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F-580 “Light” Corporate Finance

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Summary: Nobel-prize-winning theorems of economics and corporate finance are introduced and followed by a discussion of how the recent waves of corporate restructuring, mergers and acquisitions are motivated by these important and basic theorems.

Ms. Judy L. Strachan: I’m an education actuary with the Society of Actuaries. My responsibilities include the core, finance, and the investment exams. There is an investment track and a finance track. Recently I talked to SOA members who were not aware of these tracks. I’ll discuss the education and examination (E&E) system and what it looks like.

Then I’ll introduce Werner. Werner F.M. De Bondt, our guest instructor, received his Ph.D. from Cornell University. He is the chairperson of the University of Wisconsin Finance Department and the Frank Graner Professor of Investment Management. His general area of study is the psychology of how people manage their money, and he’s going to talk about the principles of investment management and give an introduction to the principles of corporate finance. Werner is going to focus on the major text of the F-580 course, *Principles of Corporate Finance* (5th ed. New York: McGraw-Hill, 1996) by Richard A. Brealey and Stewart C. Myers.

Our investment and finance education starts with the core exams, and right now everybody has to take these to become an Associate. The first of the finance and

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investment courses in the core exams is Course 220, which is an introduction to asset management and corporate finance. On that course, one of the first topics is macroeconomics. We use a monograph by Professor Wachtel at New York University, which gives a brief introduction to the areas of macroeconomics. We have a great deal of material that overlaps with the Certified Financial Analyst (CFA) exams, and that was deliberate. We wanted to introduce actuaries to the language of CFAs so that they could converse with their investment people. The two primary texts on Course 220 are *Investments* by Bodie, Kane, and Marcus (3rd ed., Burr Ridge, IL: Irwin Professional Publishers, 1995), and *The Handbook of Fixed Income Securities* by Fabozzi, Fabozzi and Pollach (4th ed., Burr Ridge, IL: Irwin Professional Publishing, 1995). Also the corporate finance piece studies how to analyze a company and the financial data to look at before investing in a company. The text for that topic is *Analysis for Financial Management* by Robert C. Higgins (4th ed., Burr Ridge, IL: Irwin Professional Publishers, 1994).

Course 220 introduces you to assets. It shows you stocks, bonds, medium-term notes, futures, options, and swaps. On the portfolio-theory side, it introduces you to the risk/return trade-off, the capital asset pricing model, the arbitrage-pricing model, and the index-pricing model, and Higgins introduces you to the basics of financial analysis.

Course 230 covers the principles of asset/liability management. The course has two topics: option-pricing theory and tools and techniques. In this course we pick up the same two texts, *The Handbook of Fixed Income Securities* and *Investments. Managing Investment Portfolios: A Dynamic Process*, by John L. Maginn and Donald L. Tuttle (2nd. ed., Boston, MA: Warren, Gorham & Lamont, Inc.), introduces the basics of setting investment policy. The course also introduces some practical techniques for asset/liability management, particularly stochastic interest-rate generators, and application of option-pricing techniques to single-premium deferred annuities (SPDAs).

The finance track looks at the sell side. If you're a corporation, the readings try to answer questions such as: If you have projects or products for which you need funding, how are you going to do that? That's what the finance track starts with. It's an internal look at how to finance a corporation and how to manage a corporation. The primary objective of the finance track is to allow actuaries to apply modern corporate finance theory to manage a business. The topics are capital structure, capital raising, shareholder relations, dividend policy, and things like that. Again, it has an internal focus.

The finance track was formed in 1992. The idea was to train people to hold a position as chief financial officer (CFO) or as the corporate manager of an insurance

holding company. Currently, the Education Committee is looking to broaden the scope as we gain expertise and as people move into other fields, and the track is not so narrowly focused on insurance. The comfort level of the people who created the track was that it should focus on insurance because that was what we knew how to do. Right now it still has a very strong insurance focus.

The first course, F-385, is financial management. It has two topics. The first is valuation and financial management. The second topic is taxation. Valuation and financial management gets into more advanced things that you need to know to set reserves. It's reserving for a variety of products. It gets into some of the pension issues. The second topic, taxation, is mostly insurance company taxation.

The next two courses are I-442 and I-443. The "I" means they're individual life and annuities courses, and they look at GAAP and statutory accounting practices (SAP) for insurance companies. In addition, the course covers valuation actuary responsibilities and cash-flow testing. These courses cover advanced topics in financial reporting for Canada and the U.S.

Course F-580 is where the track starts broadening. Corporate finance is corporate finance for any type of corporation. It uses *Principles of Corporate Finance* a text by Richard A. Brealey and Stewart C. Myers (5th ed., New York: McGraw-Hill, 1996). It is considered to be the industry standard. It also has a topic of applied corporate finance for financial services and readings that apply corporate finance in the insurance industry.

The next course, F-585, Applied Corporate Finance, applies the principles you learned in F-580 to the financial services industry in a broader context. The texts for this course are *The New Corporate Finance: Where Theory Meets Practice* by Donald H. Chew (New York: McGraw-Hill, 1992), and *Financial Institution Management: A Modern Approach* by Anthony Saunders (2nd ed., Burr Ridge, IL: Irwin Professional Publishing, 1996). The Saunders text has a very heavy banking focus. Course F-590, Corporate Strategy and Solvency Management, looks at insurance company and corporate strategy. The corporate strategy part is a generic corporate strategy. The text used is *Fundamental Issues in Strategy: A Research Agenda*, edited by Richard P. Rumelt, et al. (New York: McGraw-Hill, 1996). The readings address issues such as, How do firms behave? Why do firms differ, and does it matter? What is the function or value added by the headquarters? What determines success or failure in international competition? The solvency topic covers rating agencies, risk-based capital, and dynamic financial condition analysis.

The investment track looks at the buy side from an insurance company perspective. The readings address issues such as: I have money to manage, so how should I

invest it? What kind of investment policy should I have so that I can meet my financial obligations when I need to and get the kind of returns that I want? Two courses in the investment track overlap with the finance track, F-385, Financial Management, and F-585, Applied Corporate Finance. That may change over time. The investment track was completed in 1995, so it's new. We expect these two tracks to evolve further from each other. In fact, we're already talking about whether to leave F-385 on the Investment Track or determine whether there is a course that would better meet the track objectives.

V-480 is Derivative Securities, Theory and Application. It uses a text by John C. Hull, *Options, Futures, Other Derivative Securities* (3rd ed., Englewood Cliffs, NJ: Prentice Hall, 1996). It goes in great depth into the mathematics of pricing options. Hull is considered by the industry to be the text to use for the mathematics of pricing options. V-485, Advanced Portfolio Management, uses a text by Edwin J. Elton and Martin J. Gruber called *Modern Portfolio Theory & Investment Management* (5th ed., New York: John Wiley & Sons, Inc., 1995). The course looks more closely at the capital-asset-pricing model and the risk/return trade-offs that the students learned about in Course 220.

Course V-595, Applied Asset/Liability Management, the newest course, covers applied asset/liability management. This is the most international course. We have readings by authors from the Netherlands, Canada, Switzerland, and the U.S. These readings give an overview of asset/liability management and discuss some of the different techniques available. Because swaps and options are some of the key techniques that one uses to do asset/liability management, the textbook *Advanced Interest Rate and Currency Swaps: State-of-the-Art Products Strategies & Risk Management Applications* (ed. Ravi E. Dattatreya and Kensoke Hotta, Burr Ridge, IL: Irwin Professional Publishing, 1993) is included in the course of reading.

Course 580, Corporate Finance, is the one we're going to focus on. It has two topics. The Brealey and Myers text, *Principles of Corporate Finance*, is the primary reference. There are also several study notes. "A Shortfall Approach to the Creditor's Decision" looks at how the riskiness on cash flows affects a creditor's decision to lend you money. The other two are demutualization and risk-based capital. The fourth one, "Financial Decision-Making in Markets and Firms: A Behavioral Perspective," written by Werner De Bondt and Richard Thaler, focuses on the human element of decision-making, and how decision-making is not entirely rational. It reviews recent works in behavioral finance and brings in concepts such as overconfidence and loss aversion.

Overconfidence is typified by money managers who always think that if they manage their money, they can beat the market, but very few ever do. Loss aversion

is typified by people having their money in an annuity with a withdrawal penalty. If they bit the bullet, paid the penalty, took their money and threw it in a mutual fund, they'd be better off over the long term, but nobody ever wants to pay the penalty, so they leave it there even though it doesn't maximize their expected return.

The course, *Corporate Accounting Applications*, uses the text, *Life Insurance Accounting*, by and available from the International Insurance Accounting and Statistical Association (IASA) to cover acquisitions, mergers, consolidations, and holding companies. The remaining courses cover standards of practice for either accounting or for insurance in the areas of employee benefits and fair value of liabilities.

Mr. Werner F. M. De Bondt: My talk is introductory and for actuaries who have no experience with the subject. It also is largely conceptual or theoretical. I present a stylized view of economic reality that omits complex details, but retains its essence. Good theory has the qualities of a fairy tale—in its simplicity, it is total imagination, yet total reality. It is fact and fantasy, both, at once. I hope you enjoy the story that I am about to tell.

First, I want to discuss what finance is. What defines it? More generally, what defines economics? Next, I'll review major themes of corporate finance, the themes that are found in Brealey and Myers' classic textbook. It is a wonderful book, but it reflects the past more than the present or the future. An important phenomenon before us at the present time is corporate restructuring. I want to clarify the economic factors that are its driving forces. I'll conclude by answering a very specific question: What should every actuary or every CFO know about corporate finance?

What is economics? What is finance? What is economics? Quoting one of my favorite Italian singers, Albano, I would say that economics is about "felicità." It is about creating happiness and well-being. Happiness is much broader than material comfort but, while money isn't everything, money talks. As we all know, money, wealth, and resources do matter a great deal in life. Nearly everyone in society faces a trade-off between unlimited needs and limited resources: scarcity. As a result, we have to choose since we cannot have it all. If I do X, I cannot do Y. Thus, whenever we make a choice, we ask, What else could I do? What is the opportunity cost of my decision?

Economics is about rational, efficient choice. It is about rational trade-offs—how to solve the problem of many needs and few resources in a sensible way.

Efficiency, if you look at it in the context of a modern industrial economy, means a number of things. Efficiency means the use of tools. This is not the Stone Age. Why do we use tools? Because we're more productive that way. Tools are valuable capital assets. With the same level of effort, we can achieve more. Efficiency further means specialization. I happen to specialize in being a professor of finance. Many of you in the audience specialize in being actuaries. Not so long ago, when the U.S. was a rural society, household production was much more important than it is today. During the 18th and 19th centuries, when the new immigrants explored the American continent and their wagons were rolling west, when a wheel came off the wagon, they literally had to repair it themselves. There was no alternative. In fact, the explorers did everything on their own, from food preparation to mending clothes, sometimes in tough circumstances without the benefit of prior experience.

Specialization, however, leads to expertise, and expertise enriches the community as a whole, so long as there is trade and safe and reliable ways to barter goods and services. Exchange is central to any modern economy. But trade introduces new complexities; for instance, there's mutual dependence and the need for coordination. If I am a dairy farmer and you grow corn, how can we be sure that there won't be too much milk or too little corn?

How is economic activity coordinated? There are various ways. One approach already mentioned is to do everything by yourself. It is not the best way to live. A second approach is the military model, where everything is top down. That is actually how things used to be in the Soviet Union. They had an ivory tower in Moscow, so to speak, and the bureaucrats said, "OK, we need so many taxi drivers. We need so many people to prepare Caesar salads. We need so many people to do this, or to do that." The organizing force was power. This is "production in hierarchies," or the planned economy. A third approach is "production for the market," pretty much driven (though not exclusively) by self-interest. That is capitalism. When I came here, and I arrived at the airport, the taxi driver didn't know that I was coming. I just showed up, suddenly, without warning. But the taxi driver does know, of course, how many people typically show up. He has learned when it is worthwhile for him to be somewhere. The coordinating force is self-interest. People need certain things. If it's hot and we all want ice cream, then entrepreneurs will start ice cream shops, because ice cream may be sold at an exorbitant price. The entrepreneurs compete to make a profit. Eventually there will be enough ice cream, and profits will be much lower, or at a high enough level, just enough to keep the ice cream people in business.

Let me sum up. There are different ways of organizing economic activity: households, hierarchies, and markets. You may think you understand capitalism and

socialism: socialism didn't work, and capitalism does work. But that's not the full story, it cannot be. Why not? Because if you believe that government bureaucracies are dismal or that the Soviet Union, by design, was an economic disaster waiting to happen, then you have to explain why IBM, AT&T, and other giant corporations are successful, profitable entities. IBM and AT&T have 300,000 employees or more. These corporations are also organized through hierarchy, and through power. I regret to inform you that when your boss says you have to do XYZ, you actually have to do it. It is that way. In capitalism too, therefore, there is plenty of coordination through hierarchy, from the top down rather than bottom up.

The more profound question is, When do we organize economic activity through markets and when do we organize through hierarchies? As an aside, the financial theory of markets, by finance professors, is called *investment theory*. The financial theory of hierarchies is called *corporate finance*. Where does the organization stop and the market begin? Is IBM, at 300,000 employees, at its optimal size or should it be 310,000, or should it be only 290,000?

Since the work of Ronald Coase in 1936, the answer to this question has to do with the costs of trading. Roughly speaking, the size of the hierarchical corporate sector (relative to gross domestic product [GDP]) varies inversely with the operational efficiency of markets. Think about it this way. Suppose that your company needs photocopies of certain documents. Well, if the firm needs lots of copies, tens of thousands each year, then you buy your own copy machine and you hire an employee who makes all the firm's copies. If you only require a few copies (and you do not consider selling photocopies), then you go to Kinko's. It is not a good idea to do the work on your own. It is not economical. Thus, economies of scale is one of the factors that determines whether you outsource or insource.

In various ways, the decision ultimately has to do with the costs of trading; for instance, can we get a reliable product at a reliable price? If we rely on outside suppliers, can they act opportunistically and extort us in case of emergency?

Let me now turn to the main question. What is finance? In the economy, we make all kinds of choices. When you walk into a supermarket, you choose between apples, pears, and other things. At a point in time, within a limited budget, you choose the bundle of consumption goods that you think best. This decision problem is of interest to consumer economists and students of marketing. It is a static problem. Finance is different—it is about saving and investing, about sowing and harvesting. It is about dynamic choice—choice over time.

Remember Robinson Crusoe? He lives on an island alone, and he wants to survive. He eats fish and little else. He catches it with his bare hands. That is difficult. Just

try to catch one fish! So, if he is lucky and/or an exceptional athlete, he survives another day. He may decide not to catch fish but instead to work on a fishing net. When would he want to do so? That depends on a couple of elements. It depends on how much fish he needs. He may eat less, right away. He also has to invest time and effort to construct the net. It also depends on his expectation of how much extra fish he'll be able to catch with the net in the future.

This is the prototypical finance problem, the decision to give up current consumption in the hope of more consumption later. This is the essence of capital budgeting, the essence of discounting formulas, the essence of "the net present value rule." If life is short and brutal, Robinson Crusoe may not find it worthwhile to wait. Another critical factor is the likelihood that the technology works. Even if it does work, if on average the payoff is satisfactory, its result may be uncertain. Robinson Crusoe may not like the downside risk of three days without fish.

In reality, in the world of corporate finance, the decision to invest is somewhat more complex than Robinson Crusoe's problem. The decision to save and the decision to invest are usually made by different people. There is borrowing and lending decision-makers. Can the funds that are used to launch a new technology or a new product be paid back, with a surplus—we call it "interest"—on top? Besides convincing themselves, entrepreneurs have to prove to outside investors that the technology is likely to work.

Some months ago, on a visit to the University of Manchester in Britain, I discovered an (out-of-print) old book in Lord Ernest Simon's library, *The Rise of Modern Industry*, by J.L. Hammond and Barbara Hammond, both fellows at Oxford. Among other things, the book described the troubles of James Watt when he attempted to finance the steam engine, certainly one of the most magnificent inventions of all time. Few people understood its value at first. Watt put all of his personal savings into the project. Although he died a prosperous man, he lived in miserable circumstances for many years. "Of all things in life," wrote the despondent scientist, "there is nothing more foolish than inventing."

Just recently I learned that, during the mid-1920s, Henry Ford's company designed the first passenger plane for service in the U.S. A major obstacle was that hardly anyone believed that there would ever be much demand for air travel. Flying was unsafe in those days and not comfortable. Ford launched an advertising campaign with the message that flying could offer a competitive mode of transportation. However, during the Depression, Ford had to abandon the project and stopped producing airliners.

I have defined finance as *dynamic decision-making*, or choice over time. But finance theory deals with many different issues. I would list three categories. The first category is valuation theory. What is the value of a chair? Simply put, it is the value of sitting on it over the lifetime of the chair. When the present and future benefits (measured in dollars) are properly discounted—considering the time value of money—and added up, the outcome should equal the chair's market value in a public auction. This story, the discounting formula, is an audacious hypothesis, as value has to do with the future.

What is the fundamental difference between a chair to sit on and a share in IBM? Very little. In truth, IBM is just a large number of chairs, plus some desks, some land, some trucks, some computers ready-for-shipment to customers, the capabilities of IBM's employees (minus cost), and so forth. After we subtract the value of the debt, and divide by the number of equity shares, we have the value of one share. The outcome should be the number that is blinking on the screen in your broker's office.

The second category is corporate finance, and all issues related to the organization and financing of production in hierarchies. A simple framework to think about this is the firm's balance sheet, the active side and the passive side. One set of questions is related to capital budgeting. What product or service does the company sell? Is it worth the effort? The second set of questions deals with financing. What contracts do we write for capital, shareholders and bondholders, labor, and for management? Sometimes there are multiple layers of contracts with financial intermediaries in between. At all levels, we want to create proper incentives for cooperation and efficient production. Finance theorists think about the firm as a temporary nexus of contracts. *Nexus* is a Latin word. It simply means "a central point" where people meet or physical objects meet. Capital, labor, management, and the local community come together and make production possible. Every single person or entity, in order to stay, has to find it worthwhile to stay.

Consider your own job. If the opportunity cost is high, if you can improve yourself somewhere else, you will leave. The objective of all organizations, profit or nonprofit, is surplus. If there is no surplus, then the organization cannot keep everyone happy, and there will be people walking in the hallways with long faces, looking for a better place to work.

Let me briefly return to the issue of trade, because the costs of trade define the third set of issues discussed by finance theorists. I could discuss models of trading in markets as if there were just two people—say, Judy Strachan and me. Judy offers me oranges. I say, "OK, I'll pay you \$1.99 for eight oranges." She gives me the

oranges. I run away. Judy has a problem and so does the model with two agents. For the story to be correct, I need a third actor, I need a force in the background—probably government—that provides a legal system.

In Russia, in many countries in Africa and Asia, the citizens don't have good government. Without laws or other culturally based social norms of trust and loyalty, the costs of trading are much higher than they would otherwise be. This changes everything. To understand behavior, we would need a theory of corruption, an economic theory of the mafia. Besides enforcing the law, the government also facilitates trade through the monetary system and through the public infrastructure.

Probably the most significant financial innovation of all time is money, especially paper money. Its value is purely based on trust. If you put a match to a banknote, it burns and leaves nothing but smoke. For at least four centuries (or longer, if we consider ancient history), the intrinsic value of money and its use as a factor of production are built on the power of the nation state and judicious monetary policy.

Let's discuss past and present themes of corporate finance: what are the major themes of corporate finance? I have prepared a short list. Frankly, we have more questions than we have answers. Our knowledge is evolving. What one reads in a classic textbook like Brealey and Myers is the accepted wisdom of 25 years ago. It is always very logical, it is always very beautiful, but it is often wrong in its application to the real world. Appropriately, the book has two major parts. The first part is about rational capital budgeting. What is the opportunity cost of capital, considering business risk, interest rate risk, inflation, taxes, etc.? The second part is about financing economic activity.

During the late 1950s, Merton Miller and Franco Modigliani, two formidable theorists who eventually received the Nobel Prize, developed the most celebrated theorems of corporate finance. What did Miller and Modigliani (M&M) have to say? Imagine a proposal to sell ice cream at the Atlanta Olympics. (By assumption, the firm is liquidated after the event.) Estimate its value and then ask yourself: given what we want to do—all else being equal—How can we best finance an ice cream shop? What is the best mix of debt and equity?

Miller and Modigliani show that, in a world with rational investors, where the prices of financial assets equal true value, where transaction costs are zero, and where the tax code does not favor debt over equity, the method of financing logically cannot change the value of the project. Similarly, the decision whether to declare a dividend or to plow profits back into the firm cannot affect its value. These are the so-called irrelevancy results of corporate finance. The M&M modeling assumptions

are purposely chosen so that “nothing matters” and that “everything is neutral.” In the terminology of Charles Darwin, all institutional details—the corporate organizational form itself—are neutral mutations without consequence.

The “*ceteris paribus*,” or all else equal assumption is central to the result. Professor Miller has a pleasant way of stating the theorem with a joke about pizza. He says “OK, there’s this construction worker in Chicago. He’s ordering a pizza and the baker asks: Do you want green pepper? Do you want pepperoni? At the end, she says, “I can cut it in pieces for you. Shall I cut it in eight or in sixteen?” The construction worker replies, “Cut it in sixteen. I’m hungry today.” The strict separation between the project (call it the pizza or call it GNP) and how it is financed (how much debt is used, and then after debtholders are paid, how much do equity holders have left)—in other words, how the claims are structured—cannot possibly affect the size of the pizza.

Let me tell you my own personal pizza joke. I was with Merton Miller in Karlsruhe (Germany) in 1990, right after he had delivered his Nobel Lecture in Sweden; as expected, he gave a talk, and as expected he spoke about pizza. So, my counterpunch was “Isn’t it interesting that the Soviet President, Gorbachev, and Merton Miller both won the Nobel Prize in the same year? Miller for discovering that the way one cuts the pizza does not affect the size of the pizza, and Gorbachev for discovering that the way one cuts the pizza very much affects the size of the pizza?” My joke captures some of the developments in corporate finance since M&M.

Today finance theorists ask a different question than M&M did. Miller asked, how is the value of a given cash flow affected by its division among different classes of security holders? He would say “It isn’t.” The new approach causes us to wonder: How does the structure of claims affect the cash-flow stream? This question takes institutions seriously. It does not throw out the baby with the bathwater. If institutions flourish and grow, we have to explain why.

If everyone at this conference is part of a team, if some work hard but others prefer to relax and to swim in the pool, and if everyone gets an equal share of what is produced (irrespective of their level of effort), my prediction is that many people will develop an interest in swimming. Incentives are fundamental to successful contract design, especially if some players have access to privileged information. These insights were pioneered by Adolf A. Berle and Gardiner C. Means in their classic book, *The Modern Corporation & Private Property* (Reprinted ed., Buffalo, NY: William S. Hein & Co., Inc., 1982).

During the 1970s, Michael Jensen from Harvard University and William Meckling from the University of Rochester revived the tradition of Berle and Means. In the modern corporation, there is a separation between ownership and control. Shares of equity are quite unusual assets to own. If I own this chair, I can do with it what I want. I have control. I can sit on it. I can do bad things to this chair! On the other hand, if you own shares in General Motors, you own but you do not control it. Try it. Write down your wishes on a piece of paper and call the CEO. Chances are that the CEO won't take your call unless you have many, many shares. It is management that controls the huge pools of capital called corporations. Where managers are strong, owners are weak. For instance, if the board does not declare a dividend, you will not get one. What can you do? If you are unhappy, you can voice your complaints, you can hit the table, but please do not expect immediate results! Your best option may be to exit and to sell your shares.

This leads me back to the financing of the corporation. The actual decisions that were made show that most new corporate investment in the U.S. is financed through past profits. If the funds are insufficient, companies go to the capital markets and raise debt. If that is difficult, as a last resort, they raise new equity. Why is this financing pattern typical? A simple interpretation is that American managers desire to achieve independence from the capital markets. However, in recent years, we've seen a resurgence of the power of equityholders.

This resurgence partly explains the new emphasis on profitability and downsizing. It is probably linked to the institutionalization of money management. In the 1950s, 80% of the shares traded on the New York Stock Exchange were held by individual investors and many holdings were small. Today, it is closer to 50% and the other 50% is often held in large blocks. When the top executive of a large pension fund calls the CEO of General Motors, he takes the call.

CORPORATE RESTRUCTURING: NOW AND IN THE FUTURE

Many of you have seen the series of articles on corporate downsizing in *The New York Times*. A collection of them was just published with the title *Downsizing of America: The Reporters of the New York Times* (New York: Random House, Inc., 1996). The book includes editorials, readers' letters, as well as some opinion polls done in December 1995.

Here are some excerpts from the opinion polls: "Do you feel things in this country are generally going in the right direction today, or do you feel things have pretty seriously gotten onto the wrong track?" Well, 64% of the respondents replied "on the wrong track," 25% "on the right track," but the remainder was undecided. There is plenty of dissatisfaction these days. "When it comes to the availability of good jobs for American workers, some say that America's best years are behind us.

Others say that the best times are yet to come. What do you think?" Best years behind us: 49%. Best years to come: 40%. These findings show that economic fear is widespread. This is unusual for a period of relative prosperity.

The next question has to do with job cutbacks. "In the last couple of years would you say you have felt more secure and confident that you can continue in your job as long as you want, or less secure and confident, or has there been no change?" Twenty-nine percent of the respondents feel more confident, twenty-eight percent feel less confident, forty-two percent experienced no change. Again, these statistics show high negatives. Here is a question about trust and loyalty. "Generally speaking, do you think companies are more or less loyal to their employees than they were ten years ago?" More loyal: 6%. Less loyal: 75%. Consider now the opposite question. "Generally speaking, do you think workers are more or less loyal to their employers than they were ten years ago?" More loyal: 9%. Less loyal: 64%. I repeat: these answers, if they reflect public opinion in general, are social dynamite and they put corporate finance at the center of the political debate.

What does finance theory have to say about corporate restructuring? Why does the restructuring occur? There is a great deal of debate, but let me list some powerful causes. The first factor is technological advance, productivity gains realized through research and development. Technology has the potential to devastate whole industries. Think about Federal Express. "To FedEx" is a new verb, a part of post-modern vocabulary. At one time, Federal Express thought that it was competing with the post office, which was pretty good because Federal Express runs a tight ship. When the Fed Ex people enter the office—I assume you share my experience—they are very quick.

In the 1990s, though, we find that Federal Express does not compete with the post office but with the fax machine. No matter how fast the truck moves or how fast the plane flies, it cannot beat the fax. It doesn't even come close. It cannot beat the Internet either. The fax and the Internet are horrific threats, but result in cost reductions of 90% or more. I could offer more examples but the point is clear. Technology reduces costs, creates massive excess capacity, and causes obsolescence for existing technologies.

The great Austrian economist, Joseph Schumpeter, described this process as one of "creative destruction." One hundred years ago, the bicycle was meant for personal transport; now it is redefined as a leisure product. One hundred years ago, before the automobile, railways were another major mode of transportation. Examine the New York Stock Exchange or the Dow Jones one hundred years ago. What companies were "blue chips?" Railways. Where are the railways today?

A second force of great consequence is globalization and international trade. Energy costs and transportation costs have fallen dramatically. This means that people in far away places have a better chance to compete on a level playing field. One of my silly habits when I travel is to collect coffee cups. I have many coffee cups from many places. Not long ago I was standing in the airport in Madison (Wisconsin), waiting for a guest to arrive, and I suddenly realized that I did not have a Wisconsin cup with a picture of Wisconsin cows, or something similar. The plane was delayed, so I walked into a store. The cups on display were made in China, Japan, Korea, Taiwan, and Thailand. None were made in the U.S. What does it tell us if a product as inexpensive as a coffee cup, yet a symbol of Wisconsin, is made on the other side of the globe and sold at the Madison airport?

Certainly global competition is reaching new levels of intensity. In the end, low transportation costs and low labor costs make this possible. Much of the world is underemployed. The exponential growth in population makes matters even worse. Imagine a world without trade barriers of any kind. The only thing that stops anyone from competing with U.S. workers is transportation costs. Is there any reason why somebody who isn't particularly well skilled and lives in Detroit should be paid more than somebody who isn't particularly well skilled and lives in Sri Lanka? There is none. This is a fundamental result built on the "law of one price"; that is, in efficient markets, identical goods sell for identical prices. The growing population in Sri Lanka puts downward pressure on wages in Detroit. If wages in Detroit are rigid and inflexible, jobs move to Sri Lanka.

Professor Michael Jensen believes that the new technologies, together with unprecedented population growth, prepare us for a new industrial revolution. He has collected many statistics to support his point of view. Allow me to list just a few, relating to population, labor force, and daily earnings in manufacturing (adjusted for productivity) for various countries (in 1992). Jensen gathered the data for his 1993 Presidential Address to the American Finance Association. China has a population of 1.2 billion. About 500 million are part of the labor force. Average daily earnings are \$1.50. The corresponding numbers for India are 850 million, 340 million, and \$2.50. For Eastern Europe and the former Soviet bloc, plus Mexico, the data are 490 million, 200 million, and \$7.50, respectively. It is interesting to compare these findings with the U.S., the European Community (E.C.), Japan, and the "Asian Tigers" (Hong Kong, Korea, Malaysia, Singapore, and Taiwan). The workforce in the U.S. and the E.C. add up to 250 million, with average daily earnings of \$85. The entrance in world markets by the "Asian Tigers" and Japan added only 90 million people to the workforce. Their average daily earnings are currently \$115.

Our political leaders constantly remind us to educate and train ourselves. Imagine that somehow, miraculously, we do the impossible. We triple the productivity of the American worker instantly. Right now, one American (or for that matter, one Frenchman) earns as much as fifty workers in China. If productivity triples, what happens? The arithmetic is simple enough. On a productivity-adjusted basis, each American earns as much as 17 Chinese. It is stunning when you think about it. The future challenges posed by globalization are extraordinary. During the next few years, perhaps as many as one billion people will enter the workforce with an average daily wage below \$5.

One implication is that, unless protectionism gains strength or the U.S. dollar keeps falling in value, we should not expect much price inflation. Maybe our experience will be like that of the 1930s—though for different reasons. During the 1930s, prices in America, on average, fell 2% per year. It is not easy to picture a world with falling prices, but it did happen before. As consumers we benefit from cheap imports; as producers we need a competitive niche that allows success in spite of a large labor cost differential.

On March 29, 1996, Michael Jensen said in the editorial pages of *The Wall Street Journal* that "Capitalism Isn't Broken." I would agree with the title of Jensen's article, but I ask myself whether he does. Jensen's analysis is frightening and his resignation to "the inevitable" is either very courageous or very foolish. Jensen says, "Like the industrial revolution of the last century, today's dislocations are wreaking havoc on the national psyche, but they are also the source of a wonderfully optimistic future. If past experience is a guide, this revolution will take another 30 years to deliver all of its benefits." Thus, Jensen turns a negative into a positive—a billion people want cars, refrigerators, and everything else—but then he immediately warns us it will take 30 years. Who has 30 years?

Jensen says, "the upshot of all this for Western workers is that their real wages are likely to continue their sluggish growth, and some will fall dramatically over the coming decades, perhaps as much as 50%." Who is ready for that? What U.S. President will ever be re-elected if that were true? The final paragraph sounds awkward because of its alarmist conclusion. Recall Jensen's earlier phrase promising a "a wonderfully optimistic future." He says,

These are dangerous times. The dislocations being caused by the Industrial Revolution threaten to undermine the stability of societies. Around the world [we] may witness the failure of one or more Western democracies, as extreme brands of political activism find their voice once again and rise up in a bid for control. Faced with a choice

between anarchy and nondemocratic governments, some societies will opt for the latter. We must not be so seduced.

I have portrayed the economic forces that drive corporate restructuring. What in fact will happen? How will corporate America adjust? Certainly, we will not fold our tent. There will be a competitive reaction, in part driven by the profit motive, in part by a paternalistic tradition that puts "America first." Despite the gradual unraveling of loyalty as an economic motive, management still cares about its workers, its local communities, its arts centers, and so on. These concerns are noble; they make life worth living but, on occasion, they do more harm than good. Some industries—shipbuilding, textiles, coal, and steel—face decline no matter what managers do to remedy the situation. Around 1950, there were 600,000 people employed in the U.S. steel industry. Today there are about 100,000. The refusal to exit, the resolve to fight, the false hope of a turnaround, are common destructive behaviors, but they cause greater pain than necessary. Unfortunately, we sometimes throw good money after bad.

Besides the risk of bankruptcy, what else pushes the corporate system towards competitiveness? I would list internal control mechanisms (such as the board of directors), the new activism of institutional investors, their obsession with short-term stock price performance, and the threat of takeover. How important these factors truly are is currently the topic of much research. Some of my friends in academics complain that these forces are too strong, while others complain that they are too weak. For every bankruptcy or takeover, however, there must be at least 10 or 20 voluntary restructuring efforts. I expect that, in the future, self-discipline will remain one of the most common instruments by which corporate America enforces economic efficiency.

WHAT SHOULD EVERY ACTUARY KNOW?

Let me go back to finance theory, its contrast with reality, and the pressing duty of action. What have we learned? I start with the big ideas and cosmic lessons.

1. Resources (labor, capital) always flow towards the investment projects that offer the highest returns. Water runs downhill. Capital moves in an instant. People migrate.
2. The process of creative destruction never stops. It takes effort to remain employable, to preserve what we already have. Remember the Olympic ideal. Capitalists always want to run faster (*citius*), to be stronger (*fortius*), to jump higher (*altius*).

3. Competition is the great equalizer. Identical goods sell for identical prices. At the core of the theory of arbitrage pricing is the law of one price. When I vacation in Europe and I want a ticket on SwissAir, I call SwissAir's reservation service and a friendly representative takes my order. Where is he or she? As you may know, he or she is in Bombay, not Zurich, or New York. The phone system keeps SwissAir's labor costs down. One day, these jobs will pay as much in New York as in Bombay.
4. Proper organization, contracting, and motivation are central to the creation of surplus and to survival. Corporate finance is organizational architecture and architecture matters.

What practical knowledge should every actuary and every CFO have? Which finance tools may be used immediately? I thought a great deal about this question, and I read Professor Richard Roll's article in *Financial Management* on the same topic. I agree with Roll on many points, but not all. I came up with four techniques that I consider useful.

1. Everyone should be familiar with the time value of money and various discounting formulas. Running worksheets in Lotus and evaluating different scenarios is the essence of capital budgeting.
2. Every actuary should know something about normative portfolio theory as developed by Harry Markowitz. Managing a portfolio or a firm is neither about maximizing return nor about minimizing risk. It is about the trade-off between risk and return. Many useful insights derive from portfolio theory, for example, the asymptotic volatility of a portfolio is the average covariance between assets.
3. Every actuary should know about hedging techniques. Today, risk management makes use of options, futures, and other derivative securities. There is much financial innovation. The valuation of these instruments relies on option-pricing theory. An example is the value of the prepayment option on a mortgage.
4. Finally, every actuary should know certain parity relationships in international finance. I still meet executives who tell me in seriousness that they prefer to borrow in Deutsche marks because interest rates are lower in Germany. Of course, prudence commands that they hedge the exchange rate risk. They simply don't realize that the cost is identical whether they borrow in Deutsche marks or U.S. dollars.