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## **Session 76TS**

### **F-585 “Light” Investment**

**Track:** Financial Reporting/Investment  
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*Summary: This teaching session will introduce course F-585 to “seasoned” actuaries who missed the opportunity to study this material on their road to Fellowship.*

**Mr. Charles L. Gilbert:** Earlier this year I joined NN Financial, a member company of ING, where I am primarily responsible for asset/liability management and profitability of the savings line of business. I am also Vice-Chairperson for the SOA Examination Committee for F-585. Mike works for Alexander Reinsurance Intermediaries, a firm that develops unique and customized financial structures for its clients. Reinsurance is used as a financial management tool. Mike is also on the F-585 and F-590 Examination Committees.

What Mike and I would like to do is let you know more about some of the information available through the SOA exam syllabus and, hopefully, provide you with a better understanding of investment banking and financial institutions management. I will begin by first going over the objectives of the finance track in general and then talk about F-585 in particular. Mike and I will then present you with the course material and take you through a whirlwind tour of applied corporate finance.

#### **Finance Track Mission Statement and Objectives**

To give you an understanding of the objectives of the finance track, I thought it would be useful to go through the finance track mission statement. The mission of the finance track is to educate actuaries in such topics as capital markets, financing

operations, accounting, strategic planning, and investment management. The primary objective of this track is to enable actuaries to apply modern corporate finance methods, as well as modern actuarial methods, to the financial management business.

This track is intended to expand the range of services that actuaries can provide to clients and to expand their potential client base. This track should provide the necessary basic and advanced material to allow actuaries to provide services across a wide range of financial risk management needs in the marketplace. An actuary completing the finance track specialty should be able to work prospectively (that is, with respect to business strategy formation, allocation of capital, forecast models, and so on) and retrospectively (by that we mean measurement of financial performance, risk exposure, value added, and so forth) and lead in the development and valuation of risk management practices. The track should provide a foundation in traditional services (for example, the valuation of liabilities) and seek a broader application of existing actuarial techniques (for example, asset/liability management in banks or strategic planning for Fortune 500 companies). The track should also bring new knowledge and techniques into the profession.

The finance track should provide an in-depth coverage of financial management topics for potential clients of actuarial services. In addition to basic financial management topics, topics on management of financial capital, management of financial risk, corporate strategy, and forecasting are covered. Basic financial management topics include theory of the business enterprise, corporate form and organization, macroeconomics, ethics, corporate governance and agency theory, the accounting environment, the regulatory environment, the tax environment, value-added concepts, and the valuation of assets and liabilities.

Management of financial capital topics includes capital markets; corporate finance; financial statements and accounting regulations; risk-based capital and solvency requirements and cost of capital; optimal structures; international management of financial capital, and investment banking. Management of financial risk topics would describe tools and techniques and would include credit risk; liquidity risk, off-balance-sheet risk, interest rate risk, and asset/liability management; expense risk; insurance hedging; derivatives; extreme or catastrophic events; currency risk; and sovereignty risks. Corporate strategy topics include mergers and acquisitions; international strategy; planning, budgeting, and control; employee benefits; and leasing. There are topics on modeling, projecting and forecasting for strategic planning, measurement of value added, evaluation of risk management techniques, capital budgeting, pricing debt in initial public offerings (IPOs), and allocation of capital.

**Overview of F-585**

F-585 in particular covers many of the topics I have just mentioned and is intended to provide background for the actuary who aspires to become the chief financial officer (CFO) of a financial institution. There is not a lot of sophisticated math on this examination, but F-585 involves considerable conceptual breadth concerning financial markets. The course is based upon the practical aspects of finance: the raising of capital for the company in various capital markets and the general financial management of financial institutions not limited to life insurance companies.

F-585 can be characterized into three sections. The first section, investment banking, draws upon the articles from *The New Corporate Finance: Where Theory Meets Practice* by Donald Chew, Jr. (New York: McGraw-Hill, Inc., 1993) and covers the activities of investment bankers, such as identifying and structuring financing needs with institutional clients, arranging mergers and acquisitions, financial innovations, and participating in the new issue process.

The second section, financial management and risk exposures of financial institutions, covers the major risks confronted by modern financial institutions. Many forces are contributing to the breakdown of interindustry and intercountry barriers between the sectors of financial services and industry. The readings are primarily taken from Anthony Saunders' textbook, *Financial Institutions Management: a Modern Perspective* (Illinois: Irwin, 1993) and focus on the industry as managers of financial risks. In addition to the Saunders' text, there is also a study note on The New Risk-Based Capital Plan for Commercial Banks.

The third section of this course deals with applications. A practical overview of corporate finance is given by three study notes: "Financial Aspects of Corporate Governance," Society of Actuaries Study Note 585-22-94; "One System of Financial Intermediation: A New Paradigm," Society of Actuaries Study Note 585-25-95; and a "Harvard Business Review case study on Enron Gas Service," Society of Actuaries Study Note 585-26-96. The case study on Enron Gas is interesting because it provides an example of a natural gas company developing innovative financial instruments.

The remainder of my presentation will focus on the first section of F-585. I will focus on the Chew text, go through the articles in the course of reading, and try to give you a flavor for the topics that are covered on F-585. Chew's book, *The New Corporate Finance: Where Theory Meets Practice*, is essentially a collection of 57 articles written by various financial economists. The articles are divided into seven sections, not all of which are covered in the course of reading for Finance Examination 585. The first section is on market efficiency. The articles in this

section give more recent evidence attesting to the efficiency of our capital markets. The remaining sections examine the implications of market efficiency for various aspects of corporate management; in particular, raising capital (and choosing among the continuing broadening spectrum of financing vehicles); managing corporate risks (including the corporate uses of derivatives, such as futures, options, and swaps); and corporate restructuring designed to increase shareholder value.

### Introduction

Before getting into the main sections of the text, it might be helpful to walk through an introduction to set the stage for the topics of the course. Beginning with the work of Modigliani and Miller in the late 1950s, evolution of “modern” theory of corporate finance into its present shape has anticipated and responded to a wave of innovations in corporate practice. The 1950s saw the first tender offers by corporations for other public companies, which led to leveraged conglomerates in the 1960s. Innovations in the 1970s included derivatives such as futures on foreign exchange and interest rate and commodity prices. The rate of financial innovation in the 1980s was dramatic. New risk management tools evolved:

1. Currency, interest rate and commodity swaps
2. Exchange-traded options on foreign currencies, interest rates, and commodity prices
3. Futures on stock market indexes, new futures contracts on an expanding range of currencies, interest rates and commodity prices
4. “Hybrid” debt securities combining standard debt issues with foreign and option-like features.

As well, a burgeoning junk bond market was giving rise to leveraged acquisitions, large stock buybacks, divestitures, spin-offs, and multibillion-dollar leveraged buyouts (LBOs), otherwise known as corporate restructuring. Theoretical advances helped stimulate the process of innovation. This innovation in turn has provided financial economists with live, real world examples with which to observe and test the workings of our capital markets—which in turn is sure to influence further innovation.

What were the economic consequences of financial innovation? The leveraged restructuring that was a product of earlier financial innovation has both its proponents and its detractors. There are those who will point to the cluster of bankruptcies starting in 1989, the savings and loan debacle, the depressed economic climate of the early 1990s, and argue that this type of corporate restructuring is destroying the competitive future of American industry by forcing short-sighted cutbacks in employment, research and development, and capital investment. Others would contend that leveraged restructuring promoted the trend

toward smaller, less diversified, more efficient corporations and created enormous increases in shareholder value.

The regulatory crackdown on one form of financial innovation, namely leveraged buyouts and highly leveraged transactions, contributed greatly to the credit crunch. Much of the financial innovation we have seen in the 1990s, including derivatives and hybrid debt, was designed to help smaller, riskier companies raise capital in the face of this credit crunch.

### **Market Efficiency**

I am going to go into somewhat more detail on parts of this as I take you through selected articles of the Chew text that are on the course of reading. The first two articles are on market efficiency. To faithfully serve the interests of shareholders, management needs a good understanding of how the stock market works. How management uses the assets at its disposal, how it measures performance, and what information management chooses to tell investors all depend on this understanding. Indeed, all operating and financing decisions are based on some theory of market pricing. We need to examine what the implications of market efficiency are for various aspects of corporate management. First I would like to present some recent evidence attesting to the efficiency of our capital markets.

### **Do Bad Bidders Make Good Targets?**

It is widely recognized that the interest of management and shareholders can diverge in public corporations with diffuse equity ownership. Agency cost theory predicts the potential loss of value caused by separation of ownership and control, but it was not until the 1980s that agency costs of separating ownership and control were shown to be significant. To the extent that corporate managements are more intent on maintaining growth than increasing profitability, they would choose to reinvest free cash flow at rates well below the corporate cost of capital rather than return it to shareholders. One way the cash flow gets reinvested, and in the process perpetuates unprofitable corporate growth, is by making value-reducing acquisitions—particularly diversifying acquisitions. I'll give you an example.

In 1986, Sir James Goldsmith made a bid to take over Goodyear Tire & Rubber. Goldsmith offered \$1.13 billion over the equity value of the company. The \$1.13 billion represented 30% of the equity value of the company at that time. Goldsmith's stated intent was to sell off Goodyear's petroleum and aerospace divisions and concentrate on the tire and rubber operations. There is evidence that Goodyear's past acquisitions were reducing the value of the company. Goodyear's stock declined 24% following the 1987 purchase of this first major petroleum acquisition. Goldsmith's bid was ultimately unsuccessful, but it forced Goodyear to adopt a major restructuring program, which included selling off part of its petroleum

division. As a consequence, Goodyear's stock price continued to reflect at least part of the 30% premium offered by Goldsmith. The point to be made here is that some markets have the ability to anticipate eventual value added or value lost by corporate acquisitions. Inefficient conglomerates can expect to be dismantled by "bust-up" takeovers.

### **An Analysis of Trading Profits: How Trading Rooms Really Make Money**

Further evidence in support of market efficiency can be given by addressing some popular misconceptions about the profitability of banking operations. Recent studies have shown that for most trading rooms, speculative "positioning" is not a reliable source of profits. Stable profits can be made trading interdealer volume, but only from traders who work for large institutions with heavy volume, with heavy order flows and who adopt a jobber style of trading. However, the primary source of revenue and profit for trading rooms comes from dealing with customers.

### **RAISING CAPITAL**

The next section is on raising capital. F-585 covers seven articles from this section which I'll go through.

### **Overview of Corporate Securities Innovation**

The rapid pace of securities innovation during the past two decades has brought about revolutionary changes in the financial instruments available. The factors that stimulated the process of security innovation are: increased interest rate volatility; frequent tax and regulatory changes; deregulation of the financial services industry; and increased competition within investment banking worldwide.

The purpose of securities innovation is to develop new financial instruments that increase investor wealth (and ultimately general economic growth). For investors, this means higher after-tax returns for bearing a given level of risk, greater liquidity, or perhaps a more desirable pattern of payoffs. For issuers, the purpose is to reduce the corporate cost of capital.

I will go over the main categories of innovation and provide examples of each, but first I would like to discuss how they add value. The process of security innovation generally can add value in the following ways:

1. Reallocating some form of risk from issuers or investors to other market participants more willing to bear them;
2. Increasing liquidity, that is, the ability of investors to sell without lowering prices or incurring high transaction costs;
3. Reducing agency costs that arise from conflicts of interest among management, shareholders, and creditors;
4. Reducing issuers' underwriting fees and other transaction costs;

5. Reducing combined taxes of issuers and investors;
6. Circumventing regulatory restriction or other constraints on investors or issuers.

There are four main categories of security innovations, although it's hard to really identify to which category some of these belong. A couple examples of debt innovations would be adjustable rate notes and floating rate notes, collateralized mortgage obligations (CMOs), and real estate investment trust (REITs). Adjustable and floating rate notes have the coupon rates float with some index such as the 91-day T-bill rate. This innovation provides for risk reallocation. Here the issuer is exposed to floating interest rate risk, but, in return, the initial rate is lower than for a fixed rate issue. Also, there is enhanced liquidity as the price remains closer to par than the price of a fixed rate note of the same maturity. With respect to CMOs and REITs, the mortgage payment stream is divided into several classes that are prioritized in terms of their right to receive principal payments. The risk reallocation that takes place here is basically a prepayment risk.

Examples of preferred stock innovations include adjustable rate preferred stock and convertible adjustable preferred stock. Examples of convertible debt preferred stock innovations are automatic bank check (ABC) plan security and liquid yield option notes (LYON). Examples of common equity innovations include callable common stock and master limited partnerships.

### **Aspects of Financial Contracting and Venture Capital**

The process of financial contracting and venture capital focuses on a few simple questions. How is cash allocated? How is risk allocated? What are the incentives for each party in the deal? An example of a typical deal would be an entrepreneur seeking capital from a venture capitalist. The terms negotiated between these two parties determine the split of cash and the split of risk and, hence, the split of value between the supplier and the user of the capital. The common venture capital practice of using convertible preferred stock in providing for the commitment of capital in well-thought-out stages is an important means by which users of capital are able to signal their confidence to investors and, thus, overcome the credibility gap that all companies raising capital face.

### **An Introduction into Mezzanine Finance and Private Equity**

Mezzanine finance has become one of the two major financing tools for executing highly leveraged transactions. By that I mean management buyouts, recapitalizations, and leveraged takeovers. The other major financing tool, of course, is high-yield bonds, otherwise known as junk bonds. Mezzanine finance occupies a position in the middle level of the capital structure, that is, between senior debt and common equity. Mezzanine finance is used to meet requirements of transactions in

the small-to-middle market. Typically, this would be for those transactions up to \$200 million.

### **Initial Public Offerings**

Another way of raising capital is through an IPO. I'm not going to say a lot about this form of raising capital, except that it is interesting to note that IPOs on average have been significantly underpriced (by as much as 18%). Large initial run-ups in the after-market usually indicate that the IPO was initially underpriced.

### **Raising Equity in an Efficient Market**

In an efficient market, all securities issued by corporations should command a fair price. Investors expect to earn an adequate return for the risk accepted. However, the issuer can gain by choosing the methods that best fit its own circumstances. There are four considerations in choosing the method best suited to raise equity for a corporation: (1) the direct costs of execution—the transaction costs, (2) taxes, (3) the risk associated with obtaining the desired amount of funds, and (4) the “information” effect on a method of issue.

It is important to note that all equity-raising techniques suffer from the market's perception that management raises equity only if it thinks that the equity is overvalued.

I'll briefly describe the five main methods of raising equity:

1. The first and most used is common underwriting. The issuing corporation hires an underwriter (usually an investment bank) that essentially agrees to buy the shares and resell them. The investment bank is therefore responsible for marketing the issue.
2. The best-efforts agreement is similar to common underwriting, but the investment bank makes no guarantee that it will sell the issues. It merely states that it will make its best effort to sell as many shares as it can.
3. An auction is another method of raising equity. Basically, there are two types of auctions. There is a direct public auction and an auction among investment banks to choose the lead underwriter.
4. In rights offerings, a company issues rights to current stockholders, which gives them the option of buying a share of stock at a given price.
5. Rule 415: “shelf” registration allows certain companies that meet a minimum size and traded life requirement to register shares to be sold with the SEC. These shares can be sold anytime within three years. In a sense, they are put on a shelf, hence the name for this method.



**Are Bank Loans Different? Some Evidence from the Stock Market**

It can be argued that bank loans are the most effective form of inside debt. Banks have an advantage over other inside lenders in evaluating and monitoring the borrowing firm. This is because of the ongoing deposit and customer relationship. Issuing inside debt does not send a negative signal to the markets that the public securities offering does. One reason for the negative reaction associated with the announcement of public securities offerings is that the potential exists for management to exploit inside information by issuing securities when it believes that the firm is overvalued.

**The Origin of the LYONs: A Case Study in Financial Innovation**

One example of successful financial innovation is the LYON, developed by Merrill Lynch in 1985. The LYON is a liquid yield option note. This is a zero-coupon, convertible, callable and portable bond. LYONs are part of a broader class of debt securities known as hybrids. A hybrid is a security that combines conventional fixed rate debt with an embedded forward swap or option. The case study on LYONs illustrates two things: successful innovation requires ingenuity, perseverance, and a measure of good fortune, and there is the potential, practical power of modern financial theory in assisting in the development of new financial products and strategies.

**Risk Management**

The next section, risk management, discusses the achievements of financial innovation and the evolution of risk management products.

**Financial Innovation: Achievements and Prospects**

Derivatives provide efficient risk-sharing. The derivatives market acts like a gigantic insurance company and effectively raises the price investors pay for corporate securities, thus adding to corporate investment and general economic growth. One criticism of derivatives has been that the futures and options are used not only by hedgers but also by speculators. But it should be recognized that speculators serve a useful purpose by providing liquidity to the market, and they also help markets maintain their efficiency. But probably the most important thing that we have gained from securities innovation has been an improvement of the allocation of risk within the financial system.

**The Evolution of Risk Management Products**

The last 15 years have seen the introduction of the following risk management products: futures contracts on foreign exchange, interest rates, metals and petroleum; currency, interest rate and commodity swaps; options on foreign exchange, interest rate and petroleum; options on futures and on options; hybrid securities, combining standard debt issue with options or forward-like features.

Most of these products are variations of more basic instruments, some of which have been around for centuries. What is new are the active market exchanges that dramatically reduce the cost of using such risk management tools.

This brings us to the last section of the two textbooks covered in F-585.

## **CORPORATE RESTRUCTURING**

The 1980s saw an unprecedented wave of corporate restructuring, including divestitures, spin-offs, buybacks, partial public offerings, limited partnerships, and leveraged buyouts.

### **The Takeover Controversy: Analysis and Evidence**

The economic analysis and the evidence indicate that takeovers, or the market for corporate control, as it is otherwise known, is benefiting shareholders, society, and the corporation as an organizational form. The market for corporate control is also making life more uncomfortable for top-level executives. Lobbying efforts on their part have resulted in pressure for restrictions that will seriously cripple the workings of this market. Already there are restrictions on share ownership and financial instruments. Numerous states already have passed antitakeover laws. The result will be significant weakening of the corporation as an organizational form and a corresponding reduction in efficiency.

### **The Causes and Consequences of Hostile Takeovers**

The causes and consequences of hostile takeovers should be distinguished from those of friendly takeovers. Hostile takeovers are motivated by anticipated profits from restructuring, changing the capital structure, cutting overhead, selling unrelated business, and ending unprofitable reinvestment. Targets of hostile takeovers tend to be low-growth, poorly performing, and highly diversified companies. Friendly takeovers take advantage of synergies or a diversified corporate strategic portfolio. Targets tend to be single-industry firms that were performing well and have high insider ownership. Corporate raiders play an arbitrage in a market for corporate control. They buy uneconomic conglomerates, dismantle them, and sell the parts for a sum greater than the conglomerate as a whole. And what we have seen is that capital market pressures are forcing corporate America toward greater focus.

### **Lessons from a Middle Market LBO: The Case of O.M. Scott**

One of the lessons that can be learned from the corporate restructuring of the 1980s is that for companies in mature industries, the combination of high leverage and management equity ownership can provide an organizational discipline that adds value. In 1986 ITT sold O.M. Scott & Sons, the lawn care company, in a divisional leveraged buyout. Clayton & DuVallier bought Scott, financing 91% of the

purchase with debt. This debt included bank loans, subordinated notes, and subordinated ventures. Seventeen and a half percent of the shares of the new equity was held by Scott management and employees. The result was a dramatic improvement in operating performance. The heavy debt load resulted in very restrictive constraints on what could be done with the cash flow. The equity ownership and incentive pay plans for management ensured that the incentives for management were closely tied to the incentives of shareholders. Results of larger studies of leveraged buyouts also suggest that the pressure of servicing a heavy debt load, combined with management equity ownership, lead to improved operating performance.

That concludes a very cursory look at the first section of F-585 investment banking. I'd like to make one last point. One of the themes of this section of the course is innovation—innovation in response to a changing environment and the changing needs of customers. We want to apply the same concept within the actuarial profession. Sometimes it is necessary for us to look outside our profession to stimulate innovation in order to find new solutions to a changing environment.

**Mr. Michael E. Gabon:** One thing I'd like to do before I start the second part of the presentation is to get an idea of why people are here. We were expecting and advertised this session as being for the seasoned actuary—someone who didn't have the chance to go through the examinations under the flexible examination/“track” system. I'm just wondering how many of you here did not write the examinations under the “track” system. Almost half of you I would say. How many are fully qualified actuaries, but who did go through the examinations under the track system? Only a few of you. Then I guess the balance of you are still writing. Can I see a show of hands? About half the audience! Did anybody just write this examination in May? No. OK, then let's continue with the presentation.

Charles has given you a whirlwind tour of the investment banking sector. Now we're going to step back and take a look at concepts relating to several sectors of the financial services industry.

As Charles has indicated, I will be covering the text by Anthony Saunders, *Financial Institutions Management: A Modern Perspective*. This is the second text on this examination, and together, the two texts constitute about 90% of the examination syllabus. Second, I will cover foreign exchange risk in more detail. This is part of the text, but I'll explain later why we chose this topic. Finally, we have a question from the examination written a few weeks ago. There's nothing like the real thing, so we decided to give you an actual examination question. Don't worry, we will help you answer the question.

The text is *Financial Institutions Management: A Modern Perspective* and it covers the financial services industry in a broad way. Anthony Saunders is a professor at the Stern School of Business at New York University. Just to give you his background, he currently holds research or academic positions at several prominent organizations: the Federal Reserve, the Federal National Mortgage Association, the Comptroller of the Currency, and the International Monetary Fund. He is very knowledgeable of happenings in the financial world. The text focuses mainly on managing the return and the risk borne by financial institutions, with the main theme that the risks faced are becoming similar for all financial institutions. The other theme is that the risk management methods are becoming similar for all financial institutions.

The text has three parts. In the first part, there is an overview of the financial services industry. The second part is about measuring risk, and the third part is about managing the risk.

The overview describes the structure of the industry, the key balance sheet and key regulatory features of the industry. The sectors covered are commercial banking, life insurance companies, property and casualty companies, mutual funds, finance companies, and securities firms. So quite a wide array of the industry is covered. Although Saunders' intention is to cover all these types of institutions in depth, he does focus more on the banking industry, and there is a reason for that. There's an interesting statistic presented in the book, and that is that two-thirds of the financial assets in the U.S. are controlled by banks and finance companies. The remaining one-third is what insurance companies and the other sectors, in total, are holding. Thus, the banking sector is very significant. In terms of the balance sheet features, these include things such as securitization of loans and the effect of the credit crunch being the decline of business loans in the 1990s. In terms of regulatory features, the main thing that Saunders indicates is that they seek to enhance the social welfare benefits of the financial intermediary, for example, insurance companies.

Although more than insurance companies are covered, knowing something about the other sectors in the financial services industry is useful for the actuary or the insurance company CFO, because the insurance company is often part of a group/holding company structure, and the capital available to the insurance company may depend on the capital needs of the group/holding company, that is, the capital needs of the other financial institutions within the group. So if the actuary or CFO understands the business of the other financial institutions, he or she can better manage or model the cash flows, and so on. Given these holding company structures, many of which have resulted from mergers and acquisitions,

the life insurance industry has to be managed in the context of the convergence of the financial service institutions into multifunctional holding companies.

In the second part of the text, Saunders identifies several kinds of risks that can be faced by financial institutions, and he presents ways to measure these risks. This section should be very interesting for many of us because we're usually developing models, doing sensitivity and scenario testing, and we have a skill set that allows us to develop techniques to measure these risks.

### **MEASURING RISK**

I'd like to go through a few of the risks that are mentioned in the book. First is the interest rate risk, but because you already know about this because it is covered on other examinations, I'll just speak about the other risks.

The first risk I will discuss is credit risk. This is essentially the default of a firm, and that's what the banking industry is all about. If you apply to obtain a loan for a business, the bank will assess whether the business will generate enough cash flow to repay the loan, that is, not go bankrupt. To assess this risk, Saunders includes, in the case of mortgages, inputs such as loan charges, loan origination fees, and the value of the collateral. Then he presents mathematical models and techniques such as discriminant analysis and linear regression to put a value on the risk. On the practical side, a recent study indicated that the credit risk within each of Argentina, India, and Poland is declining. So these countries are improving their creditworthiness as viewed by other countries and lenders. The credit risk of Hungary is increasing.

The next risk is the off-balance-sheet risk. This risk refers to the activities affecting future balance sheets, as opposed to the current balance sheet. Financial instruments such as letters of credit and derivatives (forwards, futures, options, swaps) create this risk. As these instruments are covered in greater detail on other examinations, I will not cover them here.

The next risk is operational risk. This risk occurs when, according to Saunders, technology does not produce the economies of scale or scope expected, or when an investment is made and there's a chance that you will not attain the return expected. For example, when investing in a new policy administration system, a company can spend substantially greater time than expected trying to get the system to handle, say, universal life (UL) plans or certain bells and whistles. I have seen this occur in two different companies. Furthermore, the more complicated plan features may eventually be administered on a personal computer versus the policy

administration system. So it may take much longer for a company to recoup its investment.

One area where this overall risk can be reduced is with the use of the Internet and intranets. It's anticipated by many that the use of the intranets will reduce costs, permitting firms to engage in areas that otherwise they could not do economically. Other impacts of the Internet on the insurance industry include the ambiguity, utility, and simplicity starting to overwhelm the preexisting networks that we have. One final impact of the Internet is the ease of communication and data exchange around the world. In sending an electronic mail message with a file attached, use of "express" mail services can be reduced.

The next risk is the foreign exchange risk, and as I said, I'll be covering this in more detail later.

Sovereign risk refers to the expropriation, the foreign exchange control, and the default of a country. You can probably remember about a year or a year-and-a-half ago when Mexico defaulted; firms that had investments in Mexico suddenly lost 30% or 40% of their investments. Usually it's the government that controls this decision, so how can you really predict or reduce this risk? You may believe beforehand that a commercial transaction with a particular country is going to be risky. If so, you can take this into account. But a surprise such as occurred in Mexico may occur. Although this risk isn't as precise as the mortality risk, it can still be valued. Saunders mentions qualitative and quantitative methods, such as statistical models based on a country's debt service and import/export ratios to value this risk.

The final risk that Saunders presents is the liquidity risk. This refers to a situation when the "cash" available is insufficient to meet the cash needs for normal/expected and abnormal/unexpected events. For example, in life insurance companies, the risk occurs when many policyholders want to withdraw their money quickly. In property and casualty companies, the risk occurs when policyholders cancel and do not renew. The risk is less severe in the property and casualty companies because the liabilities and assets are relatively shorter than those of a life insurance company. If their assets are shorter, they're more liquid and the liquidity risk isn't as great. In the past, it has seldom been a concern to insurance companies and pension plans, but a significant lack of liquidity can lead to a run on the bank. Also, it is typically a precursor to insolvency; examples are Mutual Benefit Life, Executive Life, and Confederation Life in Canada.

The techniques used to measure the liquidity risk are similar to those that are used to determine the capital requirements, generically, and are already familiar to us. In

constructing a liquidity model, one would first identify the plausible events that may occur—these could be company-specific, industry-specific, or even national or international in context. Examples of company-specific events, of course, would be rumors of financial problems or financial results below expectations. Industry-wide events would be things such as perceived problems with a product or service associated with the insurance industry. For example, many consumers in Canada know more about mutual funds than they do about insurers' segregated funds. In addition, the charges within a mutual fund are less than those of a segregated fund, so there's an instance where someone is saying, why should I buy a segregated fund product? Why not buy the mutual fund? An example of an international event would be political instability of a country or downgrading of government debt.

Once we've identified plausible events, it's a relatively simple thing to develop a model. You list the liabilities by type and amount and attach weights to each liability according to when that liability may come due (for example, weekly, daily, monthly, quarterly, semiannually, annually). You do the same thing for the assets. You list them by type and amount and weight them according to their availability value, for the same time periods that you chose for the liabilities. Then the weighted assets are compared with the weighted liabilities, and your shortfall, basically, is your liquidity risk. This process is completed for a realistic scenario and a number of other scenarios.

One other risk is snowfall. You might be wondering what this is. Remember this past winter's record-breaking levels of snowfall? Saunders' text discusses identifying, measuring, and managing risks. The snowfall risk is just another risk, and as actuaries we can identify the risk that the amount of snowfall is greater than expected.

We can measure it—we can find historical records for snowfall in a particular town/city (I don't think the geographic area should be made too large). Those are historical records, but as actuaries, because we look to the future, we can try to find out what weather patterns are expected. Typically, these coverages would only be one winter in length. I don't think anyone would want to gamble on the weather, two, three or four years out. Then we look at the number of inches or centimeters as a deductible, testing various levels. We would then need an element of cost—what the cost is per foot of snow removal and the number of feet of snow to be removed.

## **MANAGING RISK**

We can manage it—in measuring the risk we'll know how much risk we think our company could assume/retain and we can reinsure the remainder. This is all part of

measuring the risk. Once we've identified and measured a risk, we need to manage it. That's the third and last section presented by Saunders.

Saunders covers five categories. The first one is liability guarantees. This includes things such as deposit insurance, which you're familiar with. You deposit money in your bank account and the FDIC protects the value of your account up to \$100,000 against insolvency of the bank. The state insurance guaranty funds provide assurance for insurance policyholders in case their insurance company becomes insolvent, and the PBGC provides assurance to pension plan participants. Actually, the deposit insurance is something that's imposed upon banks, or deposit-taking firms, by the government regulators as a way to protect consumers from losing their savings. It's not something that the industry got together and decided to do. In this way, deposit insurance differs from other types of liability guarantees.

The second way of managing risks that is presented is product expansion. This involves expanding the activities or services offered by a particular company in one sector and taking these into another sector. This can be done for various reasons, such as to take advantage of favorable legislation in a new sector. For example, the risk-based capital standard in the mutual fund sector is a lot less onerous than that of the insurance sector. It just goes back to the segregated fund example I mentioned before, that there are extra costs involved in the segregated funds because it's an insurance product versus a mutual fund product. Another example of this is Aetna's decision earlier this year to wholeheartedly expand into the health business and get out of the property and casualty business.

Another way of managing risk is geographic diversification. A simple example would be to take an existing product or service from one state, or nation, to another. The attractiveness of this diversification depends on the regulations and cost and revenue synergies of the market that you're thinking of entering.

The fourth way to manage risk is securitization. Is there anyone here who has worked, or is working for a property and casualty company? You are probably familiar with this example. The firm that I work for is involved in property and casualty, accident and health, and life business. The property and casualty side was new to me. What's being done in the property and casualty industry at the moment is that a catastrophe option spread product has been developed and is traded on the Chicago Board of Trade Exchange (CBTE). This is known as the CAT option spread. These options are similar, in concept, to a layer of reinsurance. The strike price in this case is the attachment point or expected loss ratio. For example, a 50–70 call spread represents a layer of risk between loss ratios of 50% and 70%. Typically, the way the property and casualty industry works is you set some point and then a reinsurer would take a layer above that. Another reinsurer would take an



additional layer, or maybe a few reinsurers were in that first layer. But it's a layering process. It's a way of raising funds and reducing risks.

The last way of managing risks that's presented by Saunders is loan sales. This, basically, is selling off undesired loans packaged as a block. Again, the overall aspect of this book is to identify, quantify and manage risks. To sum up, I think you'll find the book both interesting and informative; it addresses innovation in financial risk assessment and management. Keep in mind that, as actuaries, we have the skills to take the measurement and management of risks to the next level, for example, the snowfall risk that I discussed earlier.

### **FOREIGN EXCHANGE RISK**

Having reviewed the text in a broad manner, I'd like to now focus on our in-depth topic, foreign exchange risk. We chose this topic for the in-depth portion of the presentation because the desire for growth has led firms to look abroad to other countries and regions, such as China, the Far East, and Latin America. This rush toward globalization is continuing, and many of these global firms are experiencing ever-increasing revenues from foreign sources or foreign operations. With these increasing foreign revenues, the financial institution exposes itself to greater foreign exchange risk. What affects the foreign exchange risk?

The sources of risk exposure are foreign asset and liability holdings and currency trading, that is, two groups of activities. When measuring the risks, we must look at the net exposure of these activities, that is, foreign assets minus the foreign liabilities (balance sheet situation), plus foreign exchange bought minus foreign exchange sold (currency trading situation). Significant aggregate positions can be taken in foreign assets, liabilities, and in trading, but the net exposure can be small if, for example, the foreign assets and liabilities are matched, or the net asset liability situation is matched with the net currency trading position. They can reduce or subsidize one another.

Positive net exposure indicates a long position in a particular foreign currency. So the risk in that situation is that the foreign currency will depreciate against, for us here in the U.S., our U.S. dollar. One might think that a global life insurance company could have a significant percentage position in foreign asset holdings, but here come the regulators again. New-York-domiciled companies are limited in their holdings of foreign assets to 10% of their total assets.

The volatility of exchange rates is another factor in foreign exchange risk. Even if your net exposure is matched, there is still a risk present in the sense that the exchange rate can fluctuate, and quite significantly. I have an article from *USA Today*, and I would like to share some thoughts from it to illustrate the significance

of these fluctuations. It starts out by saying the dollar has been on a rebound, defying expectations and grabbing the attention of profit-starved speculators. The dollar is at a 17-month high against the German mark, up 14% in the past year. It is at a six-week high against the yen, up 34% from a year ago. There is one fellow mentioned in the article who thinks it will break through an eleven-year technical barrier. Changes of 14% and 34% within a year are quite significant. Again, this is part of the reason why we chose to use this as our in-depth topic. The absolute dollar gain/loss is, thus, the net exposure from the sources of the risk exposure, multiplied by the change/shock to the spot exchange rate.

I'd like to now focus on the foreign currency trading source of risk exposure. This part of the foreign exchange risk comes from the speculative/open positions versus trading for hedging purposes or to complete an international commercial transaction. The foreign exchange risk for a single foreign currency may exaggerate the risk exposure, but we must look at all currencies. When we do, we may find negative or low cross-correlations between currencies, which cause the standard deviation, i.e., the risk of the portfolio to be less than the sum of the individual currencies. An example is the cross-correlation between long-term government bond returns during the period of 1961–90 for Italy and Japan. At only 26%, it's quite a low correlation. How are Italy and Japan related? You probably can't think of too many things that they have in common.

The last part is the foreign asset and liability positions, which is the second part of the source of risk exposure. Here we are looking at return and risk and hedging. I'd like to just quickly go through a return calculation.

Suppose we take a Canadian Bank that has decided to borrow \$300 million Canadian (i.e., the bank has a \$300-million liability). Then suppose the bank takes that \$300 million and invests \$100 million into each of Canadian dollar, Japanese yen, and German mark assets [here, guaranteed investment contract (GICs)]. The bank is matched on one-year loans versus one-year GICs. So the mismatch here is in the currencies. The other assumption made is that there's no default, credit, or sovereign risk. One thing that we're interested in is the weighted return of our assets, and I'd like to step through that calculation by using the German mark as an example (the same process would apply for the Japanese yen).

The first step is that you'd sell your \$100-million Canadian dollar for the deutsche mark (DM). The spot exchange rate was assumed to be \$0.70 Canadian per DM, so you would receive \$142.86 million DM. Upon receiving these DM, you would lend this amount to, say, a large corporation and charge a rate of interest. Here we have assumed 8%—this loan is an asset. The cash flow you will receive at the end of the year is your \$142.86 million DM grossed up by 8%, i.e., \$154 million DM.

You would then want to repatriate these DM back to Canada. You have to use the spot rate at the end of that year, but you don't know that ahead of time. If the spot rate was \$0.70 as it was at the beginning of the year, you would have earned just 8%. But if the exchange rate dropped by, say, 10%, you could have a loss, and vice versa. You'd make more than 8% if it went up a couple percentage points.

There are basically three types of hedging. There's on-balance-sheet hedging, which basically is matching the German liability with the German loan, and Japanese yen liability with the Japanese yen asset. In this type of hedging, currencies are matched. There are a few advantages to this. The first one is that you've locked in a positive spread, whichever way the exchange rate moves. Such was the case when you invested \$100 million in Canadian loans—the asset was earning a rate of 7% and the liability was only 6%, so you had a positive spread. It doesn't matter what happens to exchange rates. One thing is that you can subsidize a negative domestic spread with a positive foreign spread. So there are a couple on-balance-sheet hedges.

Off-balance-sheet hedges are through the use of derivatives, and the third type of hedge is multicurrency diversification. Basically, this is trying to reduce your risk by purchasing more currencies to have low or negative correlations.

Now we come to the examination question. We don't really have enough time to do what we intended, but this question will illustrate how the syllabus translates into an examination question. This was question five on our May 1996 examination. It says, “You're given the following information from the balance sheet of a large Canadian bank.” The numbers are the same as in the example just presented. You have a company that has \$300 million Canadian liabilities and it is holding \$100 million of each of the three currencies with the different interest rates.

Part A asks you to calculate the forward exchange rate, which eliminates any advantage or disadvantage of the Japanese and German assets. Recall the repatriated funds back to Canada at the end of the year (\$154 million times the spot rate at the end of the year). We can look at this problem from the beginning, rather than from the end of the year. The question then becomes, what is the forward rate at the end of the year? Basically, we're looking to solve for the forward rate that leaves us neutral. I'll quickly step through the steps because we have just covered these in greater detail. The equation: we have one plus our Canadian interest rate on the liability side, equaling one plus the interest rate on the Japan side multiplied by the forward rate over the spot rate (the spot rate is the current spot rate, and the forward rate is the current forward rate). Plugging in the numbers, the Canadian liability rate was 6%, the Japan interest rate was 5%, and the exchange rate was

0.01 Canadian dollars per yen. From this we have calculated the forward Japan rate. The forward German rate is calculated similarly.

Part B of the question was, how can the position be hedged? The hedge can be of the off-balance-sheet type. Basically, you couldn't do an on-balance-sheet hedge because you were given three different currencies, so the on-balance-sheet hedge is not applicable. But you can hedge with forward contracts. I'll go through this quickly because it was already covered in calculating the return. You would sell your dollars for DM for the amount of the loan. You'd make the loan, you'd sell forward for the amount equal to your \$142 million DM times 8%, times your change in the exchange rates. This is the amount that at the end of the year would be due. You'd repay the loan and the interest with the proceeds from the sale of the forward, and the bank would deliver this amount to the purchaser of the one-year forward. The other way of hedging is via multicurrency diversification.

The pros and cons for forwards? A forward can be an exact hedge, but there's an ongoing cost and it is likely to be of only a marginal benefit. With multicurrency diversification hedging, the pros are low transaction costs (because you're not repeatedly purchasing forwards) and an opportunity to bet on the market, if you think one of the markets will be increasing. The negatives are that this hedging could be difficult or costly. And the benefits/positives are reduced as markets integrate; for example, eventually there may no longer be differentiation among the various countries in the European Union, so multicountry/currency diversification will not have as much benefit in the future.

That brings us to the end of the second half of this teaching session. I don't think we have time for questions, but I hope you've gained an appreciation or a new perspective for the financial services industry and the risks faced by financial institutions. In addition, I hope that you have found the foreign exchange portion to be practical and have gained an appreciation for how the syllabus translates into an examination question.