CSP-GH Complete Illustrative Solutions
Spring 2009

1.

Learning Objectives:

6 – Evaluate financial performance measures for companies and plan sponsors
9 – Evaluate the impacts of regulation on company / plan sponsor financial management

Source: Group Insurance (Chapter 16). GH-C107-07: Taxation Canada

Solution:

(a)

Each province has enacted its own legislation affection

- Rights and obligations of insureds / beneficiaries
- Designation of beneficiaries
- Content of contracts and member of certificates
- Administration of contracts and premiums
- Payment of claims
- Requirement on termination
- Requirement on takeover / change of insurer

CLHIA has set minimum standards for group insurance practices pertaining to

- Group insurance plan description for members
- Conversion / continuation privileges
- Change of insurer
- Coordination of COLA in government plans
- Creditor's group insurance

1. **continued**

(b)

Group Benefit	Employer contribution	Benefit
Group term Life	Taxable	Not Taxable
Survivor Income Benefit (SID)	Taxable	Capital not-taxable, but interest taxed
Death benefit paid by the employer	N/A	Taxed, except the first 10K if the spouse is the beneficiary
Accidental Death & Dismemberment (AD&D)	Not Taxable	Not Taxable
Group Disability Income (STD & LTD)	Not Taxable	Taxable if employer has contributed / Not Taxable if employees pay all
Group Health and Dental	Not taxable	Not Taxable
Flexible benefits programs	Credits are not taxable	Benefits are taxed as determined above

2.

Learning Objectives:

2 - Typical markets: Understands customer segments and how products are marketed to each.

Source: Bluhm, Chapters 1 & 2
Individual Health, Chapter 10

Solution:

(a)

Differences

- Entire Group as a whole not Individual when evaluating risk
- Group efficient means of Issuing Coverage, greater number added at any one time
- More efficient means of marketing and delivering insurance
- Marketing cost lower
- Sale not needed for each Individual Insured
- Individual underwriting – or underwriting rules difference
- Administrative expenses are typically lower on a per-participant basis
- Group has minimum participation requirements
- Employers subsidize premium in group
- Individual Health sold through Agents (Personal contact none in Group usually), or through Telephone or Internet; Mass marketing, direct marketing
- Small groups/Individual heavily/differently regulated/mandates
- Group has self-insurance/ASO option
- Group Insurance through Brokers working with HO Sales Reps
- Pre-existing condition differences
- Commission compensation for Group same % each year for
- Individual commissions typically front loaded

Similarities

- Pooling of risks
- Insurable Interest, policyholder and beneficiary both experience loss if event occurs, vested interest in mitigating the risk
- Anti-selection
- Can both be sold through Sales people who work for company (i.e. Captive Agents)
- On renewals for group, sometimes accept less rate than is needed
- Both pay commissions
- Claims and Policy Administration are similar

2. continued

(b)

Traditional Product-Driven approach

- Idea Generation
  - Ideas can come from a number of sources, such as product managers, a product committee, customers, competitors, or employees
- Idea Screening
  - The product ideas are screened to determine which are compatible with the company's strategy, resources, and skills
- Concept Development and Testing:
  - A team refines the concept into a product and questions such as "What are the benefits?" And "Who will buy this?" are answered.
- Business/Financial Analysis
  - Costs are projected, and a return on investment (or return on equity) analysis is done
- Product Development
  - The actual product is given concrete form
- Test Marketing
  - The product is tested in limited real-world markets
- Commercialization
  - Full-scale manufacture and distribution

The Market-Driven Product Process

- Assessment of Target Market Needs
  - A target market is chosen, and market research is done to assess the needs of that markets. Competitive analysis is a critical part of this research.
- Identification of Differential Advantage
  - Since the needs of the buyer and the competition's approach are known, a determination is made how to differentiate one's own product or service from the competition, to better serve the customer's need
- Strategy Formulation
  - A strategy is developed to build and deliver the product, based upon the differential advantage. This is then followed by one of two rollout processes
  - Pre-Test: A limited market test or
  - Full Implementation: The full product implementation begins

3.

Learning Objectives:

14 – Understanding an actuarial appraisal

Source: GH-C103-07 The Actuary and Health Insurance Mergers and Acquisitions

Candidates lost a large number of points in the calculation on this question. A surprising number of candidates were unable to earn credit for the straightforward adjustments to the original estimates. A large number of candidates failed to do much of the acquisition calculation. It appeared that many candidates spent less time on this question than they were expected to.

Solution:

(a)

Key Documents in M&A process

- Offering memorandum
- Actuarial Appraisal
- The "Data Room"
- The Data Request
- Supplemental Info and Sensitivity Analysis
- The Purchase Agreement
- Regulatory Requests
- Reinsurance and Admin Agreements
- The Closing Documents

(b)

Comparable Company analysis

Identify similar companies with similar earnings, capital condition, and subject to similar risks to use in analysis

- Should be large enough to be statistically significant
- Similar to seller's care business (though may differ on low dominant segments)
- Similar performers in similar lines of business (in terms profitability)
    - Financial/operational performance
    - Operational and geographic compatibility
    - Judgment/expertise of banker
    - AM best ratings
    - Stock Price
    - Agency force utilized

3. continued

- Financial, operational market risks analyzed (3 market multiples chosen)
- "Market multiple" = *x*/stock price, where *x* can be GAAP Book value, earnings or some other measure
- The market multiple for the comparable company (e.g. GAAP Book value / stock price) is then multiplied by book value of seller to calculate price
- Price is adjusted by change of control premium that buyer will pay over cost due to branding, customer loyalty, and other intangibles
- Price = (market multiple) × (GAAP Book Value) × (1 + change of control prem)

Comparable Transaction Analysis

- Enough candidates in M&A market nowadays that investment banker can find similar transactions in size and scope to be used
  - Analysis is performed on financial/operational/market metrics
  - Candidate is selected
  - Market multiple is calculated and applied (same as before)
- Understand structural implications

Discounted Cash Flow analysis

- Directly calculate value using present value of future cash flows after tax
- Based on mgmt assumptions
- Generally 5 years
- Discount rate may be WACC, buyers cost of funds rate, internal company hurdle rate, or discount rate set by experiences in M&A market
- Need assumption for GAAP book value, earnings, discount rate, future earnings, etc.

3. continued

(c)

	2009	2010	2011
Premium	12,000,000	24,000,000	36,000,000
Claims	9,000,000	18,000,000	$0.72\times 36M =$ 25,920,000
Reserves	2,250,000	4,500,000	$0.25\times 25.92M =$ 6,480,000
Change in Reserves	2,250,000	2,250,000	1,980,000
Investment Income	600,000	1,200,000	1,800,000
Expenses	$1.2M + 1.5M =$ 2,700,000	$0.9M \times 24M =$ 2,160,000	$0.08\times 36M$ 2,880,000
Commissions	600,000	1,200,000	1,800,000
Pre-Tax Income	(1,950,000)	1,590,000	5,220,000
Tax	741,000	604,200	1,983,600
Post-Tax Income	(1,209,000)	985,800	3,236,400
Pre-Tax Income = Premium – claims – change in reserves + investment income – expenses – commissions			
Required Capital	600,000	1,200,000	1,800,000
Change in Req Capital	600,000	600,000	600,00
Value	(1,809,000)	385,800	2,636,400

Value = post tax income – change in required capital

Discount using wtd avg cost of capital (WACC)

$$WACC = R(d)\times \%\text{Debt} + R(e)\times \%\text{Equity}$$

%Equity = 100%

$$R(e) = R(f) + B\left[R(m) - R(f)\right]$$

$$WACC = 0.05 + 2.75(0.1 - 0.05)$$

$$= 0.1875$$

Discount Cash Flows:

$$\frac{-1,809,000}{1.1875} + \frac{385,800}{1.1875^2} + \frac{2,636,400}{1.1875^3} = 324,602$$

AQC should pay $324,602 for TARGET

3. continued

(d)

Challenges Valuing Insurance

- Impact of statutory accounting on operational decision making
- Long Term liabilities
- Sensitivity to both interest rates and capital markets (both assets and liabilities at times)
- Cyclical nature of insurance (especially P&C and health)
- Varying state and sometimes federal regulations
- Non-market competitors influence (i.e. workers comp and state disability)
- Influence of rating agencies
- Uncertainty of liabilities
- Capital requirements

(e)

Adjustments made by buyer

- Own version of discount rate and cost of capital
- Value of goodwill premium
- Own view of management/expertise regarding due diligence of seller
- Anticipate structure and any tax benefits with it
- Anticipated business strategy
- Level of confidence underlying the projections

I would consider all factors mentioned above to adjust to our own company's situation and intended use for block. Considerations include:

- Economies of scale
- Other synergies
- Tax benefits
- Cost of capital

4.

Learning Objectives:

7 – Integrate reinsurance arrangements with overall financial strategy of company plan / sponsor

Source: Financial Uses of Reinsurance (GH-C110-07)

Solution:

(a)

Financial Uses of Reinsurance

- Stabilize Earnings – aggregate stop loss, specific stop loss, mix of business, spread risk
- Increase financial capacity – can write higher face amounts
- New business growth
- Catastrophic protection – so one bad claim does not make a business collapse
- Improve balance sheet position
- Reinsurer as guarantor in case insurer goes under
- Retrocessional reinsurance – reinsurance for the reinsurer

Non-Financial Uses of Reinsurance

- Intellectual Capital from the reinsurer
- Joint Ventures
    - Mutual interest
    - Fronting
    - Non-commitment of the ceding company
- Acquisitions – assumption agreement

(b)

Proportional

- Coinsurance and Quota Share
- Percent of claims and premiums shared plus a ceding allowance

Non-proportional

For insurers

- Excess of Loss – reinsurer covers any individual claims over a set $ amount
- Aggregate Excess – reinsurer covers aggregate claims over a set $ amount
- Attachment point usually a % of expected claims (like 120%)

4. continued

For self-insured employers:

- Specific stop loss -Covers an individual's claims that go over a set $ amount within the year
- Aggregate stop loss – Reinsurer covers aggregate claims over a set $ amount
- Attachment point usually a % of expected claims (like 120%)

(c)

Employer would purchase specific and aggregate stop loss, with a direct contract between the employer and the reinsurer.

(d)

Specific stop loss payment = $250,000 - $100,000 = $150,000
Expected Claims = $500 × 12 × 100 = $600,000
Aggregate Attachment point = $600,000 × 1; 1 = $660,000
Aggregate payout = $1,500,000 - $150,000 - $660,000 = $690,000
Total payout = $690,000 + $150,000 = $840,000

5.

Learning Objectives:

6 – Evaluate financial performance measures for insurers for both short-term and long-term products
11 – Complete a capital needs assessment

Solution:

(a)

Risk Control Analytics

- Scenario tests – test outcomes under various scenarios
  - Stress testing – choose "worst case" combinations – adverse scenarios
  - Monte Carlo – test a large number of plausible scenarios
- Economic Capital – determine economic capital the enterprise needs at various levels (aggregate of total EC, with diversification) for solvency
- Risk indicators – early warning signs
  - Use internal external data

Risk Optimization Analytics

- Not removing risk but making sure you are compensated for it
- Risk adjusted return on capital
  - RAROC = risk adjusted return / economic capital
  - If > hurdle rate, it adds value to company
  - Doesn't quantify value
- Economic Capital Created – attempts to quantify amount of income invested
  - Risk adjusted return – economic capital × hurdle rate
- $\text{Shareholder Value} = \text{Economic Capital} \times \left[\dfrac{\text{RAROC} - g}{\text{Hurdle} - g} \right]$ g = growth rate
- $\text{Shareholder Value Added} = \text{Economic Capital} \times \left[\dfrac{\text{RAROC} - g}{\text{Hurdle} - g} - 1 \right]$

  = Shareholder Value – Economic Capital – how much EC increased.

5. continued

(b)

VaR – Value at Risk – measures amount of risk with a small probability
e.g. 95% VaR is the amount expected to be lost only 5% of the time

- Parametric
  - Advantage – easy to calculate
  - Disadvantage – assumes returns linearly dependent on price
  - Disadvantage – assume normal distribution
- Historical simulation
  - Advantage – Does not assume normal distribution or linear dependence
  - Disadvantage – assumes future distributions are same of historical
  - Disadvantage – only outcomes are those that have already happened
- Monte Carlo – run scenario analysis based on assumed distribution estimated from historical data
  - Advantage – doesn't assume linear dependence
  - Disadvantage – computationally expensive
  - Disadvantage – assumes normal distribution

Asset/Liability Models

- Good when valuing interest sensitive cash flows
- Able to model degree of mismatch between assets/liabilities
- Shows scenarios requiring additional attention
- Better for illiquid portfolios
- Good for embedded options

Interest Rate Model

- Used with interest rate dependent instruments
- Helps with interest rate risk management

(c)

Top Down

- Use of analogs
  - Eliminate company specific items (e.g. credit risk), remainder is operation risk
  - Bench mark to other co's
- Use historical loss data

Bottom Up

- Self-assessment – how much with a company "lend" for an operation
- Cash flow model

6.

Learning Objectives:

8 - Evaluate the impact of taxation on company / plan sponsor financial management

Source: Fundamentals of Retiree Group Benefits, Yamamoto, 2006, Chapter 5

Solution:

(a)

Advantages of Prefunding Retiree health

- Tax advantages can be seen if a qualified trust is used (see part (b) for those vehicles)
- Better allocation of costs among generation of stakeholders
- Can reduce FAS106 costs
- Increased latitude in cash flow use by mgmt
- Protects funds from corporate raiders
- Contributions are deductible and may be worthwhile even though investment income is taxed
- Addresses some of the concerns that employers may have with regards to the financial security of the benefits
- Some regulated companies are required to prefund the benefits in order for it to be allowed

Disadvantages

- The company may be able to achieve a higher ROI if they invest the money back into the company instead of prefunding
- New legislation may alter the funding practices
- Stock analyst may not know how to handle it
- Funding the plan gives the idea that the plan is permanent and may make it hard for changes
- The reduction in FAS106 costs will be offset elsewhere in the comp.
- 401(h) funding may be too limiting
- Tax advantages are limited by DEFRA (investment income is tax; contributions are limited; coverage has to cover both active and retirees; restrictions on treatment of key employees and excise taxes)
- Use of CF (cashflow) by mgmt is less flexible

6. **continued**

(b)

Funding vehicles

- Welfare benefit trusts – VEBAs; Insurance funds
- Incidental acct with a profit sharing acct
- Qualified retirement trusts - 401(k)
- 401(h) funding in a qualified trust
- 401(h) is a money market acct
- Employee purchased group annuities
- Health stock options
- HSAs

7.

Learning Objectives:

5 - Formulate and evaluate insurer reserving techniques for other liabilities

Source: US GAAP for Life Insurers, Chapter 12
AAA Asset Adequacy Practice Note, December 2004

Solution:

(a)

Unearned Premium is the liability for premium collected beyond the valuation date. Used to match expense to revenue.

$$UPR = \left(1 - \frac{\text{elapsed time}}{\text{mode}}\right) \times \text{Mode Prem}$$

$$500 = \left(1 - \frac{4}{6}\right) \times \text{Mode Premium}$$

1500 = Mode Premium

(b)

(i)

DPAC is the acquisition expense that is capitalized. Expenses are capitalized and amortized to match expenses to revenues for GAAP reporting. DPAC is not used for STAT.

$$\begin{aligned} DPAC &= \text{Expense \%}\left(UPR\right) \\ &= 0.2\left(500\right) \\ &= 100 \end{aligned}$$

(ii)

Recoverability Testing is performed to determine if DPAC is recoverable from margin in future premium. If testing fails, DPAC is written down.

Loss ratio + Maintenance ratio + Expense ratio $\leq$ 1.0
0.65 + 0.13 + 0.2 = 0.98 $\leq$ 1.0

7. continued

(iii)

Premium Deficiency Reserve and DPAC

If recoverability testing fails, and DPAC is written down to 0 and testing still fails, a premium deficiency reserve is established.

$$0.7 + 0.13 + 0.2 = 1.03$$

DPAC is written down to 17%

$$0.7 + 0.13 + 0.17 = 1.0$$

(iv)

$$0.9 + 0.13 + 0.2 = 1.23$$

DPAC is written down to O.

$$0.9 + 0.13 + 0 = 1.03$$

Premium Deficiency Reserve of:

3% of UPR is established

$$0.03 \times 500 = 15$$

(c)

Asset Adequacy Analysis tests current reserve in light of assets held for inforce business.

Solvency Test tests the projected reserve and capital including new business anticipated.

8.

Learning Objectives:

12 – Complete a capital needs assessment

Sources: Group Insurance, Bluhm, Fifth Edition, Chapter 43, Analysis of Financial and Operational Performance

Solution:

(a)

Operating Profit = Total Revenue – Total Expenses
= Premium Revenue + Other Revenue – Health Benefit Expenses – Admin Expenses

Pretax Income = Operating Profit + Investment Income – Interest Expenses

Net Income = Pretax Income – Income tax

	Hansbrough	**Lawson**
Operating Profit	$3,800,000	$3,660,000
Pretax Income	$4,300,000	$3,787,600
Net Income	$2,900,010	$3,407,601

(b)

	Hansbrough	**Lawson**
Premium Revenue	$32,500,000	$17,760,000
+ Other Revenue	$3,000,000	$500,000
= Total Revenue	$35,500,000	$18,260,000

Create same size by dividing all elements by Total Revenue

8. continued

	Hansbrough	Lawson
Premium Revenue	91.55%	97.26%
+ Other Revenue	8.45%	2.74%
= Total Revenue	100.00%	100.00%
Health Benefit Expenses	83.80%	76.67%
+ Administrative Expenses	5.49%	3.29%
= Total Expenses	89.30%	79.96%
Operating Profit	10.70%	20.04%
+ Investment Income	2.54%	0.97%
- Interest Expense	1.13%	0.27%
= Pretax Income	12.11%	20.74%
- Income Tax	3.94%	2.08%
= Net Income	8.17%	18.66%

(c)

Advantages

- Allows decomposition of profit margins into relative components
- Allows an easy comparison of Health Plan to Health Plan
- Allows a Year over Year comparisons of a single Health Plan
- Allows a better understanding of impact of changes in expense items on profit margins

Disadvantages

- Cannot easily be used to compare performance of Health Plans that are significantly different

(d)

ROA = Net Income / Total Assets

$\rightarrow$ Total Assets = Net Income / 20%
$\rightarrow$ Total Assets for Hansbrough = 2,900,010 / 20% = 14,500,050
$\rightarrow$ Total Assets for Lawson = 3,407,601 / 20% = 17,038,005

9.

Learning Objectives:

7 – Integrate reinsurance arrangements with overall strategy of company / plan sponsor
9 – Evaluate the impact of regulation on company / plan sponsor

Sources: The Handbook of Employee Benefits, Rosenbloom, Sixth Edition, 2005, Chapter 39, Fiduciary Liability Issues under ERISA
Group Insurance, Bluhm, Fifth Edition, 2008, Chapter 15, Regulation in the US
GH-C111-07, Reinsurance for group A & H Insurance (Lachance)

Solution:

(a)

- Uniform legal culture of fiduciary responsibilities
- Standards modified and refined to accommodate pension plans
- Standards apply even if not in a trust
- Liberal access to courts to enforce or beneficiary rights
- Fiduciary personally liable for plan losses
- **Sole Benefit Standard** – fiduciary must act in sole benefit of participants/beneficiaries and with sole purpose to pay benefits and expenses; must vote plan owned stock in interest of participants and have no conflicts of interest
- **Prudent Expert Rule** – must look to how similar plans investing in similar circumstances; must exercise prudence of person especially skilled, experienced, knowledgeable in management of pension plans; must look at how each investment contributes to overall net performance of plan; must weigh loss versus gain; liquidity versus return, diversification
- **Diversification Rule** – must limit plans risk of large losses unless clearly prudent not to do so; look at plan purpose, economic conditions, investment characteristics, distribution by industry, area, maturity
- **Plan Document Rule** – must follow express written terms of plan document unless would violate ERISA fiduciary duties
- **Prohibited Transaction Rule** – cannot have transactions (sales, lease, lending, etc.) with parties of interest (plan fiduciary, employee, legal counsel, sponsor/owner, labor union, key employees, relatives of parties of interest)

9. continued

(b)

- Benefits and eligibility – must fully describe the benefits and who is eligible
- Incontestability – must define the period after which a claim can no longer be contested
- Grace period – a period of 31 days when coverage continues with non-payment of premium
- Misstatement of age provision – describes how benefits and premium will be adjusted due to misstatement of age
- Application and statements – statements made by the insured are representations, not warranties
- Certificates – certificates must be issued to each policyholder
- Evidence of insurability – Describe when it is required
- Pre-existing condition exclusions – pre-existing condition limitations are only allowed in limited circumstances
- Legal action – the period within which legal action can be brought on a claim
- Notice of proof of loss – The period within proof of loss must be provided to the insurer

(c)

(i)

- Statement of net assets for plan benefit
- Statement of changes in net assets for plan benefits
- Additional footnotes
- Statement of cash flows
- Statement of year end exhibit
    - Assets purchased and sold during the year
    - Assets held at year end
    - Leases in default or uncollected
    - Late remittances
    - Loan or financial obligation in default or uncollected
- Statement of defined benefits (net assets for plan benefits, change in net assets for plan benefits)
- Investment records
- Contribution records
- Participant records
- Actuarial reports (assumptions, methods)
- Distribution records (commencement, termination)

(ii)

- A plan with less than 100 EEs and if 90% of assets are qualified assets or if non-qualified assets are supported by fidelity bonds
- Plan funded through general assets of ER (ER or EE contribution) Plan providing benefits to a selected group of people (e.g. highly paid)
- Plan provided benefit through a purchased insurance contract

10.

Learning Objectives:

13 – Complete and Actuarial Opinion

Source: Fundamentals of Retiree Group Benefits, Yamamoto, 2006, Appendix E

Solution:

Components that need to be documented in your actuarial report supporting the attestation include:

- Data received from client including description of the time period (incurred period and paid dates), source who provided it (client, vendor, pharmacy benefit manager), the group members covered, and the plan provisions at the time the data represents
- Plan provisions being tested. The retiree drug plan specific plan provisions including any and all cost sharing provisions (coinsurance, deductible, copays (and how they vary for brand, generic, retail, mail drugs covered)). Standard Part D plan provisions (ICL, Gap, UCL, etc) should be provided as well.
- Pertinent Assumptions pertaining to data
    - Percentage rebate of claims must be factored
    - Part D excluded drugs should be removed or adjusted for if they are in the source data which is being used to calculate the Sponsor's actuarial equivalence
- Testing Results
    - Results of Gross Value test need to be provided for each specific plan which is tested. Typically these results are provided on a Paid Claim Per Member Per Month basis but a percentage of gross Allowed PMPM claims is OK as well
    - Comparatively the Gross Value (on the same basis: PMPM, %) of the Standard Medical Part D plan should be provided as well
    - Conclusion as to whether the plan(s) pass the GV test (if the GV Plan > GV Standard Part B) needs to be provided as well
- Net Value Test Results
    - Results of the Net Value Test = Gross Value – Member Contributions must be provided as well for the Plans being tested
    - Comparatively the Net value for the Standard Medical Part D plan must be provided as well. This is equal to Gross Value Standard Part D – standard Part D premium. These Standard Part D values should be calculated on the same source data as the Plan Sponsor's GV/NB test is based on

10. continued

- Methodology for GV/NV testing including all pertinent assumptions
    - The methodology section should document how the source data was ascertained, scrubbed, and adjusted to best represent the plan sponsor's plan period being tested. This should include explanation for the accounting for differences in demographics between source and plan sponsor data (if the source data is not the plan sponsor's data) and adjustments made to their data to account for these differences
    - If the plan sponsor's actual data is used, comments regarding its credibility will need to be included as well
- Adjustments beyond typical standard calculation
    - If the plan sponsor's would fail the preliminary tests (Gross or Net) based on the initial calculation, additional advanced testing would be done to reflected the impact of offering additional Medical Supplement benefits to retirees / dependents that elect Standard Part D coverage
    - Additionally, the member contributions that are applied to both Medical and Rx coverage additional allocation adjustments can be made to account for this which will impact the results of the Plan Sponsor's Net Value Test
- A final item to document is the credentials of the Attesting Actuary
    - The attesting actuary needs to provide his or her American Academy of Actuaries number along with acknowledgement that he or she is acting in accordance with all applicable guidelines and ASOPs

11.

Learning Objectives:

8 - Evaluate the impact of taxation on company / plan sponsor financial management

Source: Group Insurance, Bluhm, Chapter 3
The Handbook of Employee Benefits, Rosenbloom, Chapter 11
Fundamentals of Retiree Group Benefits, Yamamoto, Chapter 5

Solution:

(a)

Goals of CDHPs

- Provide consumers with financial incentives & information to use more cost effective care
- Encourage people to be more prudent in their health care costs
- Reduce cost for employer / sponsor

Uncertainties around CDHPs

- Not many employers have used CDHPs yet, too early to tell if cost savings
- Employees may not have enough information to make informed health care decisions
- High deductibles may incent employees to avoid needed care & preventive services
- If multiple benefit plans offered, may create adverse selection risk
- Will financially hurt employees with chronic conditions

(b)

Reference Group Insurance, Bluhm, Chapter 3, pages 44-46
SN GH-C106-07: US Health Insurance Taxation, pages 4-5
The Handbook of Employee Benefits, Rosenbloom, Chapter 11, p. 274-275

HRAs

- May be used in conjunction with HDHP/CDHP
- Is funded solely by employer
- HRA can be used for eligible medical expenses (deductibles, coinsurance, other out of pocket costs)
- Unused balance rolled over to next year
- Owned by employer, not portable if employee terminates

11. continued

HSAs

- Must be used with qualified HDHP
- Are new, included in Medicare Modernization Act of 2003
- Employer or employee can contribute funds
- Contributions deductible by employer, pre-tax for employee
- Limited annual maximum contributions based on deductible of HDHP
- No contributions post age 65, though can use balance to pay retiree medical expenses
- HSA can be used for eligible medical expenses (deductibles, coinsurance, other out of pocket costs)
- Unused balance rolled over to next year
- Owned by employee, is portable if employee terminates
- Withdrawals taxable if not used for eligible medical expenses

(c)

Reference: Fundamentals of Retiree Group Benefits, Yamamoto, Chapter 5, p. 144

Tax-effectiveness

- HSA is truly tax effective
- Contributions tax deductible
- Earnings tax sheltered
- Distributions for eligible expenses tax free

Concerns

- Unlikely that individuals will be able to save enough money in their HSA because health cost trend will exceed investment rate
- Many employees will use funds during career, reducing savings for retirement expenses
- Max annual contributions limit ability to adequately fund HSA

12.

Learning Objectives:

7 – Integrate reinsurance arrangements with overall financial strategy of company plan / sponsor

Source: The Handbook of Employee Benefits, Chapter 43

Solution:

(a)

Advantages

- Capture Favorable Claims Experience
- Reduce claim and admin costs
    - No commissions
    - No risk charges
    - No premium tax
    - Reduce underwriting and other admin costs
- No Mandated Benefits
- More Flexibility and Control
- Improve Cash Flows
- No assessment of uninsurable risk pools
- No provider tax

Disadvantages

- Difficult to product claim costs for small groups
- Loss of legal, actuarial, admin, legal and clinical services
- Employee's concerns about financial security of benefits
- Not able to respond to collective bargaining negotiations
- Loss of a financial and administrative third party buffer
- Inability to take advantage of low cost managed care due to self-funded status
- Inability to take advantage of low costs of community rating
- Financial concern of COBRA participants
- Concern over liabilities of denial of claims and malpractice

12. continued

(b)

- Plan benefit description for employees and employers
- Claims Processing
- Financial and administrative reporting
- Banking arrangements
- Government reporting and compliance
- Basic actuarial and underwriting services
- Individual conversions
- Cobra administration
- Other legal and clinical services
- Third party buffer for disputes and claim denials

(c)

Annual premium for 2009 = 2008 Premium × (1 + Trend)
Annual premium for 2009 = 1,380,000 × 1.125 = 1,552,500
Monthly premium for 2009 = 1,552,500 / 12 = 129,375

Additional interest credit = employer rate of return –
insurance company crediting rate
Additional interest credit = 8% - 6.5% = 1.5^

Savings for each month = Monthly Premium × Interest × Duration of policy year

Month 1 = 129,375 × 1.5% × (12 / 12) = 1,940.625
Month 2 = 129,375 × 1.5% × (11 / 12) = 1,778.906
Month 3 = 129,375 × 1.5% × (10 / 12) = 1,617.188

Total savings = 1,940.625 + 1,778.906 + 1,617.188 = 5,336.72

13.

Learning Objectives:

10 – Evaluate the Risk profile of a portfolio of products

Sources: "Pricing in a Return-on-Equity Environment," TSA XXXIX, pp. 257 – 271
GH-C112-07, Dynamic Financial Condition Analysis Handbook, Chapters 1, 2, & 6

Solution:

(a)

- Annual renewal
- Underwriting considerations
- Other contractual guarantees
- Wide variety of risks and benefits (coverages)
- Medical and dental benefits
- Short duration of liabilities
- Unknown claim amounts
- Little industry data
- Subject to state rate review
- Changing environment condition
- Multi-option plans
- Regulatory/legislative requirements

(b)

2009 projected ROE
= (2009 projected net income) / (2008 equity)
= 1,000,000 / 8,000,000
= 12.5%

2010 projected income without reinsurance
= member months × (Premium PMPM – Claims PMPM – Admin PMPM)
= [15,000 × (220 – 190 – 20)] + [16,000 × (230 – 300 – 22)] × [17,000 × (260 – 220 – 25)]
= $533,000

2010 ROE without reinsurance
=2010 projected income without reinsurance / 2009 equity
= $533,000 / $3,900,000
= 13.7%

2010 ROE without Reinsurance is greater than 2009 projected ROE
13.7% is greater than 12.5%
Therefore, MaGIC can meet its 2010 ROE goal without purchasing reinsurance

13. continued

(c)

Quote 1

Reinsurance premium projected for 2010:

= (premium PMPM) × (total projected member months)
= $11 × (15,000 + 16,000 + 17,000)
= $528,000

Reinsurance recovery

= (annual cost of Claims greater than attachment point) × (total member months) / 12
= $127.28 + 48,000 / 12
= $509,120

2010 income with Quote 1

= net income without reinsurance – reinsurance Premium + reinsurance recovery
= $533,000 - $528,000 + $509,120
= $514,120

2010 ROE with Quote 1

= 2010 income with Quote 1 / 2009 equity
= $514,120 / $3,900,000
= 13.2%

Quote 2

Reinsurance premium projected for 2010:

= (premium PMPM) × (total projected member months)
= $9 × (15,000 + 16,000 + 17,000)
= $432,000

Reinsurance recovery

= (annual cost of Claims greater than attachment point) × (total member months) / 12
= $112.28 + 48,000 / 12
= $451,120

2010 income with Quote 2

= net income without reinsurance – reinsurance Premium + reinsurance recovery
= $533,000 - $432,000 + $451,120
= $552,120

13. continued

2010 ROE with Quote 2
= 2010 income with Quote 2 / 2009 equity
= $514,120 / $3,900,000
= 14.2%

Quote 3
Reinsurance premium projected for 2010:
= (premium PMPM) × (total projected member months)
= $5 × (15,000 + 16,000 + 17,000)
= $240,000

Reinsurance recovery
= (annual cost of Claims greater than attachment point) × (total member months) / 12
= $56.29 + 48,000 / 12
= $225,160

2010 income with Quote 3
= net income without reinsurance – reinsurance Premium + reinsurance recovery
= $533,000 - $432,000 + $451,120
= $518,160

2010 ROE with Quote 3
= 2010 income with Quote 3 / 2009 equity
= $514,120 / $3,900,000
= 13.3%

All 3 reinsurance options will achieve 2010 ROE target, with Quote 2 projected to have the highest ROE, so the recommendation is to choose Quote 2.

14.

Learning Objectives:

4 – Formulate and evaluate insurer claim reserving techniques

Solution:

(a)

- **Stochastic considerations**
  - Availability of computer statistical software. Internal expertise to use software
  - Availability of historical data – Need sufficient MIS systems and claims warehouses

- **Model fit** – calibrated with goodness of fit tests & back-out testing
  - Covariance of model inputs – must be examined, cannot always assume independence

- **Appropriateness of data** – sometimes historical data is not always food for projecting future claims, especially with operational change

- **Advantages**
  - Better reserve estimates
  - Explicit provision for adverse decision
  - Quantification of variability of estimates
  - Explicit guidance and easing trend and seasonal

- **Disadvantages**
  - False confidence from sophistication
  - Some employees performing similar functions (i.e. pricing, forecasting) may not understand

(b)

- Explore tenets of ASOP 23,
- Sufficient sample size $n = \frac{z^2\sigma^2}{p^2}$ for credible projections to be made
- Consider who is going to be interpreting & viewing data output
- Sampling of claims – should be random or stratified
- Year-year consistency – if significant shifts in providers & member demographics data may not be accurate for future projections

14. continued

- Consider ASOP 25 for credibility

$$\text{cred} = \left(\frac{N}{X} \right)^k$$

N = volume
k = const
X = full cred volume

Or

$$\left(\frac{N}{N+k} \right)$$

k = constant
N = volume

- Make sure results not biased
  - Make sure data ties to accounting general ledger or other source
  - Check for missing data, null values
  - Tie premium & exposure data to another internal source
  - Check PC software programs for correct coding

(c)

- Use standards set from ASOP 23
- Check for null or missing values
- According to ASOP 23, actuary is not responsible for auditing data or intentionally misleading data supplied by others
- Compare against industry benchmarks, or other internal claims studies for reasonableness, appropriateness
- Disclose reliance on others for data
- Use actuarial judgment to assess reasonability
- Consider alternative data sets – casts & feasibility
- Check that data ties to another verifiable source

14. continued

(d)

- Plan provisions & business practices – affect cost, frequency, severity
- Economic influences – e.g. employment trends
- Organizational claims administration – consider staffing changes
- Claim administration expense – usually % of claim reserve
- Business risks & organizational practices by block of business
- Legislative requirements – mandated benefits
- Carve outs
- Special considerations for LTC & LTD plans
- Data and reporting
- Time value of money – for long-term runout patterns
- Margin for uncertainty
- Incurral dating method
- Reserve basis – tax, statutory, gaap
- Interest – for long-term runout patterns (e.g. LTC)
- Managed care plan features – case management, cost sharing
- Integration of coverage – with Medicare, for example
- Trends
- Seasonality
- Reinsurance
- Provider arrangements
- Large claim – remove & analyze separately
- Coordination of benefits
- Consistency of methods

(e)

Claim reserves

- Existence of a high deductible may impact claim runout patterns used in development method
- May also affect seasonality patterns if funds are rolled over to the next year (HRA)

Policy (contract) reserves

- May be needed for HRAs because of rollover (prefunding)
- Not needed for HSAs

Premium deficiency reserves

- May be needed if claims don't emerge as expected / assumed

New technique – use probability distributions to analyze claim patterns

15.

Learning Objectives:

15 – Demonstrate an understanding of the requirements regarding retiree life and health benefits

Source: Fundamentals of Retiree Group Benefits, Yamamoto, 2006, Chapter 9

Candidates lost credit here for listing and not discussing the issues in Section A
Many candidates were able to illustrate the math behind benefit leveraging, but far fewer were able to discuss their results

Solution:

(a)

- It is not appropriate to use active plan trend assumptions for retirees
- Need to factor in Medicare reimbursement trends, which have increased as a much slower pace than general health trend
- Underlying cost and utilization patterns differ between retirees and actives, as do their trends
- Must consider mix of services provided and benefit plan differences
- Consider COB with Medicare
- Consider regulatory/legislative differences between active and retiree products
- Consider potential retiree/employer contributions
- Rx – retirees are high utilizers of Rx benefits

(b)

Benefit leveraging
Active plan tred
$= 8\% \times 0.4 + 6\% \times 0.4 + 12\% \times 0.2 = 8\%$
Assume overall % trend to illustrate
Retiree year 1 cost = #3,500
Deductible = $500, Coinsurance = 85%
Member OOP Max = $1,000

In Year 1, OOP Max is hit at $3,833.33

$\$500 + 0.15 \times (3{,}833.33 - 500) = \$1{,}000$

15. continued

	Year		
	1	**2**	**3**
Total Covered Cost	3,500	3,500 × 1.08 = 3,780	3,500 × 1.08^2 =4,082.4
OOP Max Hit	3,833	3,833	3,833
Member Cost	500 + 0.15× (3,500 – 500) = 950	500 + 0.15 × (3,780 – 500) =992	500 + 0.15 × (4,082.4 – 500) = 1,000 (hit max)
Plan cost	= 3,500 – 950 = 2,250	= 3,780 – 992 = 2,788	= 4,082.4 – 1000 = 3,082.4
Plan cost trend	N/A	2,788 / 2,550 = 9.3%	$(3,082.4/2,550)^{0.5} - 1$ = 9.94%

Benefit leverage results from increasing overall plan costs with fixed deductible and OOP maxes. The plan benefit costs increase at a faster rate than medical trends. Over the 3 year period, the medical costs have increased by 8%, but the trend on total of benefits paid is 9.94% over the two years. The difference in these 2 trends is the impact of fixed benefit leveraging.

16.

Learning Objectives:

6 – Evaluate financial performance measures for companies and plan sponsors
11 – Evaluate the financial impacts of book of business risks (ERM)

Source: GH-C108-07 Calculated Risk – A Provider's Guide to Assessing and Controlling the Financial Risk of Managed Care, Chapters 1 – 6

Solution:

(a)

- Underpricing Risk
  - Risk of Charging too little
  - Downward Spiral

- Fluctuation Risk
  - Coincidence
  - Epidemic
  - Severity

- Business and Administrative Risk
  - Copay Collection
  - Capitation Management
  - Financial Viability of Partner

(b)

- Whether the venture is well capitalized?
- Whether the venture is approved by regulatory?
- Can the venture deliver patients and revenue?
- Can the venture improve the quality and health care efficiency?
- Does the venture have cost advantages?
- What value does it add?
- What is the repercussion if it is deemed an HMO or insurance company?

16. continued

(c)

- Contractual Tools
  - Stoploss insurance
  - Outlier payments
    - Experience refund provisions
    - Supplemental Capitation Payments
  - Risk Sharing Provisions
  - Risk Adjusted Capitation Rates
  - Subcapitation
  - Escalator clause in multiyear contracts

- General Business Tools
  - Risk Selection and Underwriting
  - Monitoring Reports
  - Market Assessment
  - Financial Projections
  - Management Reports
  - Periodic Price Adjustments
  - Cost Structure

- Healthcare Delivery Tools
  - Managed Care Guidelines and Protocols
  - Hiring experienced medical directors
  - Hiring skilled nurses
  - Developing Utilization Review Guidelines
  - Developing Case Management Guidelines
  - Performing Chart Audits
  - Resource Planning

(d)

- Capital Management
- Marketing and Member Relations
- Actuarial
- Payment Administration
- Benefit Plan Design
- Management Information Systems
- Regulatory and Compliance
- Network Management

17.

Learning Objectives:

6 - Evaluate financial performance measures for companies and plan sponsors

Sources: Group Insurance 5th Edition, Bluhm, Ch 20 p. 395
GH-C102-07 Health Reserves, Lloyd, p. 47
Group Insurance 5th Edition, Bluhm, Ch 17 p.352
GH-C102-07 Health Reserves, Lloyd, p. 47

Solution:

(a)

- Statement of Statutory Accounting Practices #54, #55
- Health Reserve Guidance Manual
- AAA Practice Notes
- Actuarial Standards of Practice
    - #5 – Incurred Health & Disability Claims
    - #23 – Data Quality
    - #42 – Health & Disability Liab Other Than Incurred Claims

(b)

PDR is a "reserve that is established when future premiums and current reserves are not sufficient to cover future claim payments and expenses for the remainder of the contract period."

Basic Gross Premium Valuation formula:

	Present Value of future claims costs
+	Present Value of future expenses
-	Present Value of future premiums
-	Current Reserves (contract, claim, premium)
=	Premium Deficiency Reserve

Key Issues & Considerations, Assumptions

- Grouping of contracts – what blocks/segments do you combine?
- Time period for projection –
    - Guaranteed renewable business may necessitate longer horizon
- Expenses (marginal or fully allocated)
    - If other LOBs can cover overhead, can use only direct costs
- Investment income
- Margin/conservatism
- Closed block or open block

17. continued

(c)

- Liabilities, Capital and Surplus ("Balance Sheet")
- Statement of Revenue & Expenses ("Income Statement")
- Analysis of Operations by Lines of Business
- Underwriting & Investment Exhibit, Part D
- Notes to Financial Statements
- Actuarial Opinion

(d)

PDR reported at 12/31/07	$9.4	(From question setup)
PDR reported at 12/31/08	$2.7	= $9.4 – $6.7
If breakeven in 2009 and gains going forward, no PDR needed at 12/31/08		
Should have been reported on 12/31/08 as:	$0.0	
Additional release of PDR (income) in 2008	$2.7	
Net Underwriting Gain on 12/31/08 statement	$2.7	
Should have been reported as: $2.7 + $2.7 =	$5.4	

18.

Learning Objectives:

6 - Evaluate financial performance measures for companies and plan sponsors

Source: Analysis for Financial Management, Higgins, Eighth Edition, 2007 (GH-C120-09)

Solution:

(a)

Earnings Yield = Earnings per Share / Price per Share
7.0% = EPS / 19.17
EPS = 1.3419

Net Income = EPS × Shares
Net Income = 1.34 × 7,280,000
Net Income = 9,769,032

ROA = Net Income / Total Assets
25% = 9,769,032 / Total Assets
Total Assets = 39,076,128

(b)

- Measures the efficiency with which a company allocates and manages its resources
- Based on capital from stock holders (owners) and debtors (creditors)
- ROA = Profit Margin × Asset Turnover
- Companies can operate at lower profit margin but higher turnover or higher profit margin and lower turnover

(c)

- Gross Margin is a good measure when you need to differentiate between fixed and variable costs
- Shows the portion of sales attributable to both fixed and variable costs
- Gross Profit also helps calculate a company's breakeven sales volume
- Breakeven sales volume = Operating Expense / Gross Margin

19.

Learning Objectives:

4 - Formulate and evaluate insurer claim reserving techniques
5 - Formulate and evaluate insurer reserving techniques for other liabilities

Solution:

(a)

Policy reserve

- For non cancellable or guaranteed renewable product where prem can't be raised
- LT product, for which claim trend > prem trend or claim exceeds premium at certain point of policy duration

Premium deficiency reserves

- PV (future claims and expenses) – PV (future prem) – Vx's
- Needed when future claims trend is unknown
- Esp. important for new product (those starting 6 months ago)

Claim reserves

- IBNR
- ICOS
- Due and unpaid
- Need for medical cover and LTD (open claims, IBNR and pending claims)

Premium reserves

- Unearned premium Vx
- Due and unpaid premium (asset)
- Advanced premium

Others

- Contractual liabilities to employers (for grp coverage such as experience refund)
- Liabilities to providers for capitation payment, withhold, provider stoploss, and incentive pmt
- Deferred acquisition expense asset
- Claim adjustment expense liability
- Additional liability due to asset adequacy analysis

19. continued

(b)

Ind. LTD starting 6 mon ago

- Reserves for open claim, pending claims and IBNR
- Tabular method for open and pending claims
    - Amount is benefit continuance discount
    - For pending, add pending factor
- Loss ratio method for IBNR since new product

Grp LTD

- Tabular for pending and open claims
- Use % of prem method for IBNR
- May use lag method for setting IBNRs if experience credible and pmt pattern predictable

Ind. Non-cancellable LTD for > 10 years

- Lag method
- Tabular method

Guaranteed renewable ind. Medical > 10 years

- IBNR
    - Lag method. Ideal for medical Vx, short lag, predictable pmt pattern
    - Projection method – use to supplement lag method for recent durations; may use weighting with lag method
    - LR method
    - PMPM method
    - Case reserves for large claims
    - Stochastic methods

19. continued

(c)

Actuarial considerations

- Plan provisions
    - Benefit, etc.
- Age/gender/area mix
- Market – commercial vs. government; ind. Vs. SG. LG.
- Internal consistency
- External factors – epidemics; recession – impact LTC, LTD
- Provider contract
- Trend
- Seasonality
- Large claims
- Reins
- COB
- Interest rate
- UW marketing practices
- Claims processing – inventory level, staff, systems
- Morbidity
- Reserve basis (GAAP, Stat, Tax, Canadian)

Standard of Practice

- Canadian 2100
- Canadian 2300
- ASOP 5 – setting claims reserves / incurred claims
- ASOP 42 – reserves for other than claims, applies to policy res., prem res
- ASOP 23 – data quality
- ASOP 22 – cash flow, etc.
- ASOP 7

20.

Learning Objectives:

11 – Evaluate the financial impacts of book of business risks (ERM)

Source: Financial Reporter, Number 48 "A New Perspective on Risk Management: Creating Value by Managing Risk" http://www.soa.org/library/newsletters/financial-reporter/2001/december/frn0112.pdf

Solution:

Risk Mitigation is an old paradigm of ERM

- Is to minimize the negative effects of risk
- Is a defensive mechanism
- Assess risk independently on a line by line basis without considering interaction
- A strategy is devised on a line by line basis
- The strategy is implemented on a line by line basis
- The effectiveness is monitored on a line by line basis

Capture Opportunities is the new paradigm of ERM

- Is to maximize the risk/return trade-off
- Is an offensive mechanism
- Assess risks independently on a line by line basis
- Develops opportunities, synergies, technology across the organization
- Management decides on a comfortable level
- Manage risks across the organizations through software, natural hedge, and technology

Value Added:

- Creates risk opportunities
- Aligns incentives
- Reduces costs
- Creates insights that can be drawn upon
- Leads to intellectual information
- Better coordination
- Risk reporting

21.

Learning Objectives:

15 – Demonstrate an understanding of the requirements regarding retiree life and health benefits

Source: Fundamentals of Retiree Group Benefits, Chapter 7, U.S. Accounting
The Handbook of Employee Benefits, Chapter 45, Costing & Funding Retirement Benefits
ASOP #6, Measuring Retiree Group Benefit Obligations

Solution:

(a)

Net Periodic Benefit Cost Components

Service Cost

- EPBO for current year

Interest Cost

- Based on APBO, service cost, benefits, and discount rate
- $(APBO + SC) \times d - BP \times d / 2$

Expected Return on Assets

- $Assets \times i - BP \times i / 2$

Amortizations

Amortization of Net Transition Obligation

- Amortize straight line until expected retirement

Amortization of Gains/Losses

- Amount in excess of 10% corridor amortized straight line until expected retirement
- Corridor = 10% × max (APBO, market value of assets)
- Amortization of Prior Service Cost
  - Amortized to full eligibility date
  - Standard method is to amortize over the remaining service years (Prior SC # service years current year / # service years total)
  - Alternative method is to amortize straight line to full eligibility date
  - First must be used to pay remaining net transition obligation

Net Periodic Benefit Cost = Service Cost + Interest Cost – Expected Return on Assets + amortization of net transition obligation + amortization of gain/loss + amortization of prior service cost

21. **continued**

(b)

Demographic Assumptions for Life and Health Pension Plans

- Termination
- Disability
- Mortality
- Retirement
- Plan Participation
- Spouse Plan Continuation
- Dependent Plan Continuation
- Changes in plan design

Economic Assumptions for Life and Health Pension Plans

- Discount rate
- Inflation rate
- Salary Increase
- Social Security Increase
- Current plan contributions and costs
- Incurred and paid claims
- Health cost trends
- Medicare benefit increases
- Medicare part B increases
- Retiree contribution increases

Projection Assumptions

- Economic Assumptions – ASOP 27
- Demographic Assumptions – ASOP 35
- Review of assumptions
- Change of assumptions
- Assumptions treated individually
- Assumptions due to plan changes

Retiree Assumptions

- Covered benefits
- Exclusions to benefits
- Contributions from participants
- Health care delivery system
- Optional benefits
- Anticipated future changes

22.

Learning Objectives:

12 – Complete a Capital Needs Assessment

Source: Dynamic Capital Adequacy Testing – Life and Property and Casualty, CIA June 1999
http://www.actuaries.ca/members/publications/1999/9930e.pdf

Solution:

(a)

- Process of analyzing and projecting the trends of a company's capital position given its current circumstances, its recent past, and its intended business plan under a whole variety of scenarios
- Allow actuary to inform management on implications of business plan and give guidance on significant risks
- Goal is to prevent insolvency by identifying the events that could lead to insolvency and effectiveness of corrective actions, also permits strengthening of monitoring systems in sensitive areas
- That a scenario produces insolvency is not a sign of current or anticipated difficulties, it is the degree of timing that indicate where the company is sensitive, provides guidance in revising business plan
- Report should describe the standard of materiality used and risks evaluated

(b)

- Model should move in same direction and amount as actual company results
- Focus on base scenario, major discrepancies from actual results, a problem if cannot match last year's results, or results do not flow smoothly
- Validity must consider accuracy and internal consistency with accounting
- Organizational considerations: must reflect the industry and company structure
- Same assumptions are high level and affect all areas, should be set by appropriate management
- Must model at corporate level, capital infusions, shareholder dividends, required surplus, investment of surplus, corporate expenses