% of WP	$>$ 20% of WP
Current tax liability	Positive	0	Negative
Statutory DTL	Asset	Asset	Asset
GAAP DTL	Asset	0	Liability

§20h Loss carryovers

- Allow loss in a given year to be used to reduce tax in a profitable year or years
- 2 basic forms
  - Loss carryback: when applies a tax basis net loss in a year retro to a prior year tax basis net income to reduce tax paid in that prior year
  - Loss carryforward: when carries a tax basis net loss in a year forward to be applied to a future year in which insurer produces tax basis net income to reduce tax paid in that future year
- In general, capital loss can offset only capital gain, not operating income
- Time limits of loss carryover from operating loss in US and Canada

	Loss Carryback	Loss Carryforward
Canada	Up to 3 years	Up to 20 years
United States	Up to 2 years	Up to 20 years

- Tax refunds in US are limited to tax paid in previous 2 years, and further operating loss cause a tax loss carryforward
  - There is no DTA/L associated with tax refund from loss carryback
- Preferable for taxpayer to carry back operating loss to older year
- Remaining DTA is carried forward, however, only that can be realized within the next 12 months is recognized on SAP statement

Example 1
An insurer has tax basis operating income of 100 million in 20X1, 500 million in 20X2, -400 million in 20X3 and -900 million in 20X4. The tax liability is 21 million in 20X1 and 105 million in 20X2.

· In 20X3, the 400 million operating loss is carried back to offset the 100 million operating gain from 20X1 and 300 million of the 500 operating gain in 20X2; the total tax refund received is 84 million

· In 20X4, 200 million of the 900 million operating loss is carried back to 20X2, for a tax refund of 42 million

· The remaining 700 million operating loss is carried forward to offset any operating gains in the next 20 years

The loss carryforward of 700 million expires in 20 years.

- The insurer books a gross DTA of 21 % $\times$ 700 million = 147 million if it expects to use the loss carryforward within the next 20 years.

- For its statutory financial statements, the DTA is recognized only if the insurer expects to realize it within the next 12 months.

- If the insurer expects an operating gain of 500 million in 20X5, it recognizes only 105 million of the 147 million DTA on its statutory financial statements.

§20i Methods for determining tax liability in US

- 2 methods
  - Direct methods: derive taxable income from accounting entries
    + WP - 80% of the change in the UEPR
    - Paid losses + the change in the discounted L/LAE reserves
    - Underwriting expenses
    + Tax basis investment income (using proration adjusted tax rate for each asset class)
  - Indirect: adjust SAP underwriting and investment incomes
    + Statutory income
    - Change in the loss reserve discount
    + 20% of the change in gross UEPRs
    - Tax-exempt investment income (after proration)
- 2 methods are equivalent
  - When revenue and exp items are available, direct is easier
  - When SAP income is available, indirect is easier, and it's generally simpler to start with SAP income

§20i(i) Illustration: direct and indirect methods

- In summary
  - SAP underwriting income = EP (= WP - change in UEPR) - incurred L/LAE (=paid L/LAE + change in undiscounted loss reserve) - expense
  - Taxable underwriting income = SAP underwriting income + revenue offset (20% of change in UEPR) + change in loss reserve discount

Background Given the following table of information, we calculate the 20X9 taxable income using both the direct method and the indirect method

Amounts in $ millions (M)	20X8	20X9
Net written premium	850	1,000
UEPR at year-end	500	600
Loss and LAE paid	500	400
Undiscounted L/LAE reserve at year-end	900	1,000
Discounted L/LAE reserve at year-end	700	900
Tax-deductible other expenses		300
Taxable investment income		200

Direct method Taxable income = tax basis EP - tax-deductible incurred L/LAE - tax deductible expenses + taxable investment income

- Tax basis EP = WP - 80% of △ UEPR = 1,000 M - 80% × (600 - 500) M = 920 M
- Tax basis incurred losses = paid L/LAE + △ discounted reserves = 400 M + 200 M = 600 M
- Taxable income = 920 M - 600 M - 300 M + 200 M = 220 M

Indirect method Statutory underwriting income = EP - incurred L/LAE - expenses = (WP - △ UEPRs) - (paid L/LAE + △ undiscounted reserves) - expenses

- Revenue offset = 20% × △ UEPRs = 20% × (600 - 500) M = 20 M
- Loss reserves discount for 20X8 = 900 M - 700 M = 200 M
- Loss reserves discount for 20X9 = 1,000 M - 900 M = 100 M
- The change in the loss reserves discount = 100 M - 200 M = - 100 M
- Taxable underwriting income = 100 M + 20 M + (- 100 M) = 20 M
- Taxable income = taxable underwriting income + taxable investment income = 20 M + 200 M = 220 M

§20i(ii) Illustration: taxable investment income and taxable income

Background

- Premium volume is growing 10% a year, with no changes in policy types or premium booking practices
- All dividends received are from unaffiliated companies
- The average loss reserve discount factor is 90% for valuation dates of both Dec. 31, 20X0 and Dec. 31, 20X1
- There are no payments to foreign related parties
- Amounts in the tables are in millions

Statutory underwriting gain (loss) for 20X1	(400)
Taxable interest income for 20X1	400
Municipal bond interest income for 20X1	600
Dividends received for 20X1	200
Realized capital gains for 20X1	100
UEPR at Dec. 31, 20X0	2,000
UEPR at Dec. 31, 20X1	2,200
L/LAE reserve at Dec. 31, 20X0	4,000
L/LAE reserve at Dec .31, 20X1	4,200

A common approach is to use the indirect method for computing taxable underwriting income (starting with statutory underwriting income) and the direct method for computing taxable investment income.

Taxable investment income is:

+ 400 Taxable interest income
+ 100 Net realized capital gains
+ 100 Taxable portion of dividends received (= 50% × 200 million)
+ 150 Prorated portion of tax-exempt interest income (= 25% × 600 million, bond)

+ 25 Prorated portion of DRD (= 25% × (50% × 200) million, note that preliminary taxable income is higher than dividend)

= 775 Taxable investment income

Taxable underwriting income = statutory underwriting income + revenue offset + the adjustment for loss reserve discounting

- The revenue offset is 20% of the change in the UEPR, and the change is 200 million, of which 20% is 40 million
- The loss reserve discount is 4 billion × (1 - 90%) = 400 million at Dec. 31, 20X0
- 4.2 billion × (1 - 90%) = 420 million at Dec. 31, 20X1
- The change is 20 million

Taxable underwriting income =

+ -400 Underwriting gain(loss)

+ 40 Revenue offset: 20% of increase in UEPR

+ 20 Adjustment for loss reserve discounting

= -340

Total taxable income = -340 + 775 = 435 million, and tax is 91.35 million (= 21% × 435 million).

Data sources for determining tax liability in US

- Premiums
  - EP is on page 4 (IS), line 1
  - Revenue offset adjustment is determined from the UEPRs for the current and previous years on page 3 (BS liabilities), line 9
  - Premium figures are also in UIE Part 2
  - WPs (for the direct method) are in UIE Part 1, column 1, either by line or the total on line 35
- Incurred loss
  - Incurred loss and loss adjustment expenses (L/LAE) is on page 4 (IS), lines 2 and 3
  - Change in the discount is taken from Schedule P Part 1, column 24 (by line and AY), grossed up for tabular discounts and anticipated salvage and subrogation, along with the IRS loss reserve discount factors
  - For the direct method, paid losses are in UIE Part 2, column 4
- Expenses incurred
  - Expenses incurred are on page 4 (IS), lines 3, 4, and 5
- Investment income: in the Exhibit of Net Investment Income
- Other income: on page 4 (IS), lines 12, 13, and 14

Practice questions

1. Briefly explain how IRS tax basis discounted loss reserves are determined.
2. Identify the six steps in the computational sequence for IRS loss reserves offset.
3. Explain how the triple taxation occur for stockholder dividends distributed by insurers.
4. Compare the two forms of alternative minimum income tax.
5. Contrast the direct and indirect methods in determining tax liability in US.

   [Note: SOA past-year questions may cover contents out of the current syllabus]

6. (SOA GIFREU 2014 spring Q8) You are given the following accounting items for Nola Insurance Company (NIC):

Accounting Item	Amount (000)
Unearned Premium Reserve as of Dec. 31, 2012	4,000
Unearned Premium Reserve as of Dec. 31, 2013	4,200
Statutory Underwriting Gain (Loss) 2013	(400)
Taxable Interest Income 2013	400
Municipal Bond Interest Income 2013	600
Dividends Received 2013	200
Realized Capital Gains 2013	100
Statutory Loss and Loss Adjustment Expense Reserve as of Dec. 31, 2012	4,000
Statutory Loss and Loss Adjustment Expense Reserve as of Dec. 31, 2013	4,600

   - NIC operates in the U.S. and only writes allied lines business.
   - The annual discount rate set by the Treasury Department for 2012 is 2.5%.
   - The annual discount rate set by the Treasury Department for 2013 is 4.0%.
   - The tax basis average reserve discount factor for the loss and loss adjustment expense reserve as of Dec. 31, 2012 is 0.98.
   - For the loss and loss adjustment expense reserve as of Dec. 31, 2013, 1.2 million is for accident year 2012 and 3.4 million is for accident year 2013.
   - Assume that the tax basis loss payment pattern for this line of business is 50% in the year of the loss occurrence, 30% in the first year following the year of occurrence and 20% in the second year following the year of occurrence (using mid-year loss payments).

   (a) Calculate the tax basis average reserve discount factor for the loss and loss adjustment expense reserve as of Dec. 31, 2013.

   (b) Calculate regular taxable income for NIC in 2013.

   General insurers tend to include a greater proportion of municipal bonds in their investment portfolios than other investors.

   (c) Explain the rationale for this.

7. (SOA GIFREU 2014 fall Q7) (a) Describe the purpose of deferred tax assets and liabilities (DTA/L) in financial reporting.

   (b) Compare the treatment of DTAs and DTLs in statutory accounting.

   (c) Describe the proration provision of the 1986 Tax Reform Act.

   (d) Describe the Dividends Received Deduction (DRD). Include the purpose of the DRD in your response.

Tax accounting uses discounted reserves. The loss reserve discount factors are derived from Schedule P data and a methodology set by the Internal Revenue Service (IRS). You are given the following table of data for a line of business with information from Schedule P - Part 1 of an insurer's 2011 Annual Statement. This data is to be used to compute the loss reserve discount factors for accident year 2013.

Accident Year	**Losses & LAE Paid**	**Losses & LAE Incurred**
Prior	200,000	200,000
2002	220,000	220,000
2003	240,000	240,000
2004	300,000	300,000
2005	294,000	300,000
2006	279,000	300,000
2007	272,000	320,000
2008	270,000	360,000
2009	234,000	360,000
2010	190,000	380,000
2011	100,000	400,000

(e) Calculate the IRS loss reserve discount factor that applies to accident year 2013 at 48 months of development (i.e., as of December 31, 2016). Assume a 5% annual discount rate.

8. (SOA GIFREU 2015 spring Q11) U.S. tax accounting, Canadian statutory accounting and International Financial Reporting Standards (under IFRS 4) require the discounting of unpaid loss amounts.

   (a) Compare the process for discounting unpaid losses under these three accounting standards (U.S. tax, Canadian statutory, IFRS 4) with respect to the following:

   (i) Discount rate

   (ii) Risk margins

   (b) Calculate the total Internal Revenue Service (IRS) tax-basis discounted unpaid losses and expenses for U.S. tax purposes given the following information:

AY	Total Net Losses and Expenses Unpaid [Column 24]	Tabular Discount	IRS Loss Reserve Discount Factor
2011	4,000	400	0.92
2012	7,000	900	0.90
2013	9,000	1,200	0.87
Total	20,000	2,500	

   All amounts in the table are in thousands of dollars.

   (c) Describe how the computation of earned premium in U.S. tax accounting differs from its computation in U.S. statutory accounting.

9. (SOA GIFREU 2015 fall Q7 (a)) Explain why the Internal Revenue Service uses Schedule P Part 1 instead of Schedule P Part 3 for the loss payment pattern procedure used in the calculation of tax basis reserves.

10. (SOA GIFREU 2016 spring Q11) Jax General Insurance Company (JGIC) reported a 2015 calendar year loss ratio of 65% and a 2015 accident year loss ratio of 60%.

    (a) (1 point) Explain whether JGIC's loss ratio information for 2015 is consistent with the practice of "reserve strengthening"

You are given the following information for JGIC:

Accident Year	Ultimate Loss Ratio as of Year-End 2014	Ultimate Loss Ratio as of Year-End 2014
2013	40%	40%
2014	50%	50%
2015	n/a	60%

Payment Year	Expected Loss Payment Pattern - Percentage Paid
1st	50%
2nd	30%
3rd	20%

- Historical losses have followed the expected loss payment pattern exactly.
- Losses are paid, on average, in the middle of the year.
- Calendar year earned premiums have been constant at 100 million per year.
- The annual discount rate is 3
- The marginal income tax rate is 35
- Discounting of loss reserves for tax purposes uses the expected loss payment pattern as shown in the above table.

JGIC is interested in the effect loss reserve discounting has on its 2015 income tax liability.

(b) Calculate the difference between JGIC's 2015 income tax liability using discounted loss reserves and its income tax liability using undiscounted loss reserves for accident years 2013 to 2015.

11. (SOA GIFREU 2016 fall Q21) When discounting loss reserves for financial reporting, the following four elements must be determined:

    1. the types of losses that are permitted to be discounted;

    2. the discount rate;

    3. the payment pattern; and

    4. the risk margins, if any.

    Describe the four elements for discounting loss reserves, as noted above, for each of the following accounting standards:

    (i) Canadian accounting as used in the Canadian Annual Return;

    (ii) U.S. IRS tax accounting; and

    (iii) U.S. statutory accounting principles.

12. (SOA GIFREU 2017 fall Q12) (You will need to use Case Study for 2017 fall to attempt this question) R-Dan General Insurance Company (R-Dan) uses its own annual statement data for calculating IRS tax accounting loss reserve discount factors.

    For an approximation of the factor, R-Dan uses the following simplifying assumptions:

    - Cumulative percentage paid amounts by development period should be rounded to the nearest 0.1%.
    - Cumulative percentage paid amounts above 99.6% for a development period should be assigned a value of 100%.
    - Once a cumulative percentage paid amount is 100% for a development period, it is 100% for all later development periods.
    - The annual discount rate is 4%.

Calculate R-Dan's IRS tax accounting loss reserve discount factor for Private Passenger Auto Liability reserves at 48 months of development using 2016 annual statement data and the simplifying assumptions provided above.

13. (SOA GIFREU 2017 fall Q17) You are given the following information for U.S.-based general insurer, B&D Insurance:

    - Taxable operating income of:
        - 13 million in 2013
        - 10 million in 2014
        - 8 million in 2015
    - Taxable operating loss of 40 million in 2016
    - Tax rate of 35%
    - No capital gains/(losses) reported in any of the past five years
    - Any tax refunds are received as cash
    - Any tax liabilities are paid with cash

    (a) (1 point) Determine B&D's tax loss carryover from the 2016 taxable operating loss.

    B&D has a greater than 50% probability of experiencing an operating loss in 2017.

    (b) (2 points) Determine the admitted and non-admitted assets created from B&D's 2016 tax loss carryover from part (a) under U.S. statutory accounting in 2017.

14. (SOA GIFREU 2018 fall Q9) Compare the discounting of loss reserves under U.S. tax accounting to that permitted under U.S. statutory accounting. In your comparison include the following:

    (i) Types of losses that may be discounted

    (ii) Discount rate selection

    (iii) Payment pattern selection

15. (SOA GIFREU 2019 spring Q14) General insurers in the U.S. pay income tax on the dividend income they receive. The amount of this tax is affected by the dividends received deduction (DRD) and the proration provision.

    (a) Provide the rationale behind the DRD.

    (b) Describe the purpose of the proration provision.

    You are given the following information for a U.S.-based general insurer, YYZ Insurance:

    Dividend Income: 800,000 Taxable Investment Income(excluding dividend income): 1,200,000 Operating Income: –1,000,000

    All of the dividend income is from companies unaffiliated with YYZ.

    The corporate federal income tax rate is 21%.

    The rate of the proration provision is 25%.

    The DRD is 50% for dividends received from unaffiliated dividend paying companies.

    (c) Calculate YYZ's federal income tax.

16. **SOA GIFREU 2020 fall Q16**

17. **SOA GIFREU 2021 fall Q9**

18. **SOA GIFREU 2022 spring Q6**

Solutions to practice questions

1. IRS tax basis discounted loss reserves are determined from
   - Undiscounted loss reserves (Schedule P)
   - Tax basis loss reserve discount factors by line of business, promulgated each year by the IRS based upon
     - An interest rate selected annually by the IRS based upon the corporate bond yield curve
     - Loss payment patterns by line of business derived from industry Schedule P data, as selected by the IRS
2. 6 steps of computational sequence
   (a) Start with net losses and expenses unpaid from Schedule P Part 1 column 24
   (b) Add anticipated salvage and subrogation from Schedule P Part 1 column 23
   (c) Add the tabular discounts for loss reserves from Note 27
   (d) Discount the amount from step 3 using the industry loss reserve discount factors published by the Treasury
   (e) Discount the anticipated salvage and subrogation amount with the Treasury discount factors for salvage and subrogation
   (f) Subtract the discounted anticipated salvage and subrogation (from step 5) from the discounted loss reserves (from step 4) to get the discounted net loss reserves for tax purposes
3. Triple taxation occurs when insurer receives common stock dividends issued from another firm and then remits the income to shareholders
   - Results in the imposition of two layers of corporate income tax and one layer of personal income tax on the same income stream
   - Corporate taxes are paid by the stock issuer, investment taxes are paid by the stock owner (the insurer)
   - Personal taxes are paid by the insurer's investors when they are paid stock dividends from the insurer (the stockholders of the insurer)
4. - Add-on minimum tax: tax liability = regular income tax + add-on minimum tax
     - Add-on minimum tax = (tax preference - any exemption) $\times$ minimum tax rate
     - Minimum tax rate generally $<$ regular rate)
   - Alternative tax calculation: tax liability is max(regular income tax, alternative tax)
     - Alternative tax = [(regular taxable income + tax preference) - any exemptions] $\times$ alternative minimum tax rate
5. - Direct methods: derive taxable income from accounting entries
     + WP - 80% of the change in the UEPR
     - Paid losses + the change in the discounted L/LAE reserves
     - Underwriting expenses
     + Tax basis investment income (using proration adjusted tax rate for each asset class)
   - Indirect: adjust SAP underwriting and investment incomes
     + Statutory income
     - Change in the loss reserve discount
     + 20% of the change in gross UEPRs

- Tax-exempt investment income (after proration)

6. (a) For accident year (AY) 2012, use a 2.5% discount rate as it is fixed for the AY. As of year end (YE) 2013 these reserves are entering the second year following the year of occurrence. According to the payment pattern they should all be paid off in 2014. Therefore the AY 2012 discount factor at YE 2013 is $(1.025)^{-0.5}$ = 0.9877.

   For AY 2013, use a 4% discount rate. As of YE 2013 these reserves are entering the first year following the year of occurrence. Payment pattern has 50% being paid off after the year of occurrence in the pattern (30% then 20%). AY 2013 discount factor at YE 2013 is $[(1.04)^{-0.5}] \times (30\%/50\%) \times [(1.04)^{-1.5}] \times (20\%/50\%)$ = 0.9655.

   For reserves at 12/31/2013, the tax basis average reserve discount factor is $(3.4 \times 0.9655 + 1.2 \times 0.9877)/4.6$ = 0.9713.

   (b) Taxable investment income is the sum of:

   - taxable interest income = 400,000
   - the prorated portion of tax exempt interest income = 15% × 600,000 = 90,000
   - the taxable portion of dividends received = 30% × 200,000 = 60,000
   - the prorated portion of the DRD = 15% × (200,000 - 60,000) = 21,000
   - realized capital gains = 100,000

   Taxable investment income = 671,000 (= 400,000 + 90,000 + 60,000 + 21,000 + 100,000)

   Taxable UW income equals statutory UW income plus 20% of the change in the UEPR plus the change in the loss reserve discount

   - statutory UW income is given = -400,000
   - unearned premium reserve change is 200,000, of which 20% is 40,000.
   - reserve discount is 4M × (1 - 98%) = 80,000 at Dec. 31, 2012 and 4.6M × (1 - 97.13%) = 132,000 at Dec. 31, 2013, with a change of 132,000 - 80,000 = 52,000.

   Taxable UW Income = -400,000 + 40,000 + 52,000 = -308,000

   Regular Taxable Income = taxable UW Income + taxable investment income = -308,000 + 671,000 = 363,00

   (c) General insurers have far higher ratios of after-tax to pre-tax cash flows than other financial sector companies, with incentives to invest in tax-exempt securities such as municipal bonds.

7. (a) DTAs and DTLs arise from timing differences, not from permanent differences between tax and statutory accounting.

   (b) Both DTAs and DTLs are shown on the balance sheet, and the change in them is shown as a direct charge or credit to surplus for statutory accounting.

   (c) Insurers do not receive the full exemption for tax-exempt income. The proration provision of the 1986 Tax Reform Act adds 15% of tax-exempt income to their taxable income.

   (d) DRD partly exempts common stock dividends from taxation to offset the effects of double/triple taxation.

   (e)

Accident Year	Months Developed	Paid (000)	Incurred (000)	Cumulative % Paid = (2)/(3)	Incremental % Paid = (4) differences (AYx - AYx+1)
	(1)	(2)	(3)	(4)	(5)
prior		200	200	100.0%	0.0%
2002	120	220	220	100.0%	0.0%
2003	108	240	240	100.0%	0.0%
2004	96	300	300	100.0%	2.0%
2005	84	294	300	98.0%	5.0%
2006	72	279	300	93.0%	8.0%
2007	60	272	320	85.0%	10.0%
2008	48	270	360	75.0%	
2009	36	234	360		
2010	24	190	380		
2011	12	100	400		

IRS loss reserve development factor at 48 months = B/A where

A = Sum of (5), Prior Years to 2007 = 25%

B = $10\%/1.05^{0.5} + 8\%/1.05^{1.5} + 5\%/1.05^{2.5} + 2\%/1.05^{3.5}$ = 23.3%

IRS loss reserve development factor at 48 months = B/A = 23.3/25 = 93.2%

8. (a) (i) Discount rate

   - a. U.S. Tax: the interest rate is now based on a higher-yield corporate bond yield curve (on investment-grade corporate bonds with varying maturities) and is not updated to current rates as claims mature
   - Canadian Statutory: investment yield on assets updated at each valuation
   - IFRS 17: current market rates matched to currency and maturity, and adjusted for illiquidity

   (ii) Risk margins

   - U.S. Tax: no risk margin
   - Canadian Statutory: includes three provisions for adverse deviation (loss development, reinsurance recoverables and discount rate)
   - IFRS 17: explicit adjustment to reflect the uncertainty in the estimate of future cash flows

   (b)

Accident Year	Schedule P unpaid losses	Unpaid losses gross of tabular discount	Discounted	Minimum of Discounted & Schedule P by Accident Year
2011	4,000	4,400	4,400 × 0.92 = 4,048	4,000
2012	7,000	7,900	7,900 × 0.90 = 7,110	7,000
2013	9,000	10,200	10,200 × 0.87 = 8,874	8,874
Total	20,000	22,500		19,874

The total is 19,874,000.

(c) Taxable premium revenue differs from statutory accounting premium revenue by the revenue offset which adjusts premium for a 20% implicit deferred acquisition cost.

9. - Internal Revenue Service stipulates that reserves are to include all LAE. Part 1 includes both AO & DCC whereas Part 3 excludes AO.

- Part 1 is audited whereas Part 3 is not, so Part 1 is viewed as more "reliable".

10. (a)

- Since the 2015 calendar year loss ratio is greater than the 2015 accident year loss ratio, the company incurred amounts on past accident years' claims during 2015. This was either by payments greater than reserved amounts and/or by increasing reserves.
- This pattern would be expected from reserve strengthening. Therefore it is consistent, but not proof of, reserve strengthening.

(b) Amounts in table are in millions.

AY	Nominal Ultimate	2015 Undiscounted Loss Reserves	2015 Discounted Loss Reserves	2014 Undiscounted Loss Reserves	2014 Discounted Loss Reserves
2013	40	=0	=0	$=.2\times 40$ =8	$=8/(1.03^{.5})$ =7.9
2014	50	$=.2\times 50$ =10	$=10/(1.03^{.5})$ =9.9	$=(.3+.2)\times 50$ = 25	$=15/(1.03^{.5})+10/(1.03^{1.5})$ =24.3
2015	60	$=(.3+.2)\times 60$ =30	$=18/(1.03^{.5})+12/(1.03^{1.5})$ =29.2		
Total		40	39.1	33	32.2

Change in Undiscounted Reserves = 40,000,000 - 33,000,000 = 7,000,000

Change in Discounted Reserves = 39,100,000 - 32,200,000 = 6,900,000

Difference in 2015 income tax liability due to the effect of discounting = [7,000,000 - 6,900,000] $\times$ .35 = 35,000

11. 1. Types of business

(i) All lines of business.

(ii) All lines of business.

(iii) Only lines where it is permitted for tabular (WC indemnity for wage replacement on pension or long-term disability claims) and non-tabular (sometimes medical malpractice when permitted by a state's statutory accounting).

2. Discount rate

(i) Based on insurer's investment yield, updated annually.

(ii) The interest rate is now based on a higher-yield corporate bond yield curve (on investment-grade corporate bonds with varying maturities), and the rate is fixed and applies to that AY's loss in all future CY

(iii) For non-tabular discounting, the NAIC prescribes the maximum permitted rate; limited by the lower of Treasury security yields with matched duration and the insurer's own investment yields less 1.5 percentage points. For tabular discounting, the discount rate is set by statute.

3. Payment pattern

(i) Uses aggregate payment patterns by line of business developed from paid loss triangles and ultimate amounts.

(ii) Selected by line from industry Annual Statement Schedule P Part 1 paid to incurred ratios by accident year.

(iii) Tabular payment patterns are based upon mortality/morbidity in the tables selected. Non-tabular payment patterns use aggregate payment patterns for the line of business developed from paid loss triangles and ultimate amounts.

4. Risk margins

(i) Three provisions for adverse deviation are added to the discounted amount for the discount rate, loss development and reinsurance recoverables.

(ii) No risk margin is added.

(iii) There is no specific margin for tabular discounting unless the statutory discount rate is set conservatively to work as a margin. For non-tabular discounting, the margin is from the limit on the discount rate which works as a margin.

12. Use the following data: Paid = Schedule Part 1B column 11, Incurred = Sched P Part 1B column 28.

Calculate incremental paid as follows:

Accident Year	Months Developed	Paid (000)	Incurred (000)	Cumulative % Paid = (2)/(3)	Incremental % Paid = (4) differences (AYx - AYx+1)
	(1)	(2)	(3)	(4)	(5)
2008 & prior	108 & beyond			Assume 100.00%	0.0%
2009	96	163,300	163,600	99.8% so assign 100.00%	0.5%
2010	84	169,000	169,900	99.5%	0.7%
2011	72	176,400	178,500	98.8%	1.7%
2012	60	197,600	203,500	97.1%	4.0%
2013	48	190,500	204,600	93.1%	7.0%
2014	36	180,900	210,100	86.1%	

IRS loss reserve discount factor at 48 months = B/A where

A = Sum of Table Column (5), Prior Years to 2013 = 13.9%

B = $(7.0\%/1.04^{0.5}) + (4.0\%/1.04^{1.5}) + (1.7\%/1.04^{2.5}) + (0.70\%/1.04^{3.5}) + (0.50\%/1.04^{4.5})$ = 13.2%

IRS loss reserve discount factor at 48 months = B/A = 13.2/13.9 = 95.0%

13. (a) Tax loss carrybacks are limited to taxable income in the previous two years (10 million + 8 million). Further operating losses cause a tax loss carry forward. B&D would have a tax loss carryback of 18 million. The remaining 22 million of tax basis operating loss is a tax loss carryforward that can be applied up to 20 years forward.

(b) B&D would receive a refund of 6.3 million (35% of the tax loss carryback of 18 million). This would be an admitted asset of cash during 2017.

The tax loss carryforward would represent an asset of 7.7 million (35% of the tax loss carryforward of 22 million). Under U.S. statutory accounting, this would be accounted for as a non-admitted asset during 2017 because B&D is not expected to use it within 12 months due to the fact that they are likely to incur an operating loss in 2017.

14. (i) For U.S. tax accounting, all losses and LAE are to be discounted.

For U.S statutory accounting, discounting of loss reserves is generally not permitted. It is only permitted for workers compensation indemnity claims (for wage replacement) using tabular discounting. Some states permit non- tabular discounting for medical malpractice loss reserves.

(ii) For U.S. tax accounting, the rate is prescribed by the Secretary of the Treasury.

For U.S statutory accounting:

- the discount rate is set by statute for tabular discounting, and
- the NAIC prescribes the maximum permitted rate for non-tabular discounting

(iii) For U.S. tax accounting, the payment pattern is selected by line from industry Annual Statement Schedule P Part 1 paid to incurred ratios by accident year.

For U.S statutory accounting:

- Tabular payment patterns are based upon mortality/morbidity in the tables selected.
- Non-tabular payment patterns use aggregate payment patterns for the line of business developed from paid loss triangles and ultimate loss amounts.

15. (a) The DRD partly exempts common stock dividends received by corporate taxpayers from federal taxes to offset the effect of taxing an income stream multiple times.

(b) General insurers receive a significant amount of income from municipal bonds that would otherwise be tax exempt. The purpose of the proration provision is to add 25% of tax-exempt income to taxable income for general insurers so they do not avoid tax on a significant amount of their income.

(c) Taxable Income before DRD = –1.0M + 1.2M + 0.8M = 1.0M

Condition A or B have to be met to have an unlimited DRD.

Condition A: Taxable income before DRD $>$ Unaffiliated Dividends Received. Condition B: Taxable income before DRD $<$ Full DRD (before proration).

In this case, Condition A is met (1.0M $>$ 0.8M) so the DRD is not limited. Unlimited DRD before proration

= 50% of Unaffiliated Dividends Received = 50% $\times$ 0.8M = 0.4M

Proration = 25% of tax-exempt income = 25% of DRD = 25% $\times$ 0.4M = 0.1M

DRD after proration = DRD – Proration = 0.4M – 0.1M = 0.3M

Taxable Income = Taxable Income before DRD – DRD after proration = 1.0M – 0.3M = 0.7M

Federal Income Tax = Tax Rate $\times$ Taxable Income = 21% $\times$ 0.7M = 0.147M

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Chapter 45

Practice Exam

Note to Candidates: This practice exam follows the format of the past GIFREU exams, except that there are no case study questions. The total mark is 50 points, which reflects the new SOA requirement that the contents would be two hours and a half, although the permitted time is three hours. Some questions are inspired by past exams of CAS exam 6US and SOA GIFREU.

When you take the exam, stick to the time limit (three hours) and simulate exam conditions. It is recommended that you spend three minutes for each point. At the end of the recommended time, you should stop answering and move to the next question.

Questions

1. (4 points) Answer the following questions.

   (a) (1 point) Briefly explain two circumstances where federal regulation supersedes state regulation with respect to the "business of insurance" under the McCarran-Ferguson Act

   (b) (1 point) Following the passage of the McCarran-Ferguson Act, NAIC approved model bills related to rate regulation. Describe two underlying purposes of the bills.

   (c) (2 points) Identify four functions of the Federal Insurance Office (FIO) as created by the Dodd-Frank Act.

2. (6 points) Given the following information for an insurance company (all figures are in thousands of dollars), answer the questions below.

Schedule P - Part 1: Summary

	Loss Unpaid				Defense and Cost Containment Unpaid				Adjusting and Other Unpaid	
	Case Basis		Bulk + IBNR		Case Basis		Bulk + IBNR			
	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Direct and Assumed	Ceded
Total	15,000	3,000	4,000	400	6,000	700	1,500	100	300	-

Range of Reasonable Loss and Loss Adjustment Expense Reserve Estimates

	Low	High
Net	12,000	20,000
Direct and Assumed	14,000	22,000

The company does not have any retroactive reinsurance contracts.

(a) (3 points) Construct the Loss and Loss Adjustment Expense Reserves section of Exhibit A of the Statement of Actuarial Opinion (SAO).

(b) (2 points) Construct items A through D of the Actuarial Opinion Summary (AOS).

(c) (1 point) Identify and briefly justify the type of opinion that the Appointed Actuary should issue.

3. (5 points) Answer the following questions.

   (a) (0.5 point) Define regulatory forbearance

   (b) (2 points) Identify four causes of regulatory forbearance.

   (c) (1 point) Briefly describe two effects of regulatory forbearance.

   (d) (1.5 points) List two RBC action levels where regulatory forbearance may exist. Briefly explain the reason(s).

4. (4 points) For each of the following items, identify whether it is included in the Statement of Actuarial Opinion (SAO), the Actuarial Opinion Summary (AOS), both, or neither.

   i) Appointed Actuary's best estimate of loss reserves and/or range of reasonable reserve estimates

   ii) The amount of discount included as a reduction to loss reserves

   iii) Company's booked loss reserves

   iv) Materiality Standard for risk of material adverse deviation

   v) Company's range of reasonable reserve estimates

   vi) Amount of surplus

   vii) Name of the Appointed Actuary

   viii) Anticipated salvage and subrogation included as a reduction to loss reserves

5. (4 points) Answer the following questions.

   (a) (0.5 point) Briefly describe the primary goal of the NAIC Analyst Team System.

   (b) (2 points) Identify the four dimensions of the statistical phase of IRIS and give an example of a financial ratio for each.

   (c) (0.5 point) Briefly explain one similarity and one difference between IRIS and the Financial and Solvency Tracking System (FAST).

   (d) (1 point) Briefly describe two limitations of the NAIC Analyst Team System

6. (5 points) The Appointed Actuary should review the three loss reserve adequacy IRIS tests and, if exceptional values occur, comment on the tests in the Statement of Actuarial Opinion.

   Two of those tests are One-Year Reserve Development and Two-Year Reserve Development

   Use the data below to answer the following questions for the third loss reserve adequacy IRIS test, Estimated Current Reserve Deficiency. The values in the table are in thousands.

	2018	2019	2020
Surplus (End of Year)	160,000	170,000	200,000
Earned Premium (End of Year)	170,000	200,000	350,000
Unpaid Loss Reserves	90,000	125,000	190,000
Unpaid LAE Reserves	25,000	50,000	60,000
Unearned Premium Reserves	125,000	150,000	250,000

   Result of One-Year Reserve Development as of December 31, 2006 19.125%

   Result of Two-Year Reserve Development as of December 31, 2006 33.67%

   (a) (3 points) Calculate the result of this test.

