

## RATING AGENCIES

(S. Feldblum, 3 Oct 2011)

### INTRODUCTION

Rating agencies provide two types of ratings: credit ratings for corporate, municipal, and government bonds and financial strength ratings for life and property-casualty insurers. Credit ratings for bonds are the primary work for Standard and Poor's, Moody's, and Fitch; insurance ratings are primary for A. M. Best's. This syllabus reading focuses on insurance ratings, though it provides background information for credit ratings as well.

Bond ratings make securities markets more efficient by reducing information costs for investors and creditors. Securities underwriters and bond buyers expect issuers of bonds to obtain ratings from one or more agencies. A poor initial rating raises the yield needed to sell the bond, and a ratings downgrade may lower a bond's market value.<sup>1</sup> If the debt is held by a bank (not publicly issued), the debt may be recalled if its rating falls below investment grade status. The firm issuing the debt may be forced to sell assets or cease operations.

Similarly, financial strength ratings make insurance markets more efficient by reducing information costs for agents and policyholders. These ratings are particularly important for insurers, assessing their ability to meet their claims obligations. Reinsurers may need investment grade ratings to retain consumers; independent agents use ratings to place policies with higher rated insurers. Ratings have entered even into regulatory and legal arenas. The Securities and Exchange Commission designated Moody's, S&P, and Fitch as *Nationally Recognized Statistical Rating Organizations* who can provide ratings for certain securities regulations; other agencies have since been added. The NAIC Statement of Actuarial Opinion requires the Appointed Actuary to consider the ratings of reinsurers when evaluating uncollectible reinsurance recoverables. Some Canadian courts require A ratings for insurers writing life annuities to fund structured settlements.<sup>2</sup> Some insurance departments require an insurer to have an A- or better rating to write surety business. Statutory accounting values bonds with ratings of BB (Ba) or lower at market value, not amortized value. Risk-based capital (RBC) bond charges depend on the bond class, which is based on ratings by Moody's and S&P.

Recent downgrades of highly rated debt, such as triple-A rated mortgage-backed securities in 2008-2009, and failures of some highly rated firms (Enron, Worldcom, AIG) have evoked criticism of rating agencies. A 2006 law now requires extensive disclosure of rating agencies methods, to help investors and creditors understand how agencies determine the ratings. The oligopolistic nature of the rating agency industry and the (perhaps) greater efficiency of free markets in determining bond yields has provoked questions about the use of ratings.

### STRUCTURE OF THIS READING

This reading is geared to candidates for the CAS exams. It focuses on financial strength ratings of property-casualty insurers, with background information about bond ratings in other industries. It presents alternative views on disputed issues, such as the structure of the rating agency market: do the agencies make insurance markets more efficient by providing information that is hard to obtain or do they mimic public information?

Section 1 explains how rating agencies help policyholders and agents by assessing the financial strength of insurers and their ability to pay claims years in the future. (Bond ratings affect coupon rates and issue prices; they are not the same as financial strength ratings.) Rating agencies can influence the capital structure, reinsurance arrangements, and business volume of their insurer clients.

Section 2 explains the ratings process: review of public data by ratings analysts, interactive meetings where insurers' managers portray themselves in favorable hues while providing hard data for the analyst's report, and decisions by the ratings committee. Rating agencies balance objective, quantitative data that is consistent across insurers and qualitative information that reflects unique attributes. The agencies combine research by ratings analysts with the experience of ratings committees.

Section 3 explains why ratings are vital for many property-casualty insurers: professional valuations of financial strength are efficient, many outside parties rely on the ratings, and few insurers are still unrated. High ratings are important requirements for reinsurance, surety, structured settlements, Homeowners, and some specialty lines. Many parties to insurance transactions, such as banks providing mortgages, property owners hiring building contractors, courts directing structured settlements, and clients of foreign reinsurers demand products from highly rated insurers.

Section 4 describes the meetings of ratings analysts with the insurer's senior managers. The topics discussed focus on qualitative information not available from public data: corporate form (holding companies, affiliates), capital structure (debt-to-equity ratios); information flow between executives and line personnel; strategic objectives (growth vs profitability; standard vs niche markets); financial goals (risk adjusted return on capital, economic value added); recent acquisitions and divestitures (business synergies; cost savings; integration of corporate cultures); competitive strategies for underwriting, pricing, and distribution systems (strengths and weaknesses vs peers; unique attributes of insurers); reinsurance arrangements and catastrophe exposures.

Section 5 examines salient attributes of rating agency capital standards: risk measures, stochastic models, and principles-based systems. Capital standards provide benchmarks for rating analysts and objective measures for insurers. They differentiate the agencies' methods, providing actuarial validation for the ratings and marketing tools to attract clients. They use up-to-date financial modeling: expected policyholder deficit and statistical distributions for risk measures, economic scenario generators for asset liability management, and discounted cash flow modes for reserving risk. Rating agency capital standards are now widely used for economic value added and return on risk adjusted capital, replacing the leverage ratios used previously.

Appendix A distinguishes financial strength ratings for insurers from debt ratings. A. M. Best's has the longest experience with insurer financial strength ratings; S&P, Moody's, and Fitch provide most debt ratings.

Appendix B covers the history and growth of the rating agencies. The advent of non-investment grade bonds in the late 1970's, the increase in sovereign debt since the early 1980's, and SEC rules led to rapid growth of the rating agencies in the past 30 years.

Appendix C reviews public perceptions of rating agencies: impartial judges of credit worthiness whose analysis of financial strength move markets or an oligopoly protected by barriers to entry paid by the firms they rate.

Appendix D provides exercises to help readers grasp the themes of this reading. The exercises give examples of the statements in the text of the reading.

#### *SECTION 1: RATING AGENCIES PROVIDE MATERIAL BENEFITS TO INSURANCE POLICYHOLDERS*

Policyholders depend on the financial strength of insurers to fulfill long-term promises, but lack the expertise, resources, and time to examine insurers themselves. Rating agencies hire financial analysts, actuaries, and economists to assess the financial strength of insurers. Interactive meetings with senior insurance managers give them proprietary information about operating strategy and competitive advantages. The willingness of insurers to pay for ratings and of agents and investors to base business decisions on these ratings testify to the public acceptance of the ratings. Firms pay handsomely to keep high ratings.<sup>3</sup> Insurers may spend \$1 million a year (or more) on ratings, consisting of fees to rating agencies and internal costs to prepare for rating agency meetings.<sup>4</sup>

Some recent studies suggest that rating agencies do not respond as quickly as the bond and stock markets. Market traders immediately assess a firm's financial strength, whereas rating agency analysts may not respond for months. New information about a firm's operating performance leads to quick changes in stock values. In contrast, agency downgrades are slower; agencies prefer to wait until they verify their information.<sup>5</sup>

*Illustration:* An insurer with a \$200 million market value has \$800 million of bonds with average durations of six and a half years. If interest rates rise 200 basis points, the insurer's market value declines \$100 million.

Investors bid down the insurer's stock price, but rating agencies may not downgrade the insurer for half a year. An insurer's investment portfolio is detailed in its Annual Statement, which is updated annually. The rating agency does not evaluate the insurer as quickly as investors do, and it may wait to downgrade the insurer to see if interest rates turn down.<sup>6</sup>

*SECTION 2: RATINGS PROCESS COMBINES QUANTITATIVE DATA WITH QUALITATIVE VALUATIONS*

Insurers are rated for their claims-paying ability, often to meet requirements of agents, banks, consumers, and courts. Unrated insurers can be at a disadvantage: independent agents hesitate to use them and some banks do not issue mortgages without property coverage from a rated insurer. Over 90% of insurers are rated by A. M. Best's or another agency, and Best's surveys are widely reviewed in the insurance industry. Insurers who do not pay for interactive ratings may receive public ratings, with less control over the information reviewed by the agencies and greater chance of errors.<sup>7</sup>

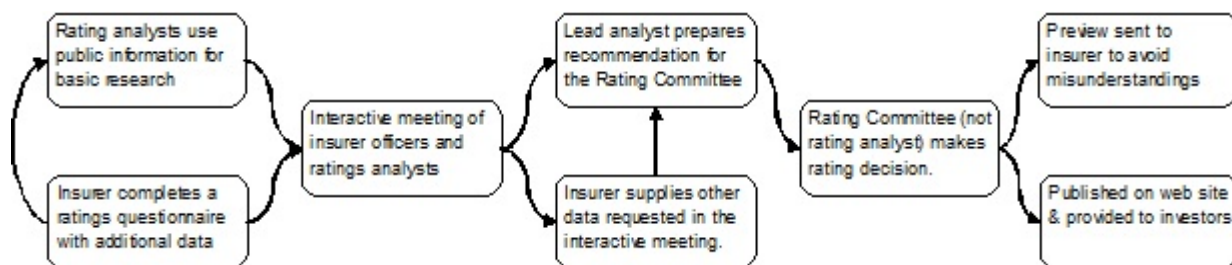
The ratings process is intrusive, time-consuming, and expensive. Ratings analysts meet with insurer officers responsible for underwriting, reserving, reinsurance, financial reporting, investments, risk management, and the insurer's major lines of business. The insurer's business strategy and internal management are clues to its resilience against adverse scenarios. The agencies focus on the quality of an insurer's managers and business strategy. They do not judge if a particular underwriting or investment decision was wise, as random fluctuations and market movements distort observed results. They focus on the insurer's managers: their knowledge of industry trends, their experience with adverse scenarios, and their handling of current problems.

Insurers decide the substance of their presentations, and they select the information they provide to agencies. Rating analysts may question the insurer's views, but they generally avoid specifying the data they want. They evaluate the integrity of their clients: deceptive, misleading, or incomplete information may lead to poor ratings.

An interactive rating has five steps:

1. Background research by the ratings analyst and submission of proprietary data by the insurer.
2. Interactive meetings between ratings analysts and senior managers of the insurer.
3. Preparation of ratings proposal by lead analyst and submission of additional data by the insurer.
4. Decision by the ratings committee after presentation by the lead analyst.
5. Publication of rating on public web sites and provision of analysis to fee-paying subscribers.

*Background to an interactive rating*



1. Public ratings rely on public data only, with no input from the insurer; interactive ratings rely also on proprietary data and meetings with the insurer's senior managers. If an insurer pays for an interactive rating one year but does not want an interactive rating the next year, the agency may issue a public rating based on published financial statements, SEC filings, earnings reports, and similar data. An insurer expecting a downgrade may refuse an interactive rating, but the agency may proceed with a public rating to inform investors (and other audiences) that the previous rating is no longer valid.<sup>8</sup>

Most insurers have financial strength interactive ratings, often from two or more agencies. An insurer already rated by A. M. Best's may request another rating from S&P, Moody's, or Fitch, for several reasons. The insurer may want to issue debt through a holding company and seeks a rating from an agency with more experience in debt ratings; it may be publicly traded and wants a rating from an agency better known to investors; it may be dissatisfied with its current rating and believes the second rating will be higher.

*The insurer prepares a presentation for the interactive meeting consistent with the agency's outline.*

The rating agency assigns an analytical team to conduct basic research, using data from the insurer's Annual Statements and GAAP reports of recent years: reserve estimates from Schedule P, reinsurance recoverables from Schedule F, investment portfolio from the asset schedules. The analysis is *not* shared with the insurer; it serves as a check on the insurer's forthrightness and integrity and is used where the insurer's submitted data are absent or dubious.

Public data are rarely sufficient for ratings analyses. For example, reinsurance data do not show attachment points and limits of in-force treaties; investment schedules have scant data on derivative securities; reserving schedules do not show the segmented data that insurers use for their estimates. Rating agencies ask insurers to disclose underwriting, reserving, investment, and operating performance along with supporting data.

Rating agency analysts generally specialize by industry.<sup>9</sup> The rating team has a lead analyst familiar with the lines of business written by the insurer and one or more specialists. For example, if the insurer writes property exposures in Gulf Coast states, an analyst with expertise in windstorm models may join the team. If the insurer writes long-tailed lines of business, one analyst may be an actuary to prepare reserve analyses.

The rating agency requests certain presentations at the interactive meeting. Some are generic, such as business strategy and risk concentration guidelines, with a focus on information flow: how results are reported to executives and how directives are passed down to underwriters. Other topics are specific to insurers writing certain lines, such as how asbestos claims are handled or what reinsurance is used to control windstorm exposures. The insurer decides on the content of the presentation and may add additional topics.

For an initial meeting, rating agencies ask insurers to provide extensive background material. Some agencies provide checklists, to ensure complete information. The common types of requested information are

- Statutory Annual Statements and GAAP financial statements for past five years.
  - Quarterly financial statements for the past year, if available.
- History of the company focusing on major events, such as mergers, acquisitions, and expansions.
  - Biographies of senior executives with their insurance industry experience.
- Investment strategy, policy, and guidelines, and
  - How the investment committee of the Board of Directors reviews investment department activities.
- Organizational charts covering corporate structure and senior manager reporting relations.
  - Capital structure showing debt issues by holding companies and affiliates.
- Product descriptions and business strategy for each line.

The substance of the qualitative information varies greatly. Business strategy by line may be a paragraph for one insurer and a report for another. Rating agencies evaluate how insurers respond to the requests for information: does the insurer honestly compare its performance with that of its peers or does it provide summary figures that are already publicly available?

The interactive meeting is like an intricate dance: the rating agency seeks the insurer's knowledge of its risks and potential liabilities, and the insurer seeks the agency's view of its financial strength. The agency reviews Schedule P figures but wants also the insurer's reserve estimates, especially for exposures that are hard to estimate from publicly available data. During the interactive meeting, it compares the insurer's estimates with its own valuations from public data. The public data are used to evaluate the integrity of the insurer. If the

insurer's workers' compensation reserve estimates agree with Schedule P figures, the rating agency is more likely to trust its asbestos and pollution reserve estimates.

For example, the rating agency adjusts reserves in long-tailed lines for adequacy and discounts them at a conservative discount rate. But reserve adequacy, investment yields, and loss payment patterns differ among insurers, so the rating agency wants the insurer's analyses of reserve adequacy and discounting methods.

If the insurer has long-term debt through a holding company, goodwill, or substantial deferred tax assets, the rating agency computes net income after debt payments and taxes and re-states leverage ratios as a function of tangible equity capital.

An insurer should not withhold potentially damaging data that the analyst does not request. An insurer who strengthens year-end reserves after assuring a rating agency that its reserves are adequate loses credibility and worsens the agency's reputation with investors. The agency may place the insurer on a ratings watch until its next meeting, and it is less likely to trust the insurer's future reserve estimates. For insurers who need ratings each year, it is almost always better to inform agencies of likely problems before they become evident.

*Illustration:* Rating agencies use industry ratios of asbestos loss reserves to annual loss payments in recent years. If an insurer presents exhibits with low ratios that are not supported by data, the exhibits may not be presented to the rating committee. Some insurers tell rating analysts that the analysis is confidential and can not be shared. The analyst will not demand more information. But the analyst gives the rating committee a conservative (worst-case) estimate from industry figures, rather than the insurer's figure. The estimate reserve is usually greater than the insurer's own figures.

An insurer's officers are reluctant to disclose weaknesses, and their lack of candor may harm the rating. Undisclosed credit problems that lead to future write-offs ruin the insurer's credibility and may contribute to ratings downgrades. Informing rating agencies of expected write-offs of receivables before they occur may keep a good rating. Rating agencies who learn of adverse developments from the trade press after the management meetings often downgrade the offending firm.

Some insurers use a dry run with a ratings advisor. Financial underwriters such as Morgan Stanley serve as ratings advisors for firms issuing new debt, and actuarial consulting firms perform a similar role for insurers. The advisor takes the place of the rating agency, meets with the insurer's senior managers, and tells them their impression of their presentation. The insurer's managers may learn that their reticence harms the agency's view of their integrity, and that they must supply hard data to support a high rating.

*A rating committee decides the rating; the rating analyst presents the insurer's data to the committee.*

To promote consistency, the actual rating decision is made by a ratings committee, not an individual analyst. Rating analysts have different views on financial strength and rating factors. The lead analyst prepares a rating proposal for the committee, but the rating decision comes from the committee.

The rating committee has no permanent members; it is formed anew for each case from senior members of the agency. The insurer does not know its members, to avoid improper inducements. The ratings analyst is an intermediary, summarizing public data and proprietary information from interactive meetings into a report to the committee. The analyst may prepare an initial rating that is reviewed by the committee. Analysts are flexible in meetings with insurers, letting insurers volunteer information instead of eliciting data by intrusive cross-examinations. Some insurers mistakenly think that an analyst's acceptance of an unsupported assertion is a positive sign. But the rating committee relies on hard data. Experienced insurers provide the analyst with convincing data supporting their story.

Agencies generally use a top-down approach, starting with economic and industry forecasts and proceeding to the insurer's position among its peers. The committee evaluates underwriting cycles by line of business and

then the insurer's own performance, risks, and management quality. The industry evaluation is made by senior officers of the rating agency, bringing more consistency into the ratings.

The rating analyst is the insurer's advocate, and the insurer makes certain that he or she has the necessary supporting data. Knowledgeable insurers provide the rating agency analyst with the data needed for the report to the rating committee. The interactive meeting between the insurer and the analyst is the preparation for rating meeting between the analyst and the committee. Tangential material, such as slide presentations that are not backed by hard data, are not presented to the committee. Analysts collect data and information about the insurer to present to the rating committee. Analysts who receive inconsistent or incomplete data may present the information to the rating committee in a less favorable manner.

### *Ratings and outlooks*

The committee decides on ratings by majority vote, though opinions of senior officers of the agency are often followed. But agencies hesitate to change ratings too quickly. Erroneous downgrades anger clients, who pay the agency's fees; erroneous upgrades ruin the agency's reputation with investors and agents.

Agencies delay down-grades by repeating the current rating with a negative outlook for several months. They reduce the rating only if the insurer can not raise capital or otherwise assuage the committee's concerns.

Initial ratings may be private or public; subsequent ratings are generally public. The rating agency informs the insurer of the committee's decision. If the insurer requested an initial rating and the agency has not previously rated the insurer, the insurer either agrees to a press release or requests that the rating be kept private. Decisions of the committee are appealed only if the insurer believes a material error was made and provides data correcting the error.

If the agency has previously rated the insurer, the rating is posted on the agency's web site and released to the press. Initially, rating agencies required subscriptions to their ratings and charged subscribers for the rating information. But information travels fast in efficient capital markets and most users need only summary figures (such as the letter rating). Rating agencies now freely provide basic information, such as the letter rating, and require subscriptions for more detailed assessments of insurers' solvency.

### *SECTION 3: RATINGS ARE ESSENTIAL FOR MANY PROPERTY-CASUALTY INSURERS*

Almost all insurers are rated, compared to a small percentage of firms in other industries; some large insurers have ratings from two or more agencies, despite their high cost. Other firms need ratings if they issue debt securities or are publicly traded. Most insurers have no debt and are not publicly traded, yet almost all are rated, for three reasons: (i) agents are wary of unrated insurers, since they might be financially distressed, (ii) third-parties rely on outside assessments of insurer solvency, and (iii) rating agencies are efficient at assessing financial strength.

*Unrated insurers:* In other industries, most firms with no debt have no ratings. But almost all insurers are rated, except for new firms. It is less expensive to pay for a rating than to demonstrate financial strength individually to others.<sup>10</sup>

*Reliance by consumers and third parties:* Independent agents use ratings to select insurers, and insurers use ratings to select reinsurers. Agents might be sued for providing insurance from a financially weak insurer. Reinsurance officers at primary insurers must evaluate the ability of reinsurers to pay obligations years in the future. They rely on commercial ratings, and an unrated reinsurer might not even be considered.<sup>11</sup>

*Efficiency:* Evaluating financial solidity requires expertise and extensive data. Most agents, underwriters, and even some regulators do not have the time, experience, or resources of the rating agencies to thoroughly research the financial condition of all insurers.<sup>12</sup>

*High ratings are important for certain lines of business.*

Financial ratings are particularly important for reinsurance, surety, structured settlements, homeowners, and some specialty lines. Insurers with low ratings are not able to compete in certain markets. Rating agencies assess financial risk efficiently and reduce costs when safety is essential. Third parties who rely on insurance coverage often demand that the insurer obtain a rating, as the paragraphs below describe.

Reinsurance is a global market, and many reinsurers are not licensed in the United States. Excess-of-loss coverage is long-tailed, and reinsurers are exposed to catastrophe and other large claim risks that are hard to foresee. Primary insurers need to assess the financial strength of reinsurers to balance premium vs credit risk. Strongly capitalized reinsurers may charge higher prices; some reinsurers provide letters of credit or other collateral to secure their obligations, but the security is expensive; weakly capitalized reinsurers may charge low premiums. A primary insurer can use the reinsurer's rating as one tool to assess the financial strength of the reinsurer. Small reinsurers with A ratings can compete with larger peers. A large reinsurer that is downgraded below investment grade may not be able to renew its treaties.

*Illustration:* Scor Re was the ninth largest global reinsurer in 2001. After large losses in 2001-2002, its net worth declined 70%, and its rating dropped to BBB- by the end of 2003, below the A- level normally expected of large reinsurers. It could not renew treaties with primary insurers outside its home country, and it left several reinsurance markets.<sup>13</sup>

Some reinsurance treaties explicitly link ratings and security. A treaty with a downgrade clause may specify that if the reinsurer fails to maintain an certain rating, such as A- or better, it must deposit funds covering its obligations or provide letters of credit as security. The downgrade clause benefits both parties: the reinsurer avoids the costs of collateral as long as it maintains its rating, and the primary insurer gets collateral to cover reinsurance recoveries if the reinsurer cannot meet its obligations.

Insurance often provides security to a third party. For example, a *surety* ensures that a construction firm will complete a project. Many sureties are specialized firms, exposed to high surety losses in recessions. Principles may require construction firms to obtain surety contracts from A rated companies. The cost of examining the surety's finances and risks are incurred by the rating agency, not by each principal. The rating also reduces the surety's costs. Instead of reducing prices or advertising heavily to persuade principals of its financial stability, it provides its rating.

Banks require property insurance to issue mortgages, often requiring that they be listed in the policy as payees up to the amount of the mortgage. As a lien-holder, the bank receives the insurance payment if the property is destroyed. The banks can not independently verify the financial strength of the insurer, so they rely on commercial ratings.

Personal property is subject to natural catastrophes. An insurer with excessive risk (high concentration of exposures in coastal areas with inadequate reinsurance arrangements) may become insolvent after a hurricane and unable to pay claims to banks providing mortgages. It is too expensive for banks to assess the solidity of each insurer. Instead, banks may require Homeowners coverage on mortgaged properties from insurers with investment grade ratings, relying on rating agency's risk evaluation.

Structured settlements indemnify accident victims by periodic payments, often funded by life annuities. These settlements are particularly important for young children or persons incapable of handling large sums of money. The casualty insurer paying the structured settlements may buy a life annuity from a life insurer to fund the payments. To ensure that claimants receive secure funding, some Canadian courts require structured settlements from A rated insurers, and plaintiff attorneys often make similar demands in the U.S. Courts and attorneys can not independently judge the financial strength of insurers, and they rely on commercial ratings.

#### SECTION 4: THE INTERACTIVE MEETING WITH THE INSURER'S SENIOR MANAGERS

The rating agency sets the agenda for the interactive meeting, with the insurer providing the substance. The rating agency expects to meet with senior managers for investments, underwriting, finance, actuarial, and reinsurance, as well as with the chief risk officer. Organizational, management, and capital structures, operating characteristics, business objectives, financial goals, reinsurance arrangements, and competitive strategy are major elements of interactive meetings. An insurer with much debt issued by a holding company can expect extensive analysis of its capital structure and associated risks, and a stand-alone monoline medical malpractice insurer can expect a focus on its reinsurance arrangements.

##### *Interactive Meetings Focus on Qualitative Issues Not Available from Public Data.*

Quantitative data, such as operating income, combined ratios, and investment yields, are not always ideal predictors. Underwriting cycles, asset volatility, and catastrophes affect past performance but may not affect an insurer's future returns. Rating agencies stress qualitative aspects of insurers' strengths and weaknesses, such as business strategy and management expertise.

Many qualitative attributes, such as exclusive sales forces, high name recognition, and reputations for honest claim settlement are expensive to develop and have uncertain benefits. Rating agencies judge the costs vs potential rewards of developing qualitative attributes. For example, acquisitions and mergers have uncertain benefits and high costs; they may lead to a ratings upgrade by one agency and a downgrade by another. In 2010, after multi-billion dollar investment losses and a government bail-out, AIG sold parts of its international operations to Prudential (a British life insurer) and Metropolitan Life (a New York life insurer) at prices favorable to the buyers. Most analysts viewed the acquisitions positively for Prudential and MetLife, who replaced AIG as global leaders. But Moody's changed its outlook on MetLife to negative after the deal, issuing a press report that the acquisition may not produce the anticipated synergies.

##### *Qualitative attributes must be objective and measurable.*

Underwriting expertise is critical for insurance operations, but rating agencies can not easily judge underwriting expertise. Quality of claims service is subjective; rare is the insurer that does not say its quality is best. Brand names may lead to greater consumer persistency and high renewal rates. But brands are more important for industries with high profit differentiation. Many consumers view insurance as the same from all firms. Brand loyalty may lead to high renewal rates but not to better new business. Economies of scale may reduce costs from larger volume of business. Insurers serving small niche markets may have lower ratings, unless they show long-term higher profits from greater underwriting expertise. But large insurers must show measurable effects of size to improve their ratings.

*Organizational structure:* Does the insurer have subsidiaries or affiliates; is it owned by a holding company? Are subsidiaries and affiliates used for pricing (different rates by legal entity), are they intended for operations in specific states or countries, or were they formed to handle discontinued business (asbestos, pollution)? An outline of the insurer's organizational structure can be gleaned from public documents, but the reasons for the different entities is not shown. Rating agencies are especially concerned about off-balance sheet liabilities for debts of affiliates. They first evaluate each legal entity, and then raise or lower the rating for benefits or liabilities of the corporate group. For example, a U.S. insurer that has a Japanese subsidiary and guarantees its liabilities to satisfy Japanese regulators faces risks that a domestic-only company does not have.

*Capital structure:* Many insurers are financed by equity only; others have complex capital structures. Topics discussed in rating meetings include: Is the insurer owned by a holding company that has issued debt? Is the debt guaranteed by the insurer's assets? Has the insurer or holding company issued hybrid securities, with debt characteristics but treated as equity in statutory accounting? Has the insurer secured loans by affiliates or subsidiaries? Have subsidiaries gone bankrupt without being bailed out by parents? What is the coupon rate on the holding company debt? How much of statutory capital is intangible (goodwill, deferred tax assets)?



The relevant financial ratios depend on the capital structure. Agencies examine net income after taxes, debt, and lease charges. The debt may be issued by a holding company, an affiliate, or a subsidiary, and it may not be evident on the insurer's own financial statements. If the insurer has intangible capital, as is often true after an acquisition, the rating agency computes its ratio of debt to tangible capital to ascertain its financial leverage.

*Management structure:* How long have senior managers worked in the insurance industry? Are business lines and branch offices relatively independent, or do home office managers control major underwriting decisions? Are line operations separate from staff operations, or do business units operate as small insurers with internal staff support? For example, does personal auto have its own actuarial, finance, and claims staff?

No one structure is necessarily better than others. Rating agencies focus on how quickly senior managers learn of emerging risks. For example, accelerating medical inflation may cause persistent losses in several lines of business. Separate management for each line may help underwriting flexibility, but senior managers must be able to assess overall enterprise risks.

*Strategic objectives:* Insurers have different objectives and business strategies. Some insurers seek continued growth, even at the expense of short term losses; others seek stable profits even at the cost of lower market share. Rating agencies ask: Does the insurer follow market prices through hard and soft markets? Does the insurer seek niche markets? Does it have a strong brand name? Does it stress low cost for its products?

Size and efficiency are important, and rating agencies evaluate market share, competitors, and government licensing as an exclusive distributor. Efficiency may increase market share, which leads to further benefits. In the United States, low acquisition costs and independent pricing by personal lines direct writers led to their dominance of personal auto and homeowners, economies of scale, and further cost reductions.

Market share growth from lower prices is a two-edged sword. Rating agencies are wary of rapid growth that is not justified by other insurer attributes. Interactive meetings are essential for judging qualitative attributes, since the rating agency relies on the insurer to interpret the observed data. Rapid market share growth is good if it reflects superior products and bad if it reflects underpricing. The insurer must demonstrate that its growth rests on successful business strategies and validate them by actual performance. An apparent advantage with poor operating results means the insurer can not convert favorable attributes into market growth or profits.

Agencies focus on coherence of strategies and insurers' ability to attain them. Insurers with costly distribution system might focus on niche markets with alternative distribution systems for target consumers, not on price competition for generic products. Insurers accepting low returns to gain market share should be able to demonstrate the long-term rationale for this strategy and their ability to withstand short-term losses.

*Financial goals:* Insurers and rating agencies use a variety of performance measures. Financial statements show statutory and GAAP earnings, and many insurers compute some type of economic income. Rating agencies ask: Does the insurer target return on statutory surplus, GAAP equity, or invested capital? What financial measures are used for performance measurement and manager bonuses? How closely have actual returns matched target returns in past years? How do the target returns compare with industry averages? How does the insurer estimate economic income? Does it use economic value added (EVA) or risk adjusted return on capital measures (RAROC)?

*Acquisitions:* Profitable insurers have the money for good acquisitions, which lead to further profits. Some large insurers achieved their dominance by fleets of inter-related companies built from sensible acquisitions. But acquisitions can be as harmful as they are helpful. Fewer than a third of corporate acquisitions increase the market value of the combined entity. Acquisitions may cause downgrades if the agency doubts the insurer can absorb the new firm into its culture or if expected synergies offset costs. An acquisition may fail to produce the expected benefits, and rating agencies look closely at complex corporate transactions.

Insurers may discuss potential acquisitions with rating agencies to avoid actions that may spark a downgrade. After the acquisition, they provide data showing expense reductions, division of responsibilities, and smooth transition of the new managers into the parent firm.

Rating agencies closely examine acquisitions that strain the resources of the parent. They ask: How well have past acquisitions been integrated? Does the insurer contemplate further acquisitions? Even good acquisitions prompt rating reviews, since anticipated synergies often dissipate before they are realized.

*Diversification may reduce insolvency risks, but it must be balanced against core competencies.*

Diversification smooths income and reduces solvency risk, but may reflect a straying from core competencies. Geographic spread of risk is essential for catastrophe perils, such as hurricanes for homeowners or terrorist attacks of office buildings for workers' compensation. If the insurer has underwriting expertise in each region, the geographic spread of risk reflects better agent placement. Single state insurers rarely receive the highest ratings, unless they are exceedingly well capitalized or are part of a larger insurance fleet.

Diversification by product is reasonable only if it is done for underwriting purposes. Insurers, like other firms, focus on core strengths where they have underwriting expertise and cost advantages. Expansion to new lines is risky: high costs of new business, lack of expertise, and costs of new distribution systems. Rating agencies examine insurers with much new business to judge if synergies with existing business justify the expansion.

Some rating agencies emphasize core competencies more than diversification. Insurers with well-structured exclusive agency or direct marketing systems need not use other distribution channels. Multiple distribution channels sometimes cannibalize each other, with growth in one channel coming from declines in others.

*The ideal qualitative attributes are product innovations that are not easily copied.*

Good qualitative attributes differentiate an insurer and are not easily copied. In other industries, successful firms may have patents and trade secrets. In food industries (soft drinks, chocolates), firms may even avoid patents to keep their formulas secret. Brand names and patents do not always reflect objective differences. For example, consumers of beer and cigarettes are loyal to particular brands even if they can not distinguish the brand in blind tests.

Insurance policies, class plans, and rates are public information that are easily copied and cannot be patented. For example, medical payments coverage in personal auto, homeowners, and general liability provide first aid treatment to accident victims and have high appeal. They cost little because of their low limits and may even reduce costs by preventing bodily injury claims. But the coverages are now offered by all insurers. Rating agencies may not view coverage innovations as a persisting qualitative attribute.

Class plans are best if they are not easily copied. Generalized linear models gave some insurers long-term advantages because their peer companies did not have the actuarial and statistical expertise to replicate the plans. More refined class variables, such as more age distinctions in personal auto, are easily copied and have less long-term value. The first insurer to use a new class variable, such as credit rating in personal auto, may build a profitable block of preferred business. High market share with strong policyholder loyalty (many renewals) may lead to long-term profits.

New product designs, such as package policies (homeowners and small businessowners), high deductible liability coverages, claims-made professional liability; and various specialty coverages, give the first insurers several years of high profits. Low cost generic products with high returns on capital, such as personal auto policies with discounts for good credit scores, and differentiated products with premium pricing, such as high deductible policies in states with large workers' compensation residual markets, were ideal product innovations. Their success lead eventually to copying by others, but they provided strong competitive advantages for the insurers who first sold them. But policy forms are filed with states, publicly known, and not patented. Many new product designs have little effect on long-term profits.

*Optimal operating (underwriting) characteristics depend on the insurer's lines and business strategy*

Rating agencies stress balance sheet strength (including loss reserve adequacy) and operating performance. They emphasize balance sheet strength for writers of short-tailed lines of business with high catastrophe risk. They emphasize stability of annual earnings for writers of long-tailed lines with high reserving risk.

Underwriting is the core of insurance operations. The pricing and underwriting standards that underlie an insurer's strategy are not easily quantified. The insurer's task is to persuade the rating agency that competitive strengths will persist and weaknesses will be corrected.

Rating agencies judge insurers against their peers and set objective criteria for consistent evaluations. All insurers say they underwrite carefully and provide excellent service; these assertions carry little weight. Rating agencies evaluate the coherence of the insurer's strategy. Products geared to specific markets with profitable risk-adjusted returns on capital indicate a sustainable business strategy.

Rating agencies have financial ratios for each insurer: combined ratios, investment yields, and pre-tax net income. Interactive meetings allow rating analysts to evaluate the underwriting and pricing characteristics that provide competitive advantages to the insurer. The paragraphs below summarize the operating issues normally covered in the interactive meetings.

*Lines of business:* What competitive advantages does the insurer have in its major lines of business? How do niche markets (earthquake insurance, substandard auto, surety, excess layers) fit with the major lines? Does the insurer sell package policies to select policyholders?

*Pricing:* Rating agencies evaluate pricing strategy, not specific techniques: does the insurer target high or low quality insureds? Insurers targeting high quality insureds may reduce the price based on conservative underwriting and focus on high persistency for long-term profits. Insurers targeting low quality insureds may increase the price to cover higher than average losses and focus on underwriting standards that weed out bad risks. In many lines, high cost insureds have higher risk but higher margins. Low cost insureds have low risk but low margins.

*Underwriting controls:* In long-tailed lines of business, pricing and underwriting errors may compound over many years. Rating agencies want to know what feedback line underwriters get. For long-tailed lines, how quickly do they learn their policy year results? For lines with catastrophe exposure, do they know their contributions to tail value at risk before catastrophe events occur?

Insurance losses are often settled years after policies are written, and underwriting managers may not have good measures of profitability. Actuarial bulk reserves, excess-of-loss reinsurance costs, and costs of holding capital must be allocated to underwriting offices so that line managers can estimate ultimate results.

*Illustration:* An umbrella underwriting unit often has favorable policy year combined ratios on direct business, since losses emerge slowly and may not be recognized for years. Rating agencies judge whether bulk reserve estimates, reinsurance costs, and the costs of holding additional capital for umbrella policies are provided to the manager of the umbrella underwriting unit and used to assess the return on capital.

*Long-term strategy:* Rating agencies stress the strategic considerations affecting long-term profits. How does the insurer expect to outperform its peers? What are the insurer's strengths and weaknesses? How well does the insurer know the strategy of its peers? Does the insurer target niche markets, or does it compete on cost for all insureds?

The rating agencies use a multi-stage analysis: industry, line, and insurer. They evaluate first the prospects for the property-casualty insurance industry based on expected investment yields and underwriting returns. Bursting of a housing bubble and widening credit spreads in 2007-2008 led agencies to downgrade insurers with exposure to mortgage-backed securities and corporate bonds (much of the industry).

Rating agencies evaluate prospects for each line of business based on its likely growth, current capitalization, and insurers' negotiating power with their consumers and suppliers. For example, workers' compensation for manufacturing firms faces declining revenue as workplace hazards decrease. Insurers that served traditional manufacturing firms face severe contraction unless they have feasible strategies for alternative markets. The third stage focuses on the individual insurer, evaluating its competitive advantages relative to its peers.

*Distribution systems:* Supplying products to consumers is expensive: insurance acquisition costs may be 20% or more of premium. Efficient systems reduce costs and improve marketing control, but they require high up-front investment, such as subsidies to exclusive agents in their early years, discounts for insurance coverage sold through banks, discounts for insurance sold through voluntary associations, advertising campaigns to establish brand names, direct response insurance sales to avoid agency costs, and participation in internet web sites. Initial expenses lower current profits but may improve the insurer's future profits.

Rating agencies stress control, cost, and consumer access. Does the insurer control its distribution system (exclusive agents, direct marketing) or does it work through independent agents and brokers? Are its costs lower or higher than those of its peers? What are the conversion ratios (new policy sales over quotations) and renewal ratios by line? Does the distribution system reach the target market?

*Control:* Exclusive agents give insurers control over their consumers: they better select markets and classes and retain insureds. The agent is an employee of the insurer, and the insurer own the rights to renewals. The insurer decides the marketing strategy and targets consumers. It can price higher without fear that agents will switch consumes to competitors; it can price lower to gain market share and retain the renewals.

In contrast, independent agents own their renewals and can switch policies to competing insurers. They avoid insurers in financial distress, lest they be responsible for policyholder losses. An unexpected loss from stock market declines, the effect of a hurricane on the insurer's capital, or adverse reserve development may result in a ratings downgrade, leading agents to switch policies to higher rated peers. The lower business volume and a perception of financial weakness may also encourage agents to avoid the insurer.

Rating agencies consider the control that *direct writers* have over their business. A direct writer can more easily change its mix of high vs low cost homes or urban vs rural autos to meet perceived risks. Quantitative data may not show poor performance in the current year, but lack of control over consumers may hurt future results. The following paragraphs describe how rating agencies balance attributes of distribution systems.

*Cost:* Independent agents have high costs. Exclusive agency forces are expensive at first, requiring multi-year subsidies for new agents to set up offices, but they have high retentions at low cost in subsequent years. Independent agency insurers rarely adopt exclusive agency systems, lest their current agents switch business to competitors. Exclusive agencies reduce costs for long-persisting lines (personal auto, homeowners, small commercial) by their low renewal commissions. Similarly, direct marketing has low variable costs and works well for insurers who dominate markets, but it may have high fixed costs (advertising) and low response rates.

*Consumer access:* Internet sales are low cost, but they may not provide access to preferred consumers. Visitors to insurance web sites are often high cost insureds unhappy with their current premiums. The insurer lacks screening by the sales agent. Direct marketing through voluntary associations gives access to preferred consumers, but the response rate is low, causing a risk of adverse selection. Some direct marketing systems allow little selection of insureds. Many insurers have been burned by TV sales that led to adverse selection.

Direct marketing distribution systems do not promote brand loyalty, since the insurer or agent has no personal contact with consumers. TV marketing stresses low prices, which may limit profits. Voluntary associations may switch an entire block of business to a competitor with lower rates.

*Growth:* Growth is a result of past profit and a harbinger of future profit. Successful insurers grow, and growing insurers achieve market power. But growth must be judged critically. Is the insurer growing faster or slower

than its peers? Does its growth vary with the underwriting cycle? Does growth stem from lower premiums or better underwriting? In what lines does the insurer expect to grow? Where does it expect to shrink?

Rating agencies are especially concerned about insurers who can not easily shift away from low return blocks of business. An insurer with an exclusive agency force in a state that has suppressed rates below adequate levels may feel that it can not reduce its premium volume because of commitments to its agents. Nimble insurers forecast expected profits for different states and lines and adjust their marketing accordingly.

Insurers speak of profitable growth; rating agencies judge if the growth is indeed profitable. Almost all insurers say they do not follow markets blindly, cutting rates as underwriting cycles turn down simply to retain market share. Rating agencies assess if business strategies seem likely to succeed. For example, a rating agency may question an insurer that says it writes only profitable business and reduces sales in soft markets but has a direct writing sales force that is compensated primarily as a percentage of new business.

*Technology:* Insurance is a technology driven industry. Insurance policies have changed little, but pricing and underwriting have changed over time as new technology has allowed better analysis of data. Rating agencies judge if an insurer's technology is up-to-date. Does the insurer provide relational databases to pricing and accounting personnel? Does the insurer use current pricing, reserving, underwriting, and ERM tools?

Generalized linear models (pricing), stochastic reserving tools, credit scoring (underwriting), and economic capital models are current actuarial tools viewed favorably by rating agencies. These actuarial tools take several years to implement, and they have tremendous effects on selecting and valuing good business.

*Regulatory interaction:* Insurance is highly regulated. Quick approval of policy forms, premium rates, and class plans from regulators gives insurers competitive advantages over their peers. Rating agencies check if the insurer lobbies in state and federal arenas or relies on trade organizations. Does the insurer have rate filings and class plans approved by state insurance departments, or does it rely on bureau filings and class plans?

*Claims handling:* Insurers' cash outflow depends on their claims handling. Some insurers settle claims quickly to avoid litigation expenses; others fight dubious claims to avoid future claims. Asbestos claims show the merits of both strategies. Settling a class-action suit quickly is less risky and usually costs less than allowing the suit to proceed to trial. But quick settlements prompt more claims.

Rating agencies ask: Does the insurer promote cost-saving claims handling programs: back-to-work programs in workers' compensation, structured settlements in products liability, quicker claim payments in personal auto? What percentage of claims are litigated? How does the insurer's claims settlement practices compare with those of its peers?

*Expense management:* Well-managed insurers keep expenses reasonable; left unchecked, expenses rise quickly. Rating agencies examine if the insurer's expenses are higher or lower than average. Does the insurer monitor expenses in sufficient detail to identify and correct poor performance?

High expense ratios impair competitiveness and form a drag on earnings. Insurers with high expenses may lose business to more efficient competitors. By comparing the operating practices of peer companies, rating agencies try to identify inefficient insurers.

#### *Current reinsurance arrangements vs reinsurance recoverables on past exposures*

Rating agencies focus on the insurer's reinsurance arrangements vs its catastrophe and large loss exposures. After Hurricane Andrew in 1992, several Florida Homeowners insurers became insolvent because their direct losses exceeded the limits of cat covers.

*Coverage:* Rating agencies examine the insurer's current reinsurance program and recent changes in treaty limits, attachment points, and lines of business covered. They ask insurers for details of catastrophe covers

and corporate excess-of-loss treaties. Reinsurers are often excellent judges of a reinsured's financial strength, and their underwriting and pricing actions may signal potential risks. Higher attachment points or a greater coreinsurance percentage may indicate a reinsurer's concern that risk quality is poor. (It may also indicate the primary insurer's belief that less coverage is needed or the reinsurance is too expensive, so this information must be examined carefully.) Changes in reinsurance pricing may reflect past results. Increasing reinsurance rates that do not match reinsurance underwriting cycles may indicate the reinsurer's belief that the reinsured is financially distressed. Reinsurers have better knowledge of the primary insurer's underwriting portfolio than the rating agencies has, so relying on reinsurers' pricing decisions is often useful.

*Catastrophe modeling:* To evaluate insurers with high property exposure in catastrophe-prone areas, rating agencies may compare the insurer's gross catastrophe modeling with its catastrophe covers. Catastrophe models generally provide the gross loss at various percentiles of the loss distribution, such as a 1 in 250 year event (the 99.6 percentile). An insurer may have a stated ERM goal of "no more than a 10% loss of surplus" except for a 1 in 250 year event. The rating agency would compare the attachment point and cover of the catastrophe treaty with the insurer's surplus and its modeling of catastrophes.

*Risk transfer:* Not all reinsurance transfers risk. Financial reinsurance, funds withheld treaties, and treaties with offshore reinsurers are potential warning signs to rating agencies. Some arrangements circumvent the strictures of statutory accounting; others hide solvency problems.

#### SECTION 5: RATING AGENCY CAPITAL REQUIREMENTS

Since the late 1990's, rating agencies have been publishing capital requirements for each rating. Insurers set policy prices, limit business expansion, avoid high-risk policies, sell blocks of business, or structure reinsurance to meet these capital requirements. Pricing actuaries once used premium to surplus or reserves to surplus leverage ratios for discounted cash flow (NPV and IRR) pricing models. Now they are more likely to use the required capital for their desired rating from Best's, S&P, Moody's, or Fitch.

Rating agency capital standards began as adaptations of the NAIC RBC requirements. The agencies modified the RBC formula to include other risks, such as interest rate risk, catastrophe risk, or asbestos and pollution loss reserves. They changed the RBC risk measure from the worst case year to value at risk, tail value at risk, or expected policyholder deficit. Moody's and Fitch use stochastic economic capital models.

Capital standards are salient differences among the rating agencies. The agencies all use data from Annual Statements, SEC filings, analyst meetings, and earnings reports, and they discuss similar management issues in their interactive meetings with insurers. But their capital formulas differ greatly, and they stress the accuracy and flexibility of their models to attract clients. Each rating agency chose a different means of competing for clients by producing a better capital adequacy formula.

Rating agencies examine quantitative measures of balance sheet strength and operating performance and qualitative analyses of management quality, operating strategy, competitive advantages, and ERM practices. Agencies say that qualitative items are important: how ERM is used to mitigate risks and whether competitive advantages are sustainable. But judging qualitative items is not easy. Insurers provide idyllic pictures of ERM practices and competitive strategy at interactive meetings, and agency evaluations are subjective.

Rating agencies strive for consistency: clients of similar financial strength should be rated similarly. Standard insurance financial ratios (quantitative data) do not capture qualitative items that affect long-term profitability, but a stress on qualitative issues may cause inconsistencies: the analyst for one insurer may give credit for some qualities that another analyst does not.<sup>14</sup> To ensure consistency, agencies relate ratings to economic capital measures and issue ratings by committees independent of the ratings analyst.

To be consistent, analysts' ratings should have the same meaning. If two analysts each recommend 30 "A-" ratings one year, the number of defaults should be similar. But an A- rating has a negligible default probability, so differences among analysts are hard to validate. Rating agencies therefore use quantitative measures to ensure consistency. Analysts should have similar capital ratios among their A- clients. Rating agencies publish the expected capital ratios for each rating, though qualitative factors influence the final rating. Analysts begin with the capital adequacy measure and adjust for management quality, ERM, and competitive advantages.

To succeed, rating agencies must distinguish weak vs strong insurers: identify stable insurers who are under-rated by other agencies (gaining clients who will pay for the rating) and identify weak insurers who are over-rated by other agencies (strengthening a reputation for accurate ratings). All agencies have the same data (accounting statements and presentations by clients), use similar methods (quantitative ratios of balance sheet strength and operating performance), and produce the same product. Ratings are easily understood by investors, but they are perhaps less accurate than a perfectly competitive market might provide.

The capital models of the four major agencies differ. A more accurate model helps an agency attract insurers who might be mis-rated by generic models. Inaccurate capital models may damage an agency's reputation or lower its market share. A rating agency with high capital standards and low ratings may lose clients. A rating agency with low standards and high ratings may lose investors' trust in its objectivity or financial expertise.

Best's adopted underwriting risk estimates, expected policyholder deficit risk measure, and interest rate risk from the American Academy of Actuaries task force on risk-based capital. By building on the work on casualty actuaries involved in RBC systems, it had the first sophisticated capital model among the rating agencies.

Moody's and Fitch developed stochastic capital models, since fixed formulas could not accurately assess the risks of most insurers. They used actuarial studies of risk variances and dependencies, aligning their models with papers of the CAS. But persuading clients that proprietary models estimate required capital is difficult.

Many insurers have their own economic capital models. The European Union Solvency II directives advocate principles-based RBC solvency monitoring, and Standard and Poor's proposes partial weight for internal company models. But assessing the quality of insurers' internal models has proved difficult.

This section focuses on the distinctive attributes of rating agency models:

- A. M. Best's use of the *expected policyholder deficit* to calibrate risk.
- Moody's and Fitch's use of *stochastic cash flows* to model economic capital.
- Standard and Poor's emphasis on *principles-based* models and ERM practices.

#### *BEST'S CAPITAL ADEQUACY RATIO*

Best's BCAR (Best's Capital Adequacy Ratio) retains the RBC structure of independent risk categories with a covariance adjustment. RBC has six risk categories (fixed-income securities, equities, credit, reserves, written premium, and off-balance sheet risks). BCAR adds interest rate risk (which the NAIC did not include in its property-casualty formula) and risks not easily quantified from accounting statements: asbestos/pollution exposures and catastrophe risks.

The NAIC uses a worse case year measure to calibrate reserving and new business risks that is influenced by underwriting cycles in certain years: a different experience period gives different risk charges. The RBC charges are not consistent across risks. Asset risks reflect the pre-1990 MSVR (mandatory statutory valuation reserve) for life insurers, and credit risks are chosen subjectively. Instead of the worst case year and MSVR, BCAR uses an expected policyholder deficit (EPD) risk measure. BCAR uses a 1% EPD ratio for all sources of risk. In financial terms, the charge for each risk is the amount of capital such that the cost of a put option offsetting the risk is 1% of policyholder reserves. In conventional insurance terms:

- The *EPD* is the pure premium for unlimited aggregate excess-of-loss reinsurance.

- The *EPD ratio* is the EPD divided by the market value of held reserves.

*Illustration:* Insurer ABC's general liability reserves have a market value of \$V, but they may develop adversely or favorably. ABC buys an aggregate excess-of-loss reinsurance treaty that pays the adverse development above \$Z. The pure premium for the treaty is \$P.

- The EPD ratio is \$P / \$V, and the required capital is \$Z.
- As \$Z (the attachment point) increases, the EPD and the EPD ratio decrease.
- Best's chooses \$Z so that the EPD ratio is 1%.

The same 1% EPD ratio is used for all risks: capital losses on stocks, bond defaults, bond losses from interest rate movements, uncollectible reinsurance recoverables, reserve development, and new business losses. For each risk, the capital charge \$Z is set so that aggregate excess-of-loss reinsurance covering losses above an attachment point \$Z has a pure premium equal to 1% of reserves. The EPD depends on the volatility and size of the risk. For example, equities have more volatility than bonds, so they have a higher EPD and capital charge. But insurers hold less equities than bonds, so the marginal effect of equities on overall required capital may be less than that of bonds.

RBC looks at default risk on bonds and other fixed-income securities. Default risk on bonds held by P/C insurers (mostly Treasuries, investment grade corporate bonds, and municipal bonds) is slight. The major risk for insurers stems from interest rates rising above market expectations, leading to market value losses on fixed-income securities. Using average industry figures, Best's finds that a 120 basis point rise in interest rates gives a 1% EPD ratio. It stresses each insurer's asset portfolio with a 120 basis point interest rate rise.

RBC placed high weight on reserving risk, as befits a regulatory model. Regulators are most concerned that insurer pay their loss obligations to existing claimants. Distressed insurers often post deficient reserves. The NAIC viewed reserving risk as its highest priority.

BCAR uses an analysis of reserve volatility similar to one done by the American Academy of Actuaries in 1993-94 to estimate reserving risk and new business risk. Its analysis indicates that the RBC written premium risk charges should be raised relative to the reserving risk charges so that both have a 1% EPD.

Economic capital models can be bottom-up or top-down. A bottom-up approach determines capital charges for each risk and line of business and combines them with diversification factors. A top-down approach determines overall capital requirements from a multivariate distribution of all risks and allocates the required capital back to risk and line of business.

Best's uses loss distributions for each risk and line of business, giving separate capital charges by risk and line. To most accurately determine the required capital for the insurer, one should use a multivariate loss distribution for all risks and lines. Multivariate distributions of this sort are extremely difficult to gauge, so BCAR uses the covariance adjustment and the loss and premium concentration factors in the RBC formula. The net required capital for all risk categories combined is

$$\sqrt{(B_1)^2 + (B_2)^2 + (B_3)^2 + (B_4)^2 + (B_5)^2 + (B_6)^2 + (B_7)^2}$$

B7 is off-balance sheet risks; B1-B6 are bond, equity, interest rate, credit, reserves, and new business risks.

The expected policyholder deficit procedure requires little capital for low volatility risks, and the square root rule further reduces the marginal capital of small risk categories. If equities and loss reserves are equally volatile, and equities are one tenth as large as loss reserves, the marginal effect of the equities capital charge is one tenth that of loss reserves.



Equities and loss reserves have the same absolute capital charge before the covariance adjustment, but loss reserves has ten times as great a marginal capital charge.

In the RBC formula, almost all marginal capital charges stem from reserving and written premium risks, with little capital stemming from fixed income and equities risks. Best's partly corrects this problem with higher asset risk charges, but overall capital is still heavily weighted toward underwriting risks.

The financial crisis of 2008-09 has led the rating agencies, including Best's, to reconsider the weighting of capital charges by risk. In particular, hurricanes, earthquakes, equities, and financial derivatives caused large losses for insurers since RBC was first implemented. Reserves for major lines have had little adverse development, but asbestos reserves have led to enormous losses. Reinsurance recoverables have not led to serious problems. The rating agencies re-estimate parameters of their capital models as new data emerge.

#### STOCHASTIC CASH FLOW CAPITAL MODELS

Moody's and Fitch use stochastic cash flow models to assess capital requirements.

- The models form distributions of each risk and simulate repeatedly from them.
- Cash flows are projected until all current liabilities are settled.
- Required capital is set by a value at risk or tail value at risk measure.

The cash flow models provide full investment income offsets to full value loss reserves.

RBC, Best's, and Standard and Poor's use investment income offsets to reserving and written premium risks. The rating agencies use conservative discount rates and loss payment patterns to avoid over-stating the fair value of the insurer. RBC and Best's use 5% discount rates; Standard and Poor's uses a lower discount rate, based on current yields.

The fair value discount rates used by RBC, Best's, and Standard and Poor's range from 3% to 5%. They may be substantially less than the insurer's investment yield when interest rates are high. The stochastic models use the insurer's investment yield for the cash flow simulations.

Stochastic cash flow models examine the accumulated cash flows of assets vs insurance liabilities. Asset returns are based on interest rate generators and random walk simulations of equity returns. The interest rates and simulations are arbitrage free: that is, the mean return is the market forward rate, which is generally higher than current short term rates.

*Illustration:* The term structure of interest rates is 5% for one year, 6% for two years, and 7% for three years. These are risk-free spot rates: \$1 invested now yields \$1.05 in one year,  $\$1 \times 1.06^2 = \$1.12$  in two years, and  $\$1 \times 1.07^3 = \$1.23$  in three years. The implied interest rate from 2 to 3 years is  $\$1.23 / \$1.12 - 1 = 9\%$ .

Cash flow simulation models are of two forms, depending on the treatment of negative cash balances at intermediate dates. The strict version requires the insurer to liquidate assets if no other cash is available. The more liberal version assumes the insurer borrows funds at short-term rates to satisfy sudden cash needs.

The rating agency stochastic models use either value at risk (VaR) or tail value at risk (TVaR) measures. A 99% VaR is the capital needed to remain solvent at the 99<sup>th</sup> percentile of the aggregate loss distribution. A 99% TVaR is the average capital needed to remain solvent in the 1% worst scenarios.

*Illustration:* A rating agency runs 50,000 simulations of an insurer's aggregate losses from all risk sources. It sorts the results from worst to best outcome. In the 500<sup>th</sup> worst outcome, the insurer loses \$250 million. The average of the 500 worst outcomes is a loss of \$600 million. The 99% value at risk is \$250 million, and the 99% tail value at risk is \$600 million.

Fitch and Moody's use interest rate generators to compute interest rate risk. Moody's uses 60,000 simulations, each of which has a path of short duration and long duration interest rates. As the insurer sells bonds to pay loss obligations, scenarios with rising rates show market value losses.

The simulations provide the asset liability management analyses once done by matching durations of bonds and loss reserves. The simulations are more informative, since they encompass movements of both short- and long-term interest rates, sector spreads, credit spreads, and loss cost trends. But the simulations are harder to evaluate or replicate. The interest rate risk charge depends on the mean reversion and volatility parameters in the interest rate generator. The stochastic model often seems like a black box to insurers.

*PRINCIPLES-BASED SYSTEMS*

Standard and Poor's chose not to form its own stochastic economic capital model. It has an accounting model based on the NAIC's RBC formula, but with no financial risk measure or covariance adjustment. It does not use actuarial or financial models for underwriting and asset risks, and it has no diversification adjustment or actuarial risk measure. Instead, it focused on evaluating insurers' enterprise risk management systems and internal capital models. It bases capital requirements on a weighted average of its own formula and the client's economic capital model.

Standard and Poor's reasons that well-managed insurers evaluate their capital needs more accurately than a rating agency can. Insurers examine distributions of reserve development using extensive data bases and sophisticated reserving methods. They can assess value at risk, tail value at risk, and expected policyholder deficit better than a rating agency can using public data.<sup>15</sup>

*APPENDIX A: FINANCIAL STRENGTH RATINGS VS BOND RATINGS*

Credit quality and financial strength are continuous variables. Markets rate on continuous scales. For example, the spread of a corporate bond above Treasuries may be anywhere from 100 basis points to 300 basis points. In theory, insurers might be rated on a scale of 0 to 100. But people can not make such fine distinctions. It would be hard to distinguish a rating of 82 vs a rating of 83.

Instead, the rating agencies use letter scales (introduced by Fitch). The highest rating is A++ (or AAA) and the lowest rating is F, meaning the insurer is in liquidation. The scales of the major agencies are similar, though not identical. This section shows the scale used by A. M. Best's; the web sites of the other agencies show their letter grades.

Best's divides insurers between *secure* (likely to meet their insurance obligations) and *vulnerable* (may not meet their obligations in adverse scenarios). Secure insurers are grouped into three categories (*superior*, *excellent*, and *good*) with two levels in each. Vulnerable insurers are grouped into seven categories ranging from *fair* to *in liquidation* with ten levels (in total). The last entry, a suspended rating, might occur after a major event, such as a hurricane or earthquake, whose effects on the insurer are great but still uncertain.

	<i>Secure</i>		<i>Vulnerable</i>
<i>Excellent</i>	A++, A+	<i>Fair</i>	B, B-
<i>Good</i>	A, A-	<i>Marginal</i>	C++, C+
<i>Fair</i>	B++, B+	<i>Weak</i>	C, C-
		<i>Poor</i>	D
		<i>Under Supervision</i>	E
		<i>In Liquidation</i>	F

A. M. Best's issues also credit ratings: either investment grade or non-investment grade. A credit rating refers to the likelihood of payments on the debt securities. A short maturity bond backed by a mortgage on the insurer's property is likely to meet its coupon and principal payments, even if the insurer has a doubtful ability to pay long-term claims obligations.

<i>Investment grade</i>		<i>Non-Investment grade</i>	
<i>Exceptional</i>	aaa	<i>Speculative</i>	bb+, bb, bb-
<i>Very strong</i>	aa+, aa, aa-	<i>Very speculative</i>	b+, b, b-
<i>Strong</i>	a+, a, a-	<i>Extremely speculative</i>	ccc+, ccc, ccc-, cc, c
<i>Adequate</i>	bbb+, bbb, bbb-	<i>In default</i>	d

A. M. Best's also rates short-term debt, such as commercial paper, with a simpler set of letter grades.

*APPENDIX B: HISTORY AND GROWTH OF THE RATING AGENCIES*

Credit ratings provide information to help investors determine whether issuers of debt will be able to meet their obligations. Rating agencies provide objective analyses and independent assessments of companies and countries that issue debt. Increasingly diverse debt securities and complex multi-national firms issuing them requires investors to understand the risks of many countries and asset types. Most creditors do not have the requisite expertise, and the influence of the major rating agencies has burgeoned.

The three major U.S. rating agencies began in the late 19<sup>th</sup> century to aid investors in corporate securities. Poor's *History of Railroads and Canals in the United States* (1860) first analyzed company financial strength. Standard Statistics, formed in 1906, published corporate bond, sovereign debt and municipal bond ratings. It merged with Poor's in 1941 and was acquired by McGraw-Hill in 1966. Standard and Poor's also produces stock indices such as the S&P 500, which are used for derivatives trading and as stock market indicators.

John Moody began publishing manuals providing statistics and information about stocks and bonds of various industries in 1900. Moody's Investors Service, begun in 1914, rated government bonds. By the 1970's Moody's was rating all corporate and sovereign debt. Fitch began in 1913 with stock and bond manuals of financial statistics. Fitch introduced the letter ratings of bonds now used by all agencies: AAA for highest grade through D for default. It merged with several competitors (IBCA, Duff & Phelps, Algorithmics) to form a diversified advisor for enterprise risk management and data services.

A. M. Best's was founded in 1899, issuing reports and financial strength ratings about life and property-casualty insurers. A. M. Best's rates 95% of insurers by premium volume.<sup>16</sup> It publishes voluminous reports each year assessing all life and property-casualty insurers. It has provided claims paying ratings since 1906 and credit ratings since 1999. Its monthly trade magazine, *Best's Review*, keeps it well known among insurance industry personnel. Its comprehensive surveys of insurers, monthly trade magazines with both articles and ratings, and low costs gave it a *de facto* monopoly on insurance ratings until the 1990's. Almost all insurers still take Best's ratings, though large insurers often have ratings from other agencies as well.

S&P, Moody's, and Fitch began as credit rating agencies; Best's began by rating insurers' overall financial strength (claims-paying ability). All rating agencies have since become full-service raters, though Best's still services only insurers and some other financial institutions, and the other agencies differ in their market shares by country and type of debt (corporate vs sovereign).

Before 1970, investors (not bond issuers) paid for publications of ratings agencies. But information spreads rapidly in efficient capital markets. Rating agencies realized that good ratings reduce the cost of debt and they could charge bond issuers for this value. Similarly, insurers pay for their own financial strength ratings.

In the 1970's, the Securities and Exchange Commission (SEC) imposed capital and liquidity requirements on securities owned by banks and other financial institutions. The major rating agencies were designated nationally-recognized statistical ratings organizations (NRSRO) by the SEC, and financial institutions could satisfy their capital requirements by investing in securities with favorable ratings by an NRSRO.

The advent of non-investment grade bonds in the late 1970's, the increase in sovereign debt since the early 1980's, requirements for ratings, and SEC approvals of the major agencies led to extraordinary growth of the rating agencies. In 1940-1970, only 0.1% of corporate debt defaulted. The debt was all investment grade and the U.S. economy grew steadily. Creditors did not require ratings to provide capital. By 2010, much corporate debt is below investment grade and world sovereign debt is enormous. Some countries (Argentina, Russia) and large firms have defaulted on their debt, and ratings are now essential to secure new loans.

Despite calls for reform of the rating agency market, both investors and debt issuers generally support the current structure. Debt has become an important part of corporate and sovereign activity, and rating agencies assess its quality.

The rating agency market has grown enormously over the past 30 years, for several reasons: High yield bonds have enabled even weaker firms to issue debt; government borrowing has increased enormously with little concern for repayment ability, leading to vast debt by poorly rated entities; more complex indentures require expert evaluation of bond risks. Fifty years ago, most new corporate debt was investment grade, and ratings were not essential. Now bond issues range from triple A to B-, and without a rating, the bond can not be sold. Fifty years ago, ratings were sought by publicly traded U.S. firms; European firms used bank loans, and they were evaluated by the banks. Now firms throughout the world issue debt. Sovereign entities, including weak states with no histories of debt repayment, finance budget deficits by publicly held debt. Ratings are essential for estimating default probabilities, since fiscal statements of some countries are not well-supervised.

Ratings are paid by firms being rated, not by investors using the rating, leading to potential conflicts of interest. A rating agency that downgrades its clients may lose their business. The failure of rating agencies to identify risks leading to the insolvency or government bailout of several banks and insurers are cited as evidence that they do not properly assess risk and financial strength. About 93% of AAA-rated subprime-mortgage-backed securities issued in 2006 fell below investment grade by 2010 (New York Times, April 25, 2010). The rating agencies received millions of dollars for these ratings from the issuing firms.

Despite the market growth, the same rating agencies have dominated the industry for the past century. The leading U.S. agencies rate firms and sovereign entities worldwide. Some people say more competition would reduce rating agency costs and lead to better risk assessments. The lack of product diversification and the ease of rating are conducive to a competitive market. But rating agencies may be natural monopolies, similar to municipal utilities of the mid-20<sup>th</sup> century. It is not clear that small agencies could survive in this market. Large agencies have strong reputations, helping them attract clients and forming powerful barriers to entry.

Potential conflicts of interest by rating agencies and the failure to foresee some insolvencies raise questions about the efficiency of rating agencies. Standard and Poor's, Moody's, and Fitch rate firms, states, and sovereign entities throughout the world.<sup>17</sup> Most large firms no longer operate in a single country, and non-insurance debt ratings entail analysis of global operations. The three U.S. agencies dominate the ratings market for multi-national firms.<sup>18</sup>

Entry into the rating agency market is hard. Ratings have little value unless they are widely accepted. A group of financial analysts might produce excellent ratings, but no client would pay to be rated until the agency is

established, giving established agencies strong advantages. Agencies' greatest asset are their reputations for accurate valuations and integrity. Firms already rated by Moody's and S&P don't want to pay for a third rating and don't want to give up either of their current ratings. New agencies with no reputations can not persuade investors that their ratings are accurate. Market leaders have remained since inception.<sup>19</sup>

Most corporate debt receives similar ratings from the agencies. The agencies' ratings are calibrated to the same levels: an A rating from S&P has similar meaning as an A rating from Moody's.<sup>20</sup> Rating agencies use the same data and provide similar services: public accounting statements and voluntary disclosures by their clients.<sup>21</sup> Ratings conform to market information: a client with a rising stock price will get a favorable rating from any agency. By law, rating agencies must disclose their ratings methods, as they now do on web sites. Academic studies find few differences in ratings techniques among the agencies. Innovations by one agency are copied by the others.

National regulation affects the rating agency market. The Basel II agreement allows banks to use ratings from approved rating agencies to calculate reserve requirements. The U.S. Securities and Exchange Commission permits investment banks to use credit ratings from Nationally Recognized Statistical Rating Organizations (NRSRO's) for creditworthiness regulations. Until 2007, Moody's, S&P, and Fitch were NRSRO's, along with three specialized agencies. Present law treats all rating agencies equally, but the three large agencies already dominate the market.

#### *APPENDIX C: EFFICIENCY AND BENEFITS OF RATING AGENCIES*

Until recently, rating agencies were seen as judges of credit worthiness whose analysis of bond issues or of firms' financial strength move markets. Some recent insolvencies of well-rated firms and some ratings downgrades on sovereign debt have led to public debate about the efficiency and benefits of rating agencies.

The 2002 Enron insolvency and the government bail-out of AIG in 2009 illustrate the different perspectives. Credit rating agencies do not always downgrade companies promptly. Enron had investment grade ratings until four days before it went bankrupt, though agencies may have known already of the company's problems.<sup>22</sup> In 2007, AIG was the largest commercial insurer in the world, with operations in scores of countries and over \$100 billion of assets. It had triple A ratings from all agencies until it suddenly went bankrupt from excessive financial risk in 2008 and was bailed out by the U.S. government. Some people question whether agencies knew about the risks and failed to inform the public or were oblivious to billion dollar risks that destroyed firms.

Empirical studies indicate that bond yields rise as credit quality falls before the rating agencies downgrade the bonds. Markets composed of investors with no access to private firm information may be more efficient than agency analysts meeting with corporate management and reviewing proprietary documents. The value of credit ratings to investors and bondholders is unclear.<sup>23</sup>

Losses on subprime mortgages in 2007-08 highlight the doubts about rating agencies. In an April 2010 column in the New York Times, Paul Krugman pointed out that 93% subprime mortgage-backed securities rated triple A in 2006 fell below investment grade by 2010.<sup>24</sup>

*Agencies rank risk; they do not guarantee solvency.*

Hindsight ratings are easy and infallible. Insolvent insurers reveal inadequate reserves, speculative investment strategies, poor reinsurance arrangements, or weak underwriting standards. After each insolvency, one hears: *Why didn't the rating agencies uncover the problems?*

Insurers continually assume risks. They underwrite policyholders to screen out poor business and pool risks to quantify expected losses, but they do not eliminate the risks. Economic returns require firms to take risks: even well-managed insurers earning reasonable returns face significant risks.

Rating agencies base their evaluations on limited information. Insurers may not disclose proprietary data that might lower their ratings, unless they expect the data to become public. An A rating means that the probability of ruin is acceptably low, not that the insurer can not fail. A rating agency with no insolvencies among its A rated clients is performing well if it has the same likelihood of giving an A rating as other agencies. If it avoids A ratings for all but the most secure insurers, it is not providing useful information to users of the ratings.

Ratings corresponding to the relative risk of insurers. Rating agencies rank insurers by their probability of ruin; they do not vouch for an insurer's solidity. An A rating may mean a 1% chance of insolvency over the next three years, not a guarantee of solvency.

Rating analysts seek recommendations that match ultimate committee actions. An analyst who is consistently above or below the committee actions learns to adjust the recommendations to the committee's standards.

*Rating agencies seek fair treatment of clients and strong reputations with investors.*

Rating agencies have two objectives: impeccable reputations for assessing debt quality and financial strength, and equitable treatment of clients. When sovereign states are financially troubled, agencies are criticized in public forums whichever action they take. If they downgrade the country, they are criticized for contributing to its ills; if they don't downgrade the country, they are criticized for misleading the public. Financial ratings of insurers present the same dilemma: no ratings philosophy satisfies all critics.

Both extremes – no high ratings unless default is impossible and no downgrades unless default is certain – are poor business strategy. Giving high ratings only if the client is immune from risk doesn't serve investors, regulators, or the public.

Rating agencies hesitate to reduce ratings too quickly. An insurer may slip below its current rating because of serious operational problems, and the agency must re-assess the insurer before it slips further, or because of temporary problems, and the insurer may curtail its writings or reinsure parts of its portfolio. Sometimes the slippage reflects a new rating analyst or new members of the rating committee with different perspectives. A rating agency that downgrades insurers only to reverse the decisions later loses the goodwill of its clients, who may switch to competing agencies with more stable ratings. Slow ratings changes reflect business strategy, not poor assessments of risk.

Agencies use ratings outlooks and watch lists to avoid erroneous rating changes. A watch list means a rating change may soon occur, but the reasons are still vague. Agencies may place insurers on watch lists after large acquisitions; the rating may rise if greater market share leads to more profitable business and it may fall if the acquisition costs exceed the realized benefits. Outlooks reflect the agency's expectations. Ostensibly, a negative outlook means that trends in the insurer's operations or its environment may lead to a downgrade. In practice, a negative outlook may mean the insurer has fallen to a lower rating level, but the agency delays action for several months to verify the lower rating or to give the insurer time to correct the risks. An evaluation of ratings efficiency must consider outlooks, watches, and the potential harm of precipitous ratings changes.

Patterns of rating changes are examined by serial correlations. If agencies react promptly to new information, and downgrades occur as soon as the insurer falls below a given solvency threshold, then downgrades should be followed more often by upgrades than by a second downgrade. If rating agencies wait to issue downgrades until the insurer is well below a threshold, rating changes may be positively serially correlated.

*Illustration:* Agencies use sophisticated quantitative and qualitative scores that are weighted and mapped to letter ratings. For simplicity, suppose financial strength is ranked from 0 to 100, with 96-100 being AAA, 91-95 being AA, 86-90 being A, and so forth. Insurers move stochastically along the scale: an insurer rated 87 in 20X1 might be 85 or 89 in 20X2. If rating agencies downgraded insurers as soon as they crossed a threshold, then insurers downgraded from AA to A in 20X2 have ratings of 89 or 90. It is more likely that they rise above 90 in 20X3 than that they fall below 86. Letter rating changes should have negative serial correlations.

But if agencies do not downgrade insurers until they cross the mid-point of the rating level, an AA-rated insurer is not downgraded until it falls below 88. Insurers downgraded to A in 20X2 have average ratings of 86 or 87. It is more likely that they fall below 86 in 20X3 than that they rise above 90. Letter rating changes should have positive serial correlations. In some cases, the agency gives the insurer a negative outlook without changing the letter rating. An insurer that has dropped to 87 or 88 may retain its AA rating with a negative outlook. In contrast, capital markets (bonds for debt ratings; common stock for financial strength ratings) respond rapidly to new information.

Observed serial correlations are positive, indicating that the agencies change ratings only when the upgrade or downgrade is certain, long after bond markets change credit spreads. Good business practice explains the lag: agencies want to avoid excessive rating changes for firms on the boundary between rating categories.

Agencies' lack of proprietary data is another reason for their slow response. Markets respond to hunches and gut feelings. If investors even suspect that a firm has problems, its stock price drops and its debt yield rises. Agencies can not act without supporting evidence. The AIG case shows this clearly. Even senior managers did not know the magnitude of the risks. AIG is a highly secretive firm, and rating agencies knew no more than other outsiders. Agencies rely on the integrity of their clients: they are analysts assessing risks, not detectives.

#### *APPENDIX D: RATING AGENCIES EXERCISES*

The exercises below may help students understand the reading. However, these exercises are not necessarily representative of possible exam questions.

Exercise 1.1: Insurer XYZ writes Homeowners coverage. Insurer ABC writes life annuities funding structured settlements for accident victims, many of whom are minors. A judge has ruled that an insurer needs an A rating from a nationally recognized rating agency to fund structured settlements.

- A. Why are ratings important for Homeowners insurers?
- B. Why are ratings important for writers of life annuities funding structured settlements?
- C. For which insurer is operating performance most important and for which is balance sheet strength most important?

*Part A:* Banks providing mortgages generally require Homeowners on the property. Sometimes the bank is the payee if the home is destroyed by a covered peril, up to the amount of the remaining mortgage. If the insurer is insolvent, the insurance protection does not safeguard the bank. A hurricane or other catastrophe may bankrupt a weakly capitalized insurer, so banks may require coverage by a well-rated insurer.

*Part B:* A minor receiving a structured settlement receives payments by the insurer for many years (perhaps a lifetime), but does not choose the insurer funding the structured settlement. A weakly capitalized insurer may become insolvent during the term of the structured settlement, which may extend for the life of the minor. A high rating safeguards the interests of the minor.

*Part C:* Balance sheet strength is more important for the Homeowners insurer. The bank is concerned that the insurer can indemnify the homeowner for the damage this year, not that the insurer will stay around for many further years. Operating performance is more important for the writer of life annuities funding structured settlements, since the insurer must stay around for many years.

Exercise 1.2: The ratings meeting is like a poker game at which neither side exposes its cards.

- A. Why does the rating agency not disclose its impressions from publicly available data?
- B. Why might the insurer's failure to disclose adverse information lead to a downgrade?
- C. How does the ratings process affect the insurer's decision about what data to disclose?

*Part A:* The rating agency wants the insurer to believe it has better information than it actually has. Publicly available data are sparse; the rating agency often lacks information about critical parts of the insurer, such as its asbestos and environmental exposures. By not disclosing what data they already have, rating agencies force insurers to supply proprietary data for all parts of the company.

*Part B:* Management integrity is an important rating criterion. Rating agencies rely on proprietary data supplied by insurers. If the insurer is dishonest on one topic, the agency fears it is dishonest on others, and it may lower the rating.

*Part C:* The lead analyst gives a ratings proposal in a presentation to the ratings committee, supported by the data received from the insurer. The insurer has no opportunity to provide more data to the ratings committee, so it makes sure the lead analyst has all the data that might be requested by the committee.

Exercise 1.3: An insurer has a 2:1 premium to surplus ratio and 4:1 reserves to surplus ratio. How do each of the following affect a rating agency's view of the leverage ratios? For each item, explain why a rating agency might look favorably or unfavorably on the asset or liability. Specifically, how does the asset or liability affect the insurer's claims paying ability in adverse scenarios?

- A. Goodwill from a recent acquisition.
- B. Deferred tax assets.
- C. Surplus relief from quota share reinsurance.
- D. Holding company debt that appears as equity in the insurer's Annual Statement.
- E. Catastrophe bonds.

*Part A:* Goodwill is an asset on both statutory and GAAP balance sheets, reflecting the excess of the price paid for a subsidiary over its book value. Many acquisitions do not provide returns that justify their costs. (Half to two thirds of acquisitions turn out to have negative net present values.) Rating agencies view acquisitions critically: unless the promised benefits are likely to be realized, a large acquisition may lead to a negative outlook for the insurer. Goodwill may be excluded from surplus to evaluate the leverage ratios.

*Part B:* Deferred tax assets assume a going-concern with future taxable income that can be offset. Adverse scenarios leading to financial distress often eliminate taxable income, reducing the value of the deferred tax assets. Rating agencies may give little value to DTAs. The deferred tax asset may be excluded from surplus to evaluate the leverage ratios.

*Part C:* NAIC financial exams and IRIS tests may not give full value to surplus relief. Surplus relief offsets the surplus strain in statutory accounting. GAAP and fair value accounting do not penalize insurers for surplus strain. Rating agencies consider economic values of insurers, not just statutory values, so they have no reason to exclude surplus relief when computing leverage ratios.

*Part D:* Holding company debt appears as equity on the insurer's books, but it is a fixed charge paid from the insurer's income. Rating agencies evaluate the full debt of the insurer, whether it is issued through a holding company or an affiliate. Rating agencies may compute leverage ratios to equity only.

*Part E:* Catastrophe bonds can offset major losses. The potential value of the bond is an off-balance sheet asset. Rating agencies may add part of the bond payment to surplus when evaluating leverage ratios for catastrophes.

Exercise 1.4: Rating agency XYZ gives 40% of its client A- ratings or better, and their probability of ruin over the next five years is 4%. Rating agency ABC give A- ratings or better to 20% of its clients, who have a 2% probability of ruin over the next five years.

- A. Is ABC better or worse at rating insurers than XYZ?
- B. What is a possible effect of ABC's rating philosophy on its market share?



*Part A:* Neither rating agency is better or worse at rating. The quality of a rating depends on its consistency. The ratings given by different analysts on the same agency should be the same, but different agencies often have different meanings for a rating.

*Part B:* ABC gives fewer high ratings. Insurers who would receive an A- rating from XYZ and a lower rating from ABC are likely to choose XYZ. As a result, agencies tend to have similar ratings. But the ratings are not identical; some agencies give consistently higher or lower ratings than others.

Exercise 1.5: Firms in other industries seek ratings if they issue debt or are publicly traded. Most insurers have no debt and are not publicly traded, yet almost all insurers are rated. Many insurers have ratings from two or more agencies, despite the high cost of ratings.

- A. Why are ratings so prevalent in the insurance industry?
- B. Which insurers most need ratings?

*Part A:* Other firms sell products or services. Consumer can evaluate the products in stores and read reviews by previous buyers on internet web sites or consumer magazines. Insurers sell promises, whose worth is not known for many years. Most consumers can not themselves evaluate insurers; even insurance agents and banks providing mortgages can not always identify high risk insurers.

*Part B:* Insurers providing coverage that benefit third parties, such as banks providing mortgages, sureties who guarantee completion of a construction project, or writers of life annuities supporting structured settlements, pay for ratings to assure others that they can fulfill their promises. Sophisticated consumers (large commercial policyholders and primary insurers for reinsurance) also seek insurers with good ratings.

Exercise 1.6: Tens of thousands of firms throughout the world need ratings each year. Most of these firms are rated by one of the three major U.S. rating agencies.

- A. Why is the ratings industry dominated by three firms?
- B. Why might three firms (instead of 30) create a more efficient ratings process?

Exercise 1.7: Whether ratings affect bond yields or bond yield changes precede rating changes is unclear.

- A. Why might one presume that ratings affect bond yields?
- B. Why might one presume that bond yield changes precede rating changes?

Exercise 1.8: The ratings process

- A. What are the roles of the ratings analyst and the ratings committee?
- B. What information does the rating agency seek to obtain from interactive meetings?

Exercise 1.9: ABC, an East Coast reinsurer, is preparing an offer to acquire XYZ, a West Coast reinsurer. It expects costs savings from the acquisition, and it offers a substantial premium over XYZ's market price.

- A. How might a rating agency view the acquisition?
- B. What qualitative items might the rating agency be most concerned about?
- C. Why might ABC discuss the acquisition with its rating agencies beforehand?

Exercise 1.10: Rating agencies seek performance measures that are consistent among insurers. You are choosing between pre-tax and after-tax earnings as the measure of operating performance.

- A. Why might pre-tax earnings be more consistent among insurers?
- B. Why might after-tax earnings be more consistent among insurers?

- C. How might one adjust pre-tax earnings to make them more consistent?
- D. How might one adjust after-tax earnings to make them more consistent?

Exercise 1.11: Quality of earnings

- A. What is meant by quality of earnings?
- B. What attributes affect quality of earnings?

Exercise 1.12: ABC writes personal auto in 20 U.S. states. XYZ writes property excess-of-loss treaties for catastrophe risks of windstorms and earth movement. Both insurers have a 6% return on sales.

- A. Which insurer has the higher return on capital?
- B. How might the quality of earnings differ for these two insurers?

Exercise 1.13: A personal auto insurer targets retirement communities in the U.S. sun-belt. Many of its insureds are wealthy, but they drive less after moving to these communities. It is well-capitalized, with a 60% loss ratio, a 90% persistency rate, and a return on surplus over 20% for the past five years. Rating agencies have kept the insurer at a B+ rating, citing risks of a single line of business subject to underwriting cycles and a small niche market that may be threatened by peers. The insurer is seeking to diversify. Explain the costs and benefits of each of the following.

- A. Expand into Homeowners coverage, with a package policy for personal auto insureds.
- B. Expand into standard and sub-standard auto risks, with discounts for children of current policyholders.
- C. Expand into Medicare supplement policies for residents of the retirement communities.
- D. Expand into medical malpractice coverage for physicians serving the retirement communities.

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Rating agencies are required by law to disclose their rating procedures, and the agencies provide extensive documentation on their web sites, often updated annually. See especially

- Fitch: Ratings Criteria
  - Insurance industry rating outlook
  - Prism executive summary and technical document
  - Defining available capital
  - Enterprise risk management
- S&P: Principles of corporate ratings
  - Analysis of non-life insurance operating performance
  - Assessing loss reserves
  - Evaluating insurers' competitive position
  - Financial flexibility and capital structure
  - Interactive ratings methodology
  - Analysis of insurer capital adequacy
- Moody's: Capital adequacy
  - Risk adjusted capital model
- Best's: Key rating guide
  - Insurance rating methodology
  - Best's capital adequacy ratings

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ENDNOTES

<sup>1</sup> Corporate charters of some pension funds and similar institutional investors specify investments in bonds rated *investment grade* (BBB) or higher. Non-investment grade bonds (rated BB or lower) have higher default-adjusted yields (= the yield net of expected losses from defaults), indicating lower demand for these bonds..

<sup>2</sup> Plaintiffs' attorneys often demand an A- or higher rating for the insurer providing the annuity that funds the structured settlement.

<sup>3</sup> The predictive accuracy of ratings is less relevant than their acceptance by investors. Even if an agency's decision is contested by other analysts, the agency's decision retains its effect on coupon rates if bondholders respect the decision.

<sup>4</sup> Insurers' indirect costs to secure high ratings include reinsurance to transfer risks, non-renewal of policies to reduce business volume, and internal ERM models to demonstrate a commitment to effective risk management. An insurer may cede a large portion of its property writings to reduce catastrophe risk in rating agency capital models, giving up expected profits for a higher rating. Some critics suggest that rating agencies hint of potential downgrades to induce insurers to pay for interactive ratings. For example, an insurer with A-ratings from two agencies may pay for interactive ratings from only one. The other agency informs the insurer that it may reduce its rating to B+, but that evidence of good corporate governance would keep the A- rating. The insurer may pay for an interactive rating to demonstrate its corporate governance and keep its A- rating.

<sup>5</sup> See Koresh [2003], Kliger and Sarig [2000], Langohr and Langohr [2009], and Levich, Majnoni, and Reinhart [2002].

<sup>6</sup> Critiques of rating agency activities are reviewed later in this reading.

<sup>7</sup> Firms in other industries can keep their finances private; insurers provide extensive public information in statutory Annual Statements. Most insurers find it more efficient to pay for interactive ratings, with a chance to influence agency decisions, than to risk a public rating.

<sup>8</sup> Insurers may choose initially not to be rated by a particular agency, but they rarely cease being rated by the agency for fear of a downgrade in a public rating.

<sup>9</sup> Analysts for insurance company ratings may work entirely with insurers, so they have enough experience to assess their clients' qualities.

<sup>10</sup> State regressions examine the financial condition of all licensed insurers every three to five years. These financial examinations are more expensive and intrusive than rating agency valuations, and insurers seek to minimize the cost. Whereas a rating agency sees only data voluntarily provided by the client, state regulators often request records that the insurer might not wish to expose. Rating agencies spend two or three weeks analyzing the client; a state financial examination lasts months. State regulators do not require a commercial rating, but an unrated insurer may receive a more thorough exam.

<sup>11</sup> The importance of commercial ratings is clear from advertisements in trade publications. Both insurers and reinsurer emphasize their ratings in ads geared to agents or primary insurers.

- <sup>12</sup> Actuaries once used models to evaluate the financial strength of reinsurers. But the effort and expertise needed to build the models, and the uncertainty in models based on public information alone, cause most primary insurers to rely on the commercial ratings.
- <sup>13</sup> Most insurers that did not renew Scor Re treaties probably based their decisions on the rating downgrade.
- <sup>14</sup> Agencies are sensitive to criticisms that ratings are influenced by the desire to retain profitable clients.
- <sup>15</sup> The impetus for principles-based solvency monitoring systems stems from the European Union's Solvency II directives, which the NAIC is now also evaluating. Standard and Poor's presumes that insurers will develop economic capital models to satisfy the new regulatory regimes, and they can assess an insurer's financial strength from its ERM models.
- <sup>16</sup> The remaining 5% are mostly small or young insurers who do not meet Best's size or age criteria.
- <sup>17</sup> S&P and Moody's have 80% of the U.S. rating agency market; together with Fitch, they have about 90%.
- <sup>18</sup> Other rating agencies operate in foreign countries. Many foreign insurers operating in a single country are rated by country specific rating agencies.
- <sup>19</sup> Suppose an insurer is rated A- by S&P and Best's. A new agency approaches the insurer offering a more sophisticated rating system. If the new agency gives more favorable ratings, it won't affect investors and agents who rely on the rating agencies they are familiar with. If the new agency gives less favorable ratings, it won't attract clients. The rating agency industry may already be saturated.
- <sup>20</sup> Insurance ratings by A. M. Best's are somewhat higher (on average) than those from the other agencies, but the differences are slight.
- <sup>21</sup> Rating agencies do little proprietary financial research. It is less expensive to use published research by leading academics than to hire private researchers. The best analysts prefer work at universities where they publish freely than at private firms that own all their work.
- <sup>22</sup> See Amy Borrus, "The Credit-Raters: How They Work and How They Might Work Better," *Business Week*, April 8, 2002, and Edward Wyatt, "Credit Agencies Waited Months to Voice Doubt About Enron," Georgetown University, February 8, 2002).
- <sup>23</sup> D. Kliger and O. Sarig (2000), The Information Value of Bond Ratings, *Journal of Finance*, December: 2879-2902; Koresh Galil (2003). The quality of corporate credit rating: An empirical investigation. *EFMA 2003 Helsinki Meetings*. European Financial Management Association.
- <sup>24</sup> Krugman infers that rating agencies are corrupt. He infers that the agencies began as market researchers, selling assessments of corporate debt to investors. Eventually they morphed into something quite different: companies that were hired by the people selling debt to give that debt a seal of approval. Few economists agree with this analysis; this reading presents the interpretations without supporting any of them.