

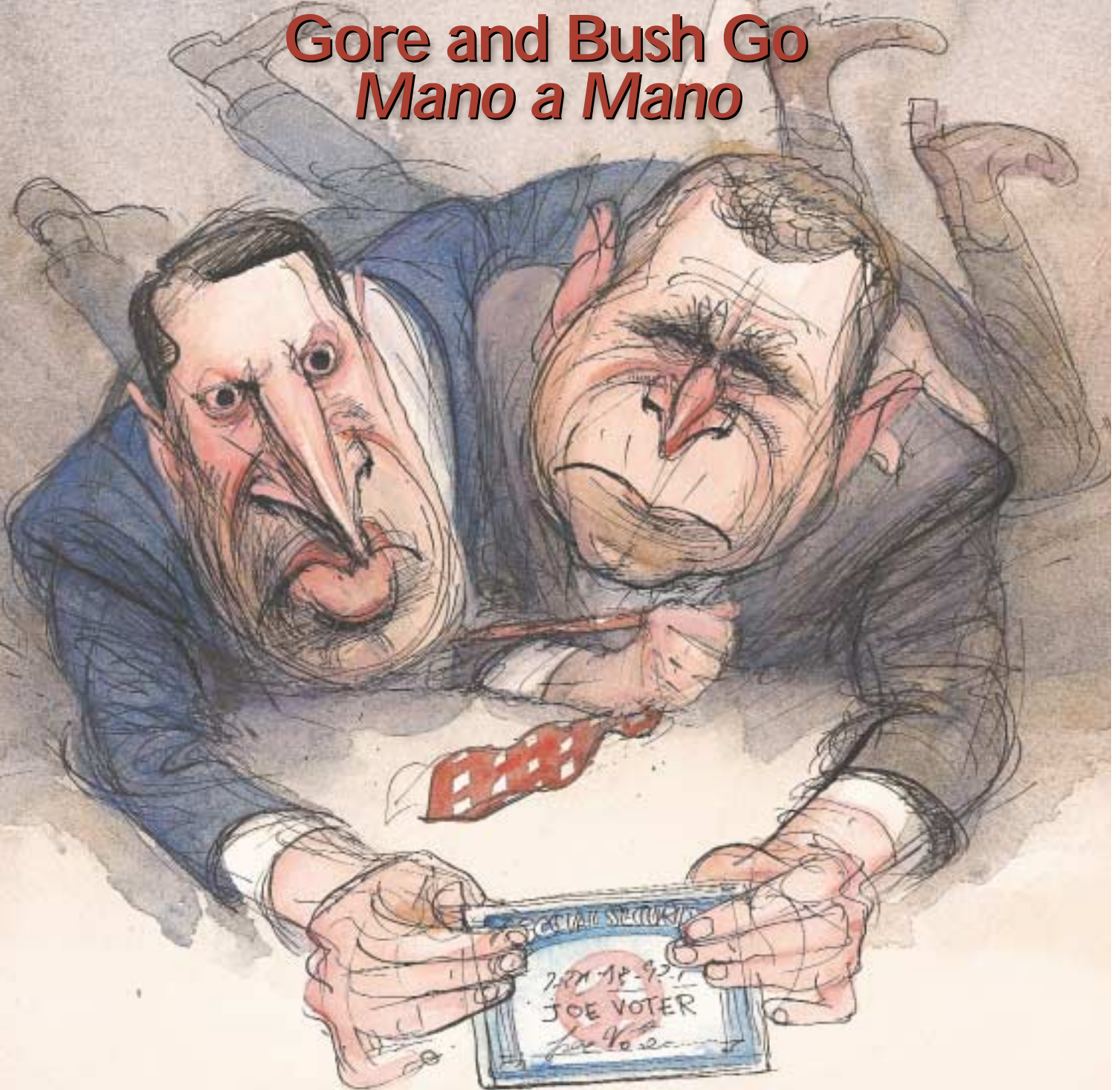
AMERICAN ACADEMY OF ACTUARIES

SEPTEMBER/OCTOBER 2000

Contingencies

FIXING SOCIAL SECURITY

Gore and Bush Go *Mano a Mano*



DW Simpson
C2

Milliman & Robertson

1



Contents

SEPTEMBER / OCTOBER 2000

FEATURES

Face-Off on Social Security:

20 A Secure Future Means a Strong Social Security
By using the budget surplus to reduce the debt and bolster Social Security, Gore will maintain a bedrock guarantee of retirement security.

BY AL GORE

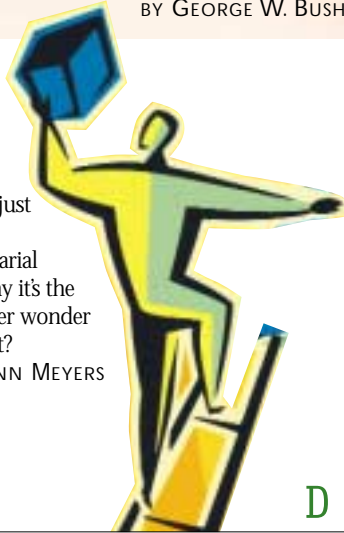
21 Building the Personal Promise of Social Security
The Bush plan includes no reduction in benefits or increase in payroll taxes. Instead, participants can invest part of their Social Security in personal accounts.

BY GEORGE W. BUSH

26 Dynamic Financial Analysis in Four Easy Steps

Dynamic Financial Analysis is more than just a buzz word in the property/casualty actuarial community—many say it's the wave of the future. Ever wonder what the buzz is about?

BY GLENN MEYERS



30 Having Your Cake & Eating It: Unconventional Underwriting for Nontraditional Distribution

Today's life insurance consumers expect fast, accurate, and uncomplicated underwriting turnaround. What they often get instead is the runaround. But now there are ways to speed up the process and keep the customers happy.

BY HANK GEORGE



36 Small is Beautiful: The Key to 21st Century Health Care

Economies of scale may work for selling pizzas and Caribbean cruises, but they don't work for health insurance. Here's why.

BY GERRY SMEDINGHOFF



42 Navigating Safely Through Mergers & Acquisitions

As more companies seek merger partners or acquisition opportunities, more executives will be expected to understand the transaction process.

BY DENNIS L. SCHOFF

DEPARTMENTS

4 INSIDE TRACK

6 LETTERS TO THE EDITOR

12 COMMENTARY
We Are Overinsured
For Health Care
By Peter Hendee



16 POLICY BRIEFING
Finding a Cure
For Unintended Consequences
By Tom Wilder

48 WORKSHOP
The Economies of Insurance
Securitizations
By Samuel H. Cox, Joseph R.
Fairchild, and Hal W. Pedersen

58 TRADECRAFT
Writing the Book on GAAP
By Tom Herget

64 AFTER HOURS
A Most Ingenious Paradox:
The Pirate King is an Actuary
By Laurie R. Weissbrot

70 BOOKLINKS
Isaac's Storm
Review by Linda Mallon



73 PUZZLES
Dual Duel
By Alan Goldberg

76 END PAPER
Vividness, Anchoring, and Regret
By Richard T. Zatorski

Milliman & Robertson

3

Campaign Promises

IT SEEMED LIKE A GOOD IDEA AT THE TIME. Bruce Schobel's idea, actually—at our last editorial advisory board meeting in January. Since this is an election year, he suggested, maybe we could invite the presidential candidates to weigh in on issues important to actuaries: Social Security, Medicare, etc.

So that's what I did. In early April, I wrote to the press secretaries of both campaigns (Nader wasn't a serious candidate at the time), sent them copies of *Contingencies*, told them about us and our concerns, and offered them 1,500 words each to make their respective cases to our knowledgeable and influential readers. I gave them both a deadline of June 15.

I heard back first from the Bush campaign. Count us in, they said. We'd love to do it.

Great, I thought. This just might work after all.

Next I heard from the Gore campaign. Thanks for the offer, they said, but Mr. Gore really wouldn't have time for an interview.

I understand that, I replied, but that isn't what I was asking for. So I sent the material all over again. I tried to make it clearer that what I was looking for was not an interview but a finished article, written by whatever ghost writer or writers they wanted to use, that would appear under the candidate's byline.

Oh, they said, that's different. Sure, we can do that.

I waited. Knowing *Contingencies* would not be their highest priority, I called and sent reminders a couple weeks before the deadline. Just in case.

Silence.

I waited some more. The suspense made life interesting.

The Gore response came by e-mail precisely on June 15. It focused almost exclusively on Social Security (I had asked them to include Medicare reform) but at least I had

something. All I needed was the other half of the equation.

The deadline came and went. After a week or so, I inquired and was told the Bush staff was working on it, but the approval process was taking longer than expected. June turned into July and I tried to use my impending vacation as an impetus to speed. Didn't work. Neither did my daily phone messages. Not even when I got a little testy and pointed out they might look a little foolish missing the boat like that.

Finally, the week before the drop-dead deadline of July 21, more than a month late, I was calling not just every day but several times a day, even from home in the evening. At one point, all I had to do was hit the "last number dialed" button on my phone, hoping I might be able to slip in and catch the real, live person. No luck.

I got a couple of after-hours phone messages in response, though, both promises that it was coming just as soon as possible. Thanks for being so patient.

So I was patient. And then time ran out.

What to do? It didn't seem fair to penalize one for the failure of the other. But nobody was prepared to weather the inevitable fallout if we published only one side.

So we arrived at a solution Solomon might have endorsed if he had had access to the Internet. We found a Bush stump speech on the candidate's Web site, extracted the part about Social Security, and put it opposite the article the Gore people wrote for us.

It's a second-best solution to be sure. But at least both candidates' positions are here. ●



EDITOR

Contingencies

VOLUME 12/NUMBER 5

PUBLISHED BY THE AMERICAN ACADEMY OF ACTUARIES

PRESIDENT

STEPHEN R. KERN

EXECUTIVE DIRECTOR

RICHARD C. LAWSON

DIRECTOR OF COMMUNICATIONS

KEN KREHBIEL

ASSISTANT DIRECTOR FOR PUBLICATIONS AND EDITOR

STEVEN SULLIVAN

ASSISTANT EDITOR

BECKY HORST

ADVERTISING

MOHANNA & ASSOCIATES

DEPARTMENT EDITORS

THOMAS L. BAKOS

ALAN GOLDBERG

PUBLICATION DESIGN & PRODUCTION

BOHOTOM STUDIO, INC.

EDITORIAL ADVISORY BOARD

JULIA T. PHILIPS, *CHAIRPERSON*

DWIGHT K. BARTLETT III

JAMES C. HICKMAN

FREDERICK W. KILBOURNE

RICHARD S. ROBERTSON

BRUCE D. SCHOBEL

SUSAN E. WITCRAFT

INTERNET ADDRESS

WWW.CONTINGENCIES.ORG

CONTINGENCIES (ISSN 1048-9851) IS PUBLISHED BIMONTHLY BY THE AMERICAN ACADEMY OF ACTUARIES, 1100 SEVENTEENTH STREET, NW, 7TH FLOOR, WASHINGTON, DC 20036. FOR SUBSCRIPTION INFORMATION AND CUSTOMER SERVICE, CONTACT THE *CONTINGENCIES* SUBSCRIPTION DEPARTMENT AT THE ADDRESS ABOVE OR (202) 223-8196. ADVERTISING OFFICES: MOHANNA & ASSOCIATES, INC., (972) 596-8777, DAWN@MOHANNA.COM. PERIODICALS POSTAGE PAID AT WASHINGTON, DC, AND AT ADDITIONAL MAILING OFFICES. BPA CIRCULATION AUDITED. (BASIC ANNUAL SUBSCRIPTION RATE IS INCLUDED IN DUES. NON-MEMBER RATE IS \$24.)

COPYRIGHT 2000. ALL RIGHTS RESERVED. THIS MAGAZINE MAY NOT BE REPRODUCED IN WHOLE OR IN PART WITHOUT WRITTEN PERMISSION OF THE PUBLISHER. OPINIONS EXPRESSED IN SIGNED ARTICLES ARE THOSE OF THE AUTHORS AND DO NOT NECESSARILY REFLECT OFFICIAL POLICY OF THE AMERICAN ACADEMY OF ACTUARIES.

POSTMASTER: PLEASE SEND CHANGE-OF-ADDRESS NOTICES FOR *CONTINGENCIES* TO PRIMA FULFILLMENT, P.O. BOX 7225, BENSENVILLE, IL 60106-7225.



Actuarial Careers

5

Loose Lips ...

I was very surprised that James C. Hickman in his article, "Actuarial Ideas That Helped Win World War II" (May/June 2000) did not mention the work of actuaries attached to the operational research group called the Tenth Fleet, which made many important contributions to winning the Battle of the Atlantic.

ROBERT B. WILLETT
GREENSBORO, N.C.

Editor's note: To find out more about the Tenth Fleet, check out the Contingencies Plus section of www.contingencies.org.
(http://uboat.net/allies/ships/us_10thfleet.htm)

File It

Thanks for the article on PPVULs in the May/June issue of *Contingencies*. It's the best brief summary—or extended summary—of the topic I've seen. More generally, it's a model of expository writing that more people should emulate. I



plan to keep it in my permanent reference file.

JOHN PALMER
CINCINNATI, OHIO

Happy Counter

Mathematics devotees of all ages will find items of interest in the Mathematics Calendar 2000, by Theoni Pappas.

Since that calendar's main purpose is not to record appointments or to keep track of the date, its purchase would be appropriate even at this late date in the year.

For each day, there is a short mathematical item — usually involving a symbolic unknown. However, the challenge relates to the solution method rather than the actual answer, since the latter is always equal to the date.

Some items are trivial: sum of n equals 210, if $n = 1, 2, \dots, x$. Others are more challenging: a ball that rebounds $3/4$ of its fall is dropped from $12/7$ feet. How many feet will it travel in total?

For mathematicians who remember portions of what they once knew, the main interest may lie in "proving" a result they "know" is correct; e.g. the square of the length from any point on a tangent to the contact with the circle equals the product of lengths to the near and far points of intersection of the circle and a line through that initial point on the tangent. (Of course, on the calendar, that complicated statement is indicated by a geometric diagram.)

There is also a short essay for each month, and some educational items for various dates; e.g. in January, the Egyptian hieratic numerals for 25.

The 2000 edition continues a series, with 2001 already in preparation. The calendar can be ordered from World Wide Publishing (phone 650-593-2839), or at various bookshops, actual or virtual. (I do not have any relationship to the author, publisher, or sellers. I'm merely a happy gift recipient of the calendar.)

HOWARD YOUNG
LIVONIA, MICH.

1/3
Winkelvoss
Page 6

Consumption vs. Redistribution

Fred Kilbourne has once again served the profession and the public well with his provocative article on past and projected governmental expenditures in relation to gross national product (*Your Government is Ready, Are You?* March/April 2000). Nevertheless, I would have felt more comfortable with his analysis if he had made a distinction between items

Andover

7

that represent consumption and those that represent redistribution of income.

The latter include most prominently Social Security but also income welfare benefits, interest income paid domestically, and perhaps a portion of in-kind benefits such as food stamps and Medicare. The government, in effect, is only acting as a pass-through agent for these expenditures. Their size, of course, remains a concern, but the concern is of quite a different nature from that for expenditures that actually consume a portion of our economic output, rather than simply transferring it from one group of consumers to another.

DWIGHT BARTLETT
SENIOR HEALTH FELLOW
AMERICAN ACADEMY OF ACTUARIES
WASHINGTON, D.C.

Smoke Signals

I can sympathize with Thomas J. Liebowitz' "utter contempt and disgust" upon reading something stupid. I had that reaction to his letter in the Ju-

1/6
Mitchell
Page 8

ly/August issue. From what I read, "the entire scientific community" does not agree that global warming: (a) is caused by man; nor (b) is a serious threat to man.

Characterizing those of us who recognize Darwin's theories as: (a) still unproven after over 100 years; and (b) an attempt to put a "scientific" label on his political opinion, i.e., slight imperceptible change is the natural order of life and, therefore, governmental change by revolution is unnatural, as "anti-evolution religious idiots" does not improve my blood pressure.

As for DDT, I wonder how his "prime example" would go down with the victims of the West Nile virus, carried by mosquitoes that might have been eliminated if DDT were still in use.

The dig at insurers for not having separate nonsmoker rates 20 years earlier is also off base. The first Society of Actuaries meeting I attended was in the fall of 1963 in Atlantic City. A panel discussion on "Smoking and Health" was given by three men: Dr. E. Cuyler Hammond of the American Cancer Society; a representative of the Tobacco Institute; and a public health expert. (I'm sorry I can't recall the names of the last two.)

After the discussion, one of these men asked the audience why insurers did not have nonsmoking rates. Al Morton, then of Prudential, as was I, responded that the objective of a "standard" rating was to include about 90 percent of all applicants. This could not be done at that time if smokers were excluded. (About half of us were smoking during the presentation. It was many years later that the Society limited smoking to one section of each meeting room and still more years before it was banned.)

RICHARD S. HESTER, SR.
NEWARK, N.J.

Unified in Volatility?

I appreciated the article, "Counting the House: Actuaries and Financial Services Reform" (July/August 2000). I want to point out a downside to unitary financial services regulation. Whatever risk model gets imposed by the regulators has unexpected secondary effects on the asset markets.

In the Asian crisis, financial institutions using VAR models exacerbated the crisis by selling into a falling market. That's what

their models told them to do. As certain asset classes exhibited greater volatility than their earlier estimates, they revised their estimates of volatility up, which told them to sell more of the volatile assets. This fed on itself for a time. The intrinsic value of the assets was not a factor in their decision-making. Stability finally came when unlevered buy and hold investors came in with fresh cash to buy the assets that were selling beneath their intrinsic value.

Now, just imagine what would have happened if all financial institutions were using VAR models during the crisis. The only investors left who could provide stability would be individual investors, and total return financial entities such as mutual funds and hedge funds. The mutual funds and hedge funds probably wouldn't be too much help, because on net, they are trend followers. Trend followers tend to increase volatility.

I submit that unitary financial regulation will produce asset markets that are more volatile than under multiple financial regulators. Financial institutions that are regulated differently respond differently to conditions in the asset markets. When one set of financial institutions is in trouble, the differing regulation of another set of institutions may leave them healthy and allow the financial system as a whole to survive.

My conclusion is this: To the degree that we adopt unitary financial regulation, volatility in the asset markets will increase. It will be worse if such financial regulation is international; diversity of financial regulation in different countries also encourages stability in the overall global asset markets.

DAVID J. MERKEL
ELLICOTT CITY, MARYLAND

Corrections: In the article "Pandora's Box," (May/June 2000) on page 43, the conclusions highlighted by bullets were incorrectly attributed to Medicaid and Minnesota Care. They were, in fact, the conclusions of a study conducted by the Medical Care Management Corporation. Contingencies regrets the error.

In the "Reinsurance Corporate Profile Section," (July/August 2000) on page 65, the phone number for Larry Roy was incorrectly listed. The correct phone number is (219) 455-3550. We regret the error and any inconvenience it may have caused.

Tillinghast
9

ING Americas
10

ING Americas

11

We Are Overinsured For Health Care

MANY AMERICANS HAVE NO HEALTH INSURANCE, and others have limited coverage that leaves them exposed to catastrophic health care expenses. On the other end of the spectrum are people with typical health benefits provided by employers or government programs. Some of these plans require only small copayments for covered doctor visits and other services. Others require payment of a deductible, after which the patient pays a portion of health care costs, such as 20 percent, up to some limit.

Too Much?

How much health insurance is too much? There's no clear line. People have different levels of risk tolerance as well as different life circumstances, and both of these affect how much they protect themselves against risk. People in similar situations often choose to buy different amounts of health insurance and other types of insurance.

Insurance is designed to provide economic protection against significant financial losses that occur by chance. If loss occurs, then the insured gets some financial compensation, the policy benefit, from the insurance company.

Health insurance in the United States has become more comprehensive than other types of insurance. One difference is the type of expenses covered. Table 1 on page 14 lists various types of expenses related to automobiles, homeownership, and health care and indicates which expenses are typically covered by insurance. This comparison illustrates that health insurance covers types of expenses that are not normally covered under other insurance. Some of them aren't significant losses and some of them are under the control of the insured rather than occurring by chance.

Another unusual aspect of health insurance is the probability of having a claim. Figure 1 on page 14 shows typical chances of having a claim under different types of insurance policies. The chance of a health insurance claim is drastically higher than the chance of a claim under the other types of coverage.

The reason health care coverage in the United States has become more comprehensive than other



JOHN CONROY

insurance is the Internal Revenue Code. A large portion of health coverage is prepayment for routine health care expenses—payment for spending that is normal and expected—on a tax favored basis.

Most compensation is taxed when employees receive it. Taxes are due on money received in the paycheck, on any shares of company stock received, and on personal use of a company car. But compensation received in the form of health benefits isn't taxed. For many people, this means that it costs only \$7 or \$6 in after-tax pay for their employer to buy them \$10 of health care benefits.

This tax policy has failed to provide a minimum level of health benefits to low-income individuals because only people with employer-provided health care get a tax break for their premiums. As a result, the tax benefits associated with health care go primarily to those in the middle and upper income brackets. And minimizing their tax breaks means covering more routine expenses, including dental and vision care. This is so common in employer plans that state laws now require individually purchased health insurance policies to cover routine and discretionary expenses. Thus, while more than 40 million Americans are uninsured, there are probably more than 150 million who are overinsured.

Market Distortion

Government programs such as Medicaid and typical major corporate health plans provide vast amounts of care at little out-of-pocket cost. Many people cov-

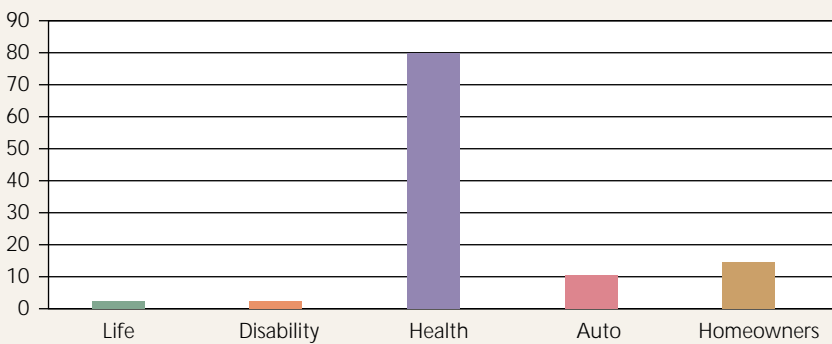
PETER HENDEE IS A CONSULTING ACTUARY WITH ODELL & ASSOCIATES IN WINSTON-SALEM, N.C.

AM Best
13

TABLE 1. Coverage Under Different Types of Insurance

Type of Expense	Auto Insurance	Homeowners Insurance	Health Insurance
Catastrophic Events	Covered <ul style="list-style-type: none"> Your car is totaled and must be replaced Someone is seriously injured in a wreck 	Covered <ul style="list-style-type: none"> Your house is destroyed by fire Your house is significantly damaged by a hurricane or tornado 	Covered <ul style="list-style-type: none"> A life-threatening illness is diagnosed and treated A serious burn results in an extended hospital stay
Unanticipated Events	Covered <ul style="list-style-type: none"> Damage from a fender bender Windshield broken by a rock 	Covered <ul style="list-style-type: none"> Property stolen from your house Minor damage from a kitchen fire 	Covered <ul style="list-style-type: none"> A broken leg A concussion
Routine & Maintenance Expenses	Covered <ul style="list-style-type: none"> Oil changes and gas fill ups Service brakes 	Covered <ul style="list-style-type: none"> Swimming pool maintenance Paint outside of house 	Covered <ul style="list-style-type: none"> Well-baby care Office visits for checkups and minor complaints

FIGURE 1. Annual Probability of an Insurance Claim



ered under these plans give little consideration to cost when deciding whether to go to the doctor, even for mild symptoms; their cost for going to the doctor is well below the real cost and value of the services they receive. This behavior, excessive demand, is one of the distortions racking the health care sector.

Another distortion is that providers don't price their services the way other sectors of our economy do. Their primary consideration is maximizing reimbursement from third-party payers - insurers, HMOs, and corporate plans. Health plans set maximum amounts they'll pay doctors and hospitals. So doctors and hospitals set their prices to maximize their revenues. They know that raising prices has little effect on demand for their services, due to the excessive levels of health care coverage under corporate and government plans. It makes sense for them to maximize revenues by raising prices, at least up to insurer reimbursement levels. Thus, health care prices are set bureaucratically and normal market forces don't operate.

People choose their grocery stores and their cars on the basis of the price they have to pay and the quality they get for the price. Supermarkets and car dealers set their prices knowing their customers will be comparing them with their competitors. And people even consider fees when hiring an attorney to write a will. But in the doctor-patient relationship, market forces don't balance the supply and demand for services.

Managed care is an attempt to control health care services from the supply side by giving the providers an incentive not to provide the unlimited care that's demanded. Managed care uses various mechanisms to discourage patients from using health care services. In other sectors of our economy, consumers themselves perform this role of controlling use. People buy other goods and services on the basis of how much they value those services compared to the value they place on other things they could spend their money on.

Managed care is a mechanism for achieving what the market isn't doing.

People are insulated from the cost of services at the time they demand and receive them. The market can't allocate health care efficiently because economic incentives, the marketplace interactions of buyers and sellers, have been removed.

An alternative health care financing mechanism is needed, one that avoids the market-distorting drawbacks of overinsurance. And as a practical matter, it should not subsidize mainly higher income Americans.

One possible mechanism is an unlimited health care tax credit. This is only one alternative, and its advantages and disadvantages should be compared with others. It would solve the problems resulting from an unlimited health care tax exclusion: overinsurance with its resulting market distortions and excluding many people with low incomes. The tax credit can provide an appropriate subsidy, even more than many people now get, without encouraging overinsurance. And the tax benefits now enjoyed by people with employer provided health coverage can be shared with people who buy their own health insurance. ●

The entire September/October issue of Contingencies is now available online. Visit us and explore more aspects of the topics in this issue at www.contingencies.org

Pricewaterhouse
15

Finding a Cure For Unintended Consequences

THERE ARE FEW ISSUES THAT GENERATE AS MUCH PASSION IN THIS COUNTRY as those involving health care. Health care issues consistently rank among the top concerns of Americans in national surveys. Yet passion and politics seldom lead to satisfactory long-term solutions to complex problems such as health care. What we need is someone who can take a step back and examine how the various pieces of the system fit and how they affect one another—someone like the members of the American Academy of Actuaries.

Debate over health care issues has been a central theme in the presidential and congressional election contests this fall. Congress struggled all year with a number of legislative initiatives, including plans to provide prescription drug benefits to seniors and proposals allowing patients to sue their health plans if coverage for medical treatment was denied. State legislatures considered a wide range of health care topics, from reporting medical errors to protecting the privacy of medical records to mandating insurance coverage for the treatment of mental illness.

It's not surprising that Americans have such strong feelings about health care. After all, safeguarding one's health and the health of one's family is a basic part of human nature. Everything else in our lives—friendship, money, job status—is all pretty meaningless if you don't have good health.

Revolutionary advances in medical science have helped raise the visibility of health care issues. People are living longer and they're often experiencing a better quality of life in their later years than has been true in the past. The human genome project, which has mapped out the basic DNA structure of humans, will add to our understanding of and ability to treat diseases. The study of human genetics has already led to a number of new medicines and medical procedures—ranging from the treatment of various types of cancer to a potential cure for certain types of diabetes.

So given all the passion for safeguarding our health and all of the scientific know-how, why do policy-makers spend so much time talking about the issue without actually getting anything done? How is it that we're unable to provide

TOM WILDER IS THE DIRECTOR OF PUBLIC POLICY FOR THE AMERICAN ACADEMY OF ACTUARIES IN WASHINGTON, DC.

all Americans with a basic level of health care? Why can't Congress and the states reach some consensus on how best to provide for the health care needs of the country?

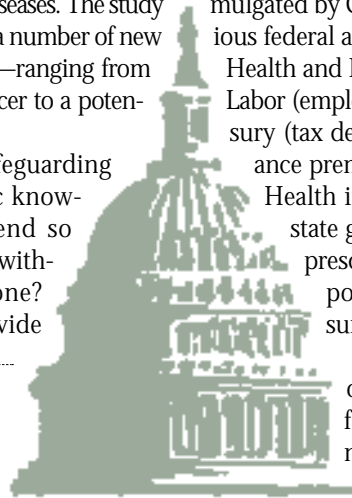
For a start, we need to recognize that the real issue is not how health care is delivered or who receives medical services but how it's paid for. As with most public policy issues, it all comes down to a question of money. Deciding how to provide effective health care to all Americans is less a matter of medical science and more one of allocating scarce financial resources.

Money is an important consideration because total health care costs are likely to continue to rise faster than the rate of inflation, at least in the near future. A major component of health care expenditures in this country is tied to the development of costly medical treatments and new types of prescription drugs, especially genetic therapies. This medical expenditures trend will place enormous pressure on our health care delivery system and narrow the choices available to policy-makers for dealing with health care issues.

A key problem is that our overall approach to health care is so schizophrenic. The delivery of and payment for health care is governed by a confusing, and often contradictory, system of federal and state laws. On one level you're dealing with statutes promulgated by Congress and rules issued through various federal agencies, including the Departments of Health and Human Services (Medicare/Medicaid), Labor (employer "self-insured" plans), and the Treasury (tax deductions and credits for health insurance premiums and medical savings accounts).

Health insurance is also heavily regulated by state governments through a variety of laws prescribing standards for pricing insurance policies, coverage mandates, and consumer access.

Because of these overlapping layers of regulation and oversight, it's difficult for health care to be delivered and financed in an efficient manner. It's even harder to get a comprehensive pic-



Ernst & Young
17

ture of what's going on in the health care market. Efforts to "solve" one problem often have unintended consequences that may make the overall situation worse.

Another barrier to resolving health care issues is our frequently unrealistic expectations about the provision of medical services and who pays. Americans seem to believe that all of their health care needs will be satisfied without having to pay a lot of money out of pocket. State legislatures pass laws requiring insurers to provide additional health care coverage and somehow believe that that won't increase premiums or drive more employers to establish self-insured health plans or to drop coverage altogether. Congress cuts Medicare reimbursement rates and then complains when health maintenance organizations withdraw from the market. Seniors demand prescription drug benefits but expect most of the cost will be paid out of general federal revenues.

We also have a vast array of interests competing for control of the health care

delivery and payment system—each with its own unique perspective on the problem and its solution. Medical providers want more input into health care decision-making and increased payments for their services. Employers want better control over their health care dollars. Consumers want the freedom to choose their doctors and less restricted access to health care services. It's no wonder that policy-makers have a difficult time deciding among these conflicting voices.

The actuarial profession can play a valuable role in this ongoing debate. Actuaries, better than most, understand the complex interactions that make up the health care marketplace and how the various pieces fit together. Evaluating the cost of health care initiatives, determining how consumers and employers will be affected, finding more efficient ways to spend scarce health care dollars—all this is part of what actuaries do on a daily basis.

The American Academy of Actuaries is involved in a number of projects to provide policy-makers with a better under-

standing of health care concerns. The Academy sponsors Capitol Hill forums to educate legislators and their staffs about health care issues. Academy members have also met with congressional staff over the past year to discuss legislative proposals dealing with Medicare reform, managed care patient protection, and how best to provide prescription drug benefits to seniors.

The Health Practice Council has developed monographs discussing long-term care insurance, Medicare reform, and prescription drug coverage for Medicare beneficiaries. The practice council has also published issue papers on a variety of health care topics, including genetic testing and the impact of legislation to limit the use of managed care strategies in health plans.

At the state level, Academy committees are working on a number of projects, such as the development of guidelines for the filing of health insurance products, a study of Medicare Supplement insurance claims data, and further refinement of risk-based capital standards for health organizations.

The key to the Academy's work on health care is that, unlike most special interest groups, we don't profess to have the "right answer" for the issues policy-makers are grappling with. Rather, the major purpose of the Academy is to help them better understand the pieces that make up the puzzle. Part of this effort is giving policy-makers a better picture of how health care is delivered and financed. This also means letting them know when changes to one part of the health care system will have unintended impacts on other parts. In addition, policy-makers need to know how consumers, medical providers, employers, and insurers will be affected by any proposals they're considering.

Right now, policy-makers in Washington and at the state level seem more concerned with short-term political gain. If we can combine our national passion for health care issues with an actuarial perspective, it may lead to long-term solutions to the problems. The Academy needs to continue its efforts to educate policy-makers and the public on these important issues.

1/3
Data Life
Page 18

COSS
19

A Secure Future Means a Strong Social Security

BY AL GORE

SOCIAL SECURITY HAS BEEN an unshakable covenant between generations for 65 years. Today, however, it faces new challenges that threaten its long-term ability to guarantee a decent and secure standard of living for America's seniors, as well as those persons with disabilities and the unemployed. To understand the problem, consider the following: The number of Americans reaching the age of retirement is projected to double from 35 million in 2000 to more than 70 million in 2035. In 1999, there were 3.4 workers for every Social Security beneficiary; by 2035, there will be only 2.0 workers per beneficiary. To save Social Security, I believe that we must use today's historic prosperity and projected budget surplus to strengthen the Social Security Trust Fund and to help pay off the nation's public debt by 2013.

I propose to strengthen Social Security through a fiscally disciplined, common-sense, balanced budget plan that devotes all of the Social Security surplus (estimated at \$2.2 trillion over 10 years) to debt reduction and Social Security. I also propose to use a small portion of the Social Security surplus to modernize Social Security—adding guarantees of fairness for widows, widowers, and mothers.

My proposal would devote the entire Social Security surplus to reduce the national debt, producing significant interest savings. In 2011, the interest savings will be about \$120 billion, all of which will be transferred to extend the solvency of Social Security. These interest savings will grow to about \$250 billion annually after 2015. By applying these interest savings to Social Security, we can extend the life of the Trust Fund through at least 2050. And I am committed to making the hard choices to extend it to 2075.

My opponent, George W. Bush, has proposed a very different approach to fiscal policy and addressing the needs of Social Security. I believe that his plan undermines the long-term viability of Social Security—and threatens our economic prosperity—by giving a huge \$2.1 trillion tax cut. At the same time, he proposes to create a semi-privatized Social Security system that could lead to greater reward for some, but far greater costs and risks for everybody. Consider the implications of his plan.

In 2002, collections on the 12.4 percent payroll tax are projected to be \$541 billion. Under current law, these will be used to pay benefits (\$456 billion) and the remainder will be accumulated in the Social Security Trust Fund. The accumulated assets of this trust fund must be available to pay benefits in the future, as Social Security's liabilities start to exceed its revenues. Governor Bush, however, proposes to divert a portion of these payroll tax collections to create individual accounts. While he has not specified exactly how great this por-



AL GORE IS VICE PRESIDENT OF THE UNITED STATES AND THE DEMOCRATIC CANDIDATE FOR PRESIDENT IN THE NOVEMBER 2000 ELECTION. THIS ARTICLE WAS WRITTEN EXCLUSIVELY FOR PUBLICATION IN *CONTINGENCIES*.

Building the Personal Promise of Social Security

BY GEORGE W. BUSH

SOCIAL SECURITY IS THE SINGLE MOST successful government program in American history. Without it, more than half of all seniors would live in poverty. For millions—for parents and grandparents with little or no savings—it is the difference between destitution and dignity.

Social Security is a defining American promise, and we will not turn back.

This issue is a test of government's capacity to give its word and keep it, to act in good faith and to pursue the common good.

And Social Security is also a test of presidential candidates—a measure of seriousness and resolve. Too many times, Social Security has been demagogued to frighten the elderly for political advantage. Too many candidates have traded on the problems of the system instead of correcting them, shoving them off for others to handle—to some future generation, some other president and some other Congress.

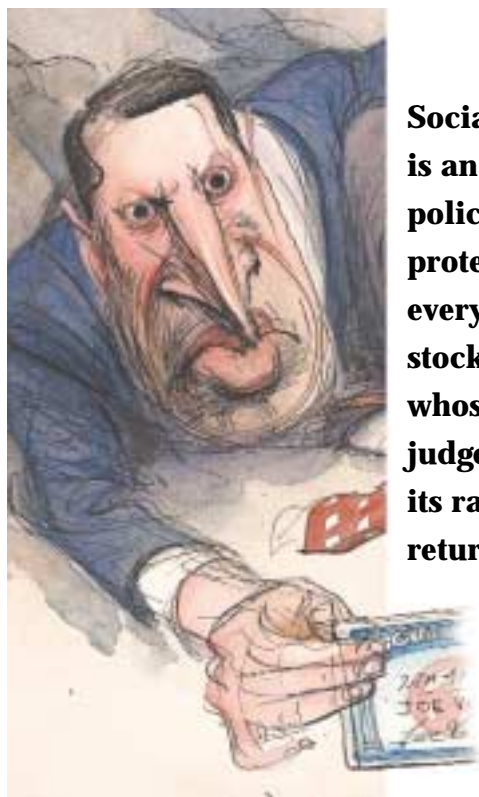
We are nearing Social Security's greatest test. Eight years from now, the massive baby-boomer generation will begin drawing benefits. Their lives will be long and healthy. And within two decades, there simply won't be enough younger workers to pay the benefits earned by the old. If we do nothing to reform the system, the year 2037 will be the moment of financial collapse. The system will be insolvent, with deficits in the trillions of dollars, requiring either a massive cut in benefits or a massive increase in taxes.

At a time for leadership—for long-term thinking—my opponent proposes a band-aid approach. He says: "If it ain't broke, don't fix it." But in our lifetime, it will be broke, and we must fix it. With every day of delay, this becomes more difficult. For 8 years, the Clinton/Gore administration has failed to act. And now Al Gore wants to pass the burden on to future generations. The Gore plan will eventually require either a 25 percent increase in income taxes—the largest in our history—or a substantial reduction in benefits.

But there is good news. There is a new attitude in Washington that shows that re-

GEORGE W. BUSH IS GOVERNOR OF TEXAS AND THE REPUBLICAN PRESIDENTIAL CANDIDATE IN THE 2000 ELECTION. THE ARTICLE ABOVE WAS EDITED FROM A SPEECH THE CANDIDATE GAVE ON MAY 15, 2000. THE COMPLETE TEXT IS AVAILABLE AT WWW.GEORGEWBUSH.COM.





Social Security is an insurance policy that protects everyone, not a stock portfolio whose efficacy is judged solely by its rate of return.

tion would be, many similar proposals call for diverting 2 percentage points out of the 12.4 percent payroll tax. I will assume that as the baseline for this discussion.

Under the hypothetical Bush plan, \$87 billion in 2002 would be diverted into individual accounts. This money would not go into the Social Security Trust Fund and could not be used to build up solvency. By 2003, payroll taxes would not be sufficient to cover the base Social Security benefits—leaving current benefits to be covered out of other income (interest on the accumulated Trust Fund). From 2001–2010, the total cost of diverting payroll taxes would be \$999 billion. This diversion would reduce the Social Security Trust Fund's interest income by \$297 billion. As a result, the Social Security Trust Fund would have \$1.249 trillion less at the end of 2010 than it otherwise would if nothing were done. If no benefit cuts are made, or no new non-Social Security surpluses are added to the system, then the Trust Fund would become insolvent in 2023—a full 14 years earlier than if no action at all were taken.

Something has to give. By reducing the funding for Social Security, either benefits must be reduced or solvency shortened. Gov. Bush says he will hold near retirees and the disabled harmless—that he won't lower their benefits. If true, this pledge only means that there will be larger cuts for Social Security's future beneficiaries.

Gov. Bush contends that he can make up the difference with

Building the Personal Promise of Social Security

BY GEORGE W. BUSH (continued)



forming Social Security can and must be bipartisan. Recently I met with Senator Bob Kerrey—a Democrat who is a leader for Social Security reform. Senator Kerrey and Senator Moynihan, both Democrats, and Senator McCain, a Republican, recently had a press conference to discuss common principles of reform. They proposed an innovative framework for members of Congress to work together on this issue—a framework that includes a bipartisan commission.

I support a bipartisan commission, because it will help pave the way to a consensus on reform. We can already see the emerging outlines of a consensus—led by people like Senators Breaux, Gregg, Grassley, and Gramm; Congressmen Kasich, Archer, Shaw, Kolbe, and Stenholm. As president, I will build on that momentum, with some clear principles.

First, we must not change Social Security for those now retired, or nearing retirement. Let me put this plainly. For those on Social Security—or close to receiving it—nothing will change. Government has made a commitment, and you have made your plans. These promises will be honored. Yet, without reform, younger workers face a great risk—a lifetime of paying taxes for benefits they may never receive. The reforms I have in mind will actually increase their retirement income.

Second, all Social Security funds in the federal surplus must stay where they belong—dedicated to Social Security. In my economic plan, more than \$2 trillion of the federal surplus is locked away for Social Security. For years, politicians in both parties have dipped into the Trust Fund to pay for more spending. And I will stop it.

Third, the payroll tax must not be raised. We cannot tax our way to reform.

Fourth, reform should include personal retirement accounts for young people—an element of all the major bipartisan plans. The idea works very simply. A young worker can take some portion of his or her payroll tax and put it in a fund that invests in stocks and bonds. We will establish basic standards of safety and soundness, so that investments are only in steady, reliable funds. There will be no fly-by-night speculators or day trading. And money in this account could be used only for retirement, or passed along as an inheritance.

Right now, the real return people get from what they put into Social Security is a dismal 2 percent a year. Over the long term, sound investments yield about a 6 percent return. Investing that 4 percent difference, over a lifetime, can show dramatic results. A worker who invests even a limited portion of



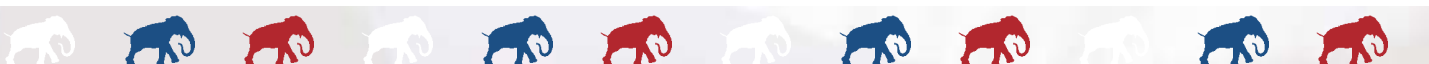
gains from the investment of private accounts. But what happens if the market takes a downturn just when you want to retire? He doesn't say, but it's safe to assume that there are only two choices—either your guarantee of a decent benefit disappears, or we risk a massive, S&L-style government bailout, leaving deficits as far as the eye can see. Under Gov. Bush's plan, lost with the solvency of the system is also the secure retirement, regardless of the fluctuations of the economy or the stock market that Social Security has always guaranteed.

I think that's the wrong approach. Social Security has always been intended to be a social safety net, a baseline guarantee to ensure that America's senior citizens will live in dignity. Social Security money is placed in safe investments that not only provide for all seniors but also support the disabled, unemployed, and others in need. In essence, Social Security is an insurance policy that protects everyone, not a stock portfolio whose efficacy is judged solely by its rate of return.

We must maintain Social Security as a bedrock guarantee of retirement security. On top of that foundation, people can and should build more—savings, investments, IRAs. For example, I am proposing a new Social Security-Plus account to help Americans with low and middle incomes save and invest for their retirement and other qualified expenses. But the American people should not have to roll the dice with their basic retirement security, and they should not have to pay for others who do.

In addition to undermining the security of Social Security, Gov. Bush's plan leaves out any details on one of the most important factors—the transition cost. According to a new report published by the Center for Budget and Policy Priorities, Bush's privatization plan would cost \$900 billion over the first 10 years. These costs would occur because the Social Security system must simultaneously pay out current benefits, while privatization drains over 16 percent of the amount of money coming into the system (assuming a 2 percentage point diversion out of the 12.4 percent payroll tax). Combine this with the cost of Bush's \$2.1 trillion tax cut, and the Bush plan will leave multi-trillion dollar debts as far as the eye can see, jeopardizing the great economic prosperity America has enjoyed for the past 7 years.

Rather than squander the surplus on a massive tax scheme or a risky, secret plan for Social Security, I will use today's prosperity to meet tomorrow's responsibilities. Because of this administration's commitment to fiscal discipline, the nation's debt will be \$2.4 trillion less at the end of this year than it was projected to be. In fact, when the Clinton administration took office, it was projected that by the year 2012, 25 cents on every dollar would go to pay interest on the national debt. Currently, about 13 cents on every federal dollar is spent on net interest payments. These payments, which were once projected to be nearly double that, would be eliminated under my comprehensive debt elimination plan.



his or her paycheck could, over a career, end up with hundreds of thousands of dollars for retirement.

The American securities markets, over time, have been among the most reliable investments in the world. Through the Great Depression, a world war, and 11 recessions, the overall stock market has never lost money over any 20-year period. It is the best, safest way to build personal wealth. That's why teacher pension plans and private business retirement plans all across America invest in such funds.

Some in Washington call this idea risky. But here are some simple questions you should ask them: Do they own stock themselves? Is that part of their own retirement plan? Does it make them feel more secure, or less, to own investments? Clearly, they don't think this is risky for themselves. People in Washington see it as an opportunity. Yet it is an opportunity they would deny to others.

Every federal worker is offered a personal account to help improve his or her retirement—1.3 million have these accounts. Al Gore, who calls these bipartisan proposals risky, has a substantial amount of his money invested in the stock market. If he is building his own retirement security in the market, why does he object to young Americans doing the same?

The payroll tax must not be raised. We cannot tax our way to reform.



AL GORE (continued)

With lower government debt have come lower interest rates for everyone. Because of the deficit and debt reduction that we have already done, it's estimated that a typical family with a home mortgage might expect to save roughly \$2,000 per year in mortgage payments. And with government no longer draining resources from capital markets, businesses have more funds for productive investment. Using the surplus to save Social Security and pay off the debt will continue to help further fuel investment and productivity growth.

Gov. Bush's irresponsible and short-sighted proposition has raised bipartisan alarm for its inability to guarantee the future of Social Security and the very real possibility the plan presents of an increase in the eligibility age, an increase in FICA taxes, or a decrease in benefits if enacted. Sen. John McCain (R-AZ) reacted to Gov. Bush's intentions of not dedicating one penny to saving Social Security by stating, "By not shoring up the Social Security system now with surplus funds we are, by fiat, agreeing to raise payroll taxes in the future. I have called this kind of economics fiscally irresponsible." I agree.

In addition to my plan for Social Security, I propose that we set aside enough of the surplus to strengthen Medicare—and

The American people should not have to roll the dice with their basic retirement security, and they should not have to pay for others who do.

then do for Medicare what we have done for Social Security, by putting the Medicare trust fund in an iron-clad lock-box. Doing so will prevent any Congress from raiding Medicare or taking it away and will keep Medicare strong for decades to come. And I propose that we update Medicare to provide a prescription drug benefit for all our seniors.

America needs a fiscally responsible plan to save Social Security. We need a plan to secure Medicare for future generations. And we need to do both in ways that maintain a disciplined fiscal policy. If we put the right policies in place now to do that, then low interest rates and capital costs will do more to promote growth and create jobs than deficit spending could ever achieve—while maintaining and strengthening these two vital pillars of our social safety net. ●

GEORGE W. BUSH (continued)

Personal accounts build on the promise of Social Security—they strengthen it.

Consider this simple fact: Even if a worker chose only the safest investment in the world—an inflation-adjusted U.S. government bond—he or she would receive twice the rate of return of Social Security.

There is a fundamental difference between my opponent and me. He trusts only government to manage our retirement. I trust individual Americans. I trust Americans to make their own decisions and manage their own money. Let me be clear. Personal accounts are not a substitute for Social Security. They involve only a limited percentage of the payroll tax so the safety net remains strong.

Let me say this again: For those who are retired or near retirement, there will be no changes at all to your Social Security. But we can and must give younger workers the option of new opportunities.

Personal accounts build on the promise of Social Security—they strengthen it, making it more valuable for young

workers. Senator Moynihan, Democrat, says that personal accounts take the system to its "logical completion." They give people the security of ownership. They allow even low-income workers to build wealth, which they will use for their own retirement and pass on to their children. Some plans would match the contributions of low-income workers to their personal accounts. That is also an idea we should consider.

Senator Kerrey, also a Democrat, recently said: "It's very important, especially for those of us who have already accumulated wealth, to write laws to enable other people to accumulate it, and arrive where we are." Ownership in our society should not be an exclusive club. Independence should not be a gated community. Everyone should be a part-owner in the American Dream.

Within the framework of these principles, we can keep Social Security strong and stable. We can keep our commitments. We can avoid tax increases. And millions of Americans will have an asset to call their own. This is the best thing about personal accounts. They are not just a program; they are your property. And no politician can take them away.

As our society grays, we must keep our commitments. But we must also set new goals. Our nation has a vital interest—a moral interest—in making retirement a time of security and health and contribution. ●

One Actuary's Critique

BY RON GEBHARDTSBAUER

Do Bush's and Gore's proposals really solve Social Security's financial problems? They both want to "save Social Security," but both leave the details to others. That's understandable of course. Tough decisions for fixing the system don't get people elected President.

BUT WE, THE VOTERS, AREN'T PURE EITHER. None of the fixes (cutting benefits, increasing taxes, and/or raising the retirement age) are painless, and we want a painless solution, which is why everyone is talking about individual retirement accounts. But they don't fix Social Security.

Both candidates agree on creating individual accounts (IAs). Bush diverts some of our current Social Security taxes to an IA (he calls it a PRA), which means that he must reduce the portion that comes from the Social Security trust funds. Gore doesn't want to cut the guarantees, so he adds a voluntary IA on top of Social Security (he calls it a Social Security-Plus Account or SSPA) and provides a progressive government match to encourage contributions from low-income people.

Bush's Proposal: Bush provides the following principles for reform (with his words in quotes).

■ No changes "for those now retired, or nearing retirement." (They've suggested age 50 and over). Does that mean that Bush won't touch their COLAs? I think his words imply that and I'll bet that's what most retired people will think. Thus, this older group (who got the greatest returns on their SS contributions) won't be a part of the solution. That means bigger fixes will have to fall on younger people, who already have a worse return on Social Security than their parents.

■ "All Social Security funds... dedicated to Social Security." Bush says he locks away more than \$2 trillion for Social Security over the next 10 years. However, he uses \$1 trillion of it for his PRAs. That is why Social Security's key problem dates come much sooner. The 2015 date when outgo exceeds income moves up to 2003 (which is why we will return to budget deficits real soon). The 2037 date when Social Security assets are exhausted moves up to 2023.

■ "The payroll tax must not be raised." This means Social Security's guaranteed benefits have to be cut and/or the retirement age must be increased and/or deficits will increase (which means that we give the bill to our kids).

■ Reform includes PRAs for young people... in reliable funds,... and only for retirement or inheritance. If, as Bush suggests, only a few investment funds will be available, then the government will be involved in selecting the investments. What if the funds aren't doing well when you retire? Will individuals sue the government or demand expensive guarantees?

Bush notes that the Social Security system gets only a 2 percent real rate of return, while investments in the PRAs will earn 6 percent real returns. This is a misleading comparison. Social Security invests in Treasury bonds, which currently earn a 5 percent real return. Its ultimate returns for us are not as good because we gave more of our payroll taxes to our parents than we will get from our kids, and that

will also be true for a system that includes PRAs. If Social Security and/or PRAs were to invest in stocks, and get better returns, we could pay ourselves larger Social Security/PRA benefits, but then other parts of society would get less of the total pie. Giving better returns to Social Security (and people with PRAs) may be a better way of distributing our production, but it'll reduce what others get.

Gore's Proposal: Gore provides the following principles for reform:

■ Gore would create individual retirement accounts on top of Social Security—his SSPAs. The government would provide a progressive match to encourage contributions and avoid the problem of small accounts having expenses larger than their investment yields for many years.

Couples earning less than \$30,000 would get a 3 for 1 match. Couples earning between \$30K and \$60K would get a 1 for 1 match. Couples earning between \$60K and \$100K would get a 1 for 3 match. The total contribution could be at most \$4,000 for couples and \$2,000 for singles.

My guess is that only 10 percent to 20 percent of the match money will go to the intended target—people earning below \$30,000, because it's difficult for them to find the money to contribute. In addition, Gore's SSPA proposal would be expensive, up to about \$50 billion per year. Gore would allow savings to be withdrawn for the same reasons as IRAs (a first home, major medical expenses, and college expenses). That encourages people to contribute but the funds may not all go to retirement.

■ Gore's proposal improves Social Security's benefits to widows and mothers, who currently get smaller benefits on average. However, the improvement for mothers may not go to its intended recipients (low-income mothers), and Gore hasn't suggested any revenue to pay for the two improvements (about ? percent of payroll).

Some of Social Security's financial problems aren't really Social Security's problem. They were caused by our huge borrowing in the past, including borrowing from Social Security. Not only do we owe \$3 trillion in public debt to ourselves, we have another \$2 trillion in gross debt (half of which is owed to Social Security's trust fund).

Thus, Gore suggests paying down the debt in good times. This reduces the government's interest payments. Gore would give those savings to Social Security (but some people have concerns with general revenue financing). It also makes it easier to pay Social Security's benefits in the future.

Both Gore and Bush would have individual accounts with Social Security, Bush's has a carve-out, Gore's has an add-on. You have to decide how much corporate responsibility/risk-taking versus individual responsibility/risk-taking we need. Maybe there's a compromise: a 1 percent add-on plus a 1 percent carve-out.

Now that we've got that solved, let's get back to fixing Social Security's financial problem. In fact, we should probably do that first. ●

RON GEBHARDTSBAUER IS THE ACADEMY'S SENIOR PENSION FELLOW. THE CRITIQUE ABOVE HAD TO BE EDITED TO FIT AVAILABLE SPACE. HIS UNEDITED COMMENTS ARE AVAILABLE AT WWW.CONTINGENCIES.ORG.

Dynamic Financial Analysis is more than just a buzz word in the property/ casualty actuarial community—many say it's the wave of the future. Ever wonder what the buzz is about?

By Glenn Meyers

ACCORDING to Susan Szkoda, president of Szkoda Actuarial Services in Marietta, Ga., dynamic financial analysis (DFA) can be defined as “a process for analyzing the financial condition of an insurance entity.” Writing in a five-part article that began in the May 1997 *Actuarial Review*, she went on to say that “financial condition refers to the ability of the entity’s capital and surplus to adequately support future operations through a currently unknown future environment.”

As property/casualty insurers intensify their interest in dynamic financial analysis, actuaries are looking at DFA as a new effective tool

DYNAMIC FINANCIAL ANALYSIS

in
4
Easy
Steps



ILLUSTRATION CREDIT TO GO HERE

they can use to set combined ratio targets by line of insurance. Given the right skills, the actuary can provide key input into an insurer's successful future business plans, however uncertain that future may seem.

Here is a four-step approach to setting those combined ratios, based on a hypothetical insurer.

The ABC Insurance Company is a multiline insurer. Its goal is to obtain an above-average return on equity by setting profitability targets for each of its underwriting divisions that reflect the cost of capital needed to support each division's contribution to the overall underwriting risk. ABC intends to exit any line of insurance that fails to meet its underwriting target.

While ABC's management recognizes the important role regulators and rating agencies play in evaluating the adequacy of an insurer's capital, it feels that controlling the insurer's risk, as measured by its statistical distribution of outcomes, provides a meaningful yardstick it can use to set profitability targets.

In addition, ABC's management wants to consider the following questions in making its decisions.

How long must capital be held? The underwriting results for the typical liability line of insurance are not known for several years. As long as there is uncertainty in the final result, some capital must be held. The profitability targets for each line of insurance should reflect the cost of holding capital until all claims are settled.

How much investment income is generated by the insurance operation? Capital held for the contingency of unusually high losses is also earning investment income. The profitability targets for each line of insurance should reflect the investment earnings generated by each line of business.

How closely correlated are the losses in the various lines of insurance? The textbook illustrations of the economic value of insurance often assume that insured accidents are independent events. Positive correlation increases the amount of capital needed and hence its cost. This cost should be reflected in the profitability targets for each line of insurance.

What is the effect of reinsurance? In place of raising capital, an insurer may rely on reinsurance to provide security for its ability to pay losses. The cost of reinsurance replaces part of the cost of capital. Profitability targets should reflect both the cost and benefit of reinsurance on each line of insurance.

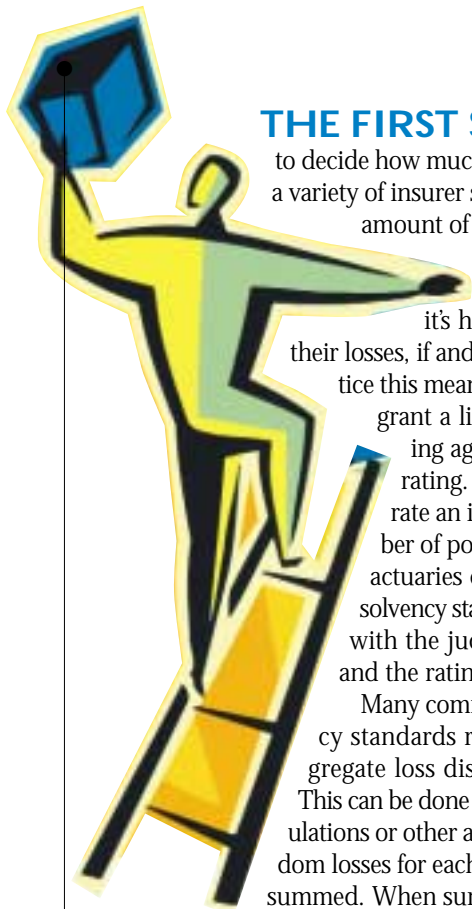
The cost of financing an insurance company is defined to be the combined cost of capital and the transaction cost of reinsurance (i.e., the premium less the expected reinsurance recovery). The ABC Insurance Company wants to allocate its cost of financing back to its individual underwriting divisions.

Next, ABC will add this allocated cost of financing insurance to the expected losses and the other allocated expenses to obtain target combined ratios for each underwriting division in the company.

Following these actuarial steps can solve this problem. For actuaries who want all the technical details of how the process works, visit the Casualty Actuarial Society Web site at <http://www.casact.org/pubs/forum/00sforum/meyers/>. (This site includes an Excel spreadsheet with a numerical example illustrating the ideas presented in this article.)

For those who prefer a less technical explanation, read on.





THE FIRST STEP in this analysis is to decide how much capital ABC needs under a variety of insurer strategies. In principle, the amount of capital an insurer needs is whatever it takes to convince policyholders that it's highly likely they'll recover their losses, if and when they occur. In practice this means persuading regulators to grant a license and convincing rating agencies to grant a desirable rating. Since a rating agency can't rate an insurer under a large number of possible operating strategies, actuaries can derive a mathematical solvency standard they hope will agree with the judgments of the regulators and the rating agencies.

Many common mathematical solvency standards require calculating an aggregate loss distribution for the insurer. This can be done by either Monte Carlo simulations or other actuarial methods. The random losses for each line of insurance must be summed. When summing the random losses, the actuary must take into account the correlation (i.e., a measure of how often bad things happen all at once) between the lines of insurance. An insurer with highly correlated lines of insurance needs more capital than an otherwise equivalent insurer with negligible correlation among its lines of insurance.

Once the insurer's aggregate loss distribution has been determined, an actuary can calculate how much capital an insurer needs to pass a selected solvency standard. Examples of the currently popular solvency standards include:

- probability of ruin (or equivalently the value at risk)
- standard deviation principle
- tail value at risk

The tail value at risk is a relatively new concept introduced by Philippe Artzner, Freddy Delbaen, Jean-Marc Eber, and David Heath in their paper, "Coherent Measures of Risk," which appeared in *Mathematical Finance*, Volume 9 (1999). It can be downloaded from the Web at <http://www.math.ethz.ch/~delbaen/ftp/preprints/CoherentMF.pdf>.

To calculate the tail value at risk, simply take the average of the top $p\%$ of losses, where p is a percentage selected by the analyst.

THE SECOND STEP in this analysis is to allocate the capital to the underwriting division—usually but not necessarily the line of business. Capital allocation has been a controversial subject among actuaries. As Chuck McClenahan, a principal with William Mercer in Chicago, once put it, "A policy written with a monoline automobile insurance company with \$100 million of surplus is not as well protected as a policy written with a large multiline insur-

ance company with \$100 million allocated to its automobile line of insurance."

I agree with Chuck's statement. But I also agree with the idea of using capital allocation as an internal management tool that can relate an underwriting division's financial goal to the insurer's corporate financial goal. A capital allocation method is valid as long it leads to decisions that make economic sense.

ABC will stop writing the lines of insurance supported by a particular underwriting division if it doesn't expect the underwriting division to meet target rates of return on its allocated capital. ABC has to expect a rate of return on its capital that's at least as high with the underwriting division as it expects without the underwriting division.

It can be demonstrated mathematically that ABC will keep the underwriting division if its return on marginal capital is greater than or equal to ABC's overall target rate of return. When totaled, however, the sum of marginal capital for each underwriting division is inevitably less than the total capital of the corporation. This means that if the return on marginal capital for all underwriting divisions is equal to ABC's target rate of return, ABC will get less than its target return on its entire capital! While it may make economic sense for the target rate of return for a single underwriting division to have a target return on marginal capital equal to the insurer's overall target, ABC can't set the target for all underwriting divisions in this manner.

Within the limits prescribed above, ABC's management can arbitrarily set profitability targets that make economic sense. An important consideration in setting these targets is that management may want to treat its underwriting division heads "fairly." One way to do this is to allocate the insurer's capital in proportion to each underwriting division's marginal capital.

THE THIRD STEP in this analysis is to calculate the cost of capital needed to support the outstanding losses. The payments for outstanding losses are uncertain, so ABC needs to allocate capital to support the uncertainty in these payments. This means that the distribution of unpaid losses must be considered when deriving ABC's aggregate loss distribution.

When writing policies in the long-tailed lines of business, it's important to note that an insurer must allocate capital to support this action for several years into the future. To do this, the insurer needs to plan for the business it intends to write for several years into the future. As the insurer settles claims for a given set of policies, the uncertainty is reduced and the insurer can release its capital back to the owners. Since capital must be held longer for the long-tailed lines, the cost of capital will be higher for these lines.

Let's look at the cash flow for writing insurance.

At time $t = 0$, an underwriting division receives its premium. It places its allocated capital, $A(0)$, in a safe investment.

At time $t = 1$, it returns the investment income on $A(0)$ to its investors. The allocated capital needed to support the outstanding losses after time $t = 1$, $A(1)$, is invested. The difference, $A(0) - A(1)$, is returned to ABC's investors.

The process continues for times $t = 2, 3$, and so on, until all outstanding losses are paid.



If we view reinsurance as a substitute for capital, the transaction costs of reinsurance must be subtracted from the profit provision in the premium.

For the underwriting division to make its target rate of return, the profit provision in the premium must be at least as large as the difference between its initial allocated capital, $A(0)$, and the present value of the cash flow above evaluated at a rate of interest equal to its target rate of return. This difference can easily be translated into a target combined ratio for the underwriting division.

THE FOURTH STEP in this analysis is to consider the effect of reinsurance. Buying reinsurance reduces the capital needed for the entire insurance company. It will therefore affect the capital allocation, with the greatest impact occurring in the lines of insurance covered by reinsurance agreements. This affects the cash flow discussed above.

If we view reinsurance as a substitute for capital, the transaction costs of reinsurance must be subtracted from the profit provision in the premium. Will the underwriting division's net profit provision be more or less than the difference between the allocated capital and the present value of the capital cash flow with reinsurance? It depends on the cost of the reinsurance and the cost of capital, as reflected in the target rate of return. This analysis provides a systematic way to compare the two costs.

Clearly, this exercise requires the financial skills to analyze the "ability of the insurer's capital and surplus to adequately support future operations through a currently unknown future environment." The right actuary can provide key input into this aspect of the insurance business by:

- Determining the amount of capital needed under a variety of strategies
- Allocating capital to underwriting
- Calculating the cost of capital needed to support to outstanding losses
- Allocating reinsurance transaction costs

Moving beyond this example, the right actuary could further reduce the necessary capital by hedging the insurer's losses or using other asset management strategies or both. This re-

quires additional knowledge of capital markets and the various tools used to manage financial risk.

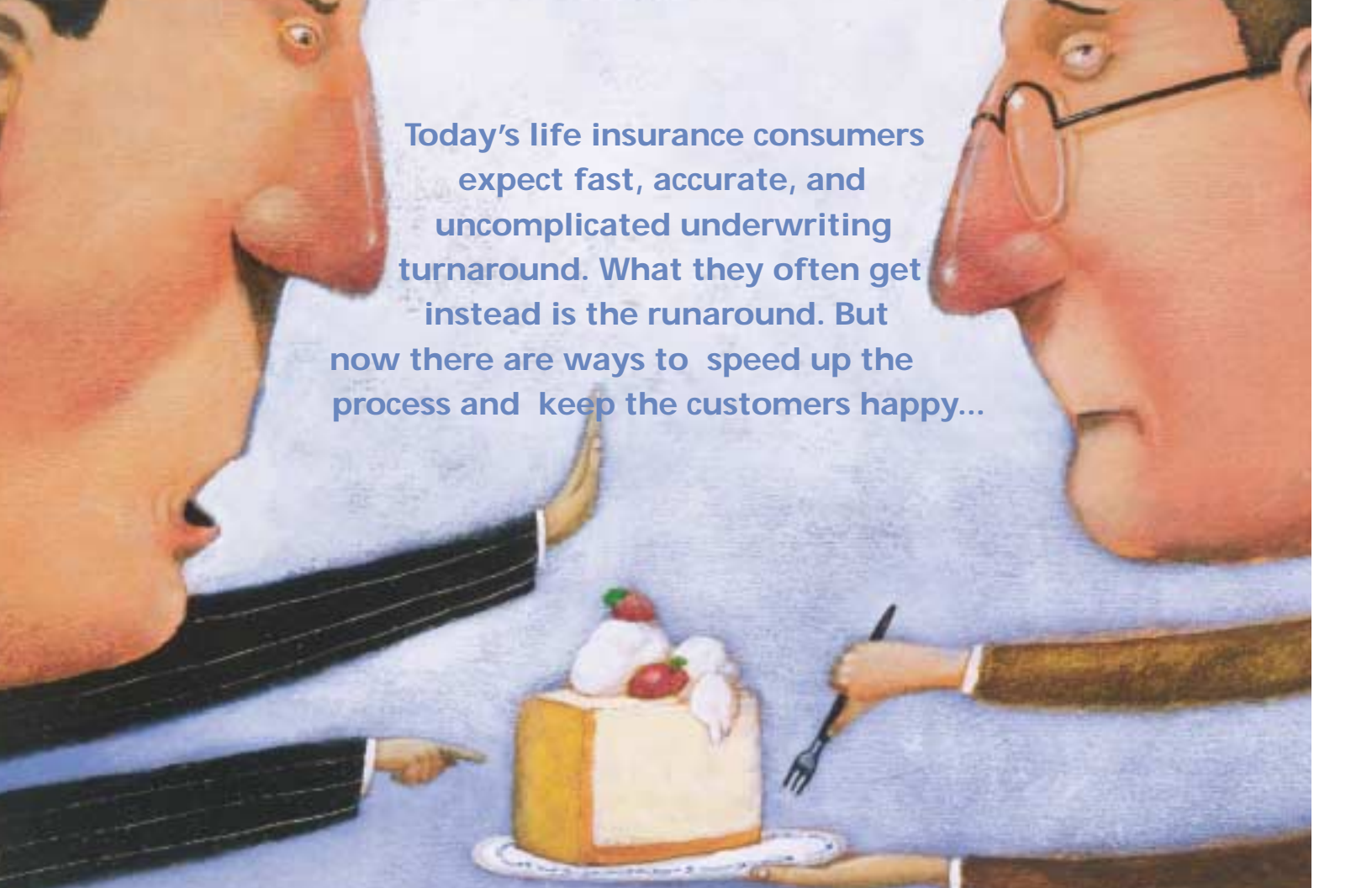
In discussing the actuary's role in DFA, Susan Szkoda said that "the DFA concept broadens the scope of the actuary's analysis to encompass the entire balance sheet as well as the company's business plans over some future horizon. The actuary must, therefore, deepen his or her knowledge to include assets, liabilities other than loss and loss adjustment expense reserves, off-balance sheet risks, and capital structures and requirements. The profession must deepen its understanding of the impacts of various exogenous factors (economic cycles, changes in capital markets, development of new types of risk transfer products) on our business. In a very real sense, DFA requires the actuary to evolve into a financial risk manager."

GLENN MEYERS IS CHIEF OF ACTUARIAL RESEARCH AND ASSISTANT VICE PRESIDENT OF INSURANCE SERVICES OFFICE, INC. IN NEW YORK CITY.



The entire September/October issue of Contingencies is now available online. Visit us and explore more aspects of the topics in this issue at www.contingencies.org

1/4
Actuarial Connection
Page 29

An illustration of two men with large noses and exaggerated features. The man on the left is wearing a dark suit and is pointing towards a cake. The man on the right is wearing glasses and a brown jacket, holding a fork. They are both looking at a small, round cake with white frosting and strawberries on top, which sits on a white plate. The background is a light blue, textured surface.

Today's life insurance consumers expect fast, accurate, and uncomplicated underwriting turnaround. What they often get instead is the runaround. But now there are ways to speed up the process and keep the customers happy...

Having Your Cake & Eating It

By Hank George

NONTRADITIONAL (or, alternative) life insurance distribution systems find themselves in a quandary. They want to have their cake (rapid turnaround, from application to issue) and eat it acceptable mortality/morbidity experience; minimized antiselection).

Wishful thinking?

With traditional approaches to risk management, yes. But there may be a way to have acceptable turnaround and adequate underwriting to avoid undesirable outcomes. Let's begin by defining our terms.

Nontraditional distribution refers to insurance sales through banks, on the Internet, by telemarketing and direct mail, and at retail sites. For the most part, these are products sold without the services of an agent or broker. Thus, there's no one positioned between the carrier and the client to gather information, to dote over and, as needed, to assuage the prospective insured when the process of acquiring insurance seems onerous.

● *Unconventional Underwriting for Nontraditional Distribution*

There's a widely held (and, likely, accurate) perception that the success of nontraditional distribution depends, at least in part, on speeding up the often sluggish process that begins with the insurance application and ends with policy issue and delivery. These new insurance distribution channels can't accommodate protracted intervals. It's realistic to project that insurers will have a few days—not weeks or, sadly, months—to dissect and approve risks. Anything longer than that, on average, and the prospects for placing the coverage in force will be greatly compromised.

This context renders traditional risk management tools, such as medical examinations, inspection reports, electrocardiograms, and chest x-rays, all but useless. They're too slow, too cumbersome, and, one might add, way too expensive.

Even more disconcerting is the extent to which life underwriters traditionally depend on physicians' reports. Measured from request to receipt, they're the slowest of all underwriting resources. There's no way physicians' reports can serve as a core underwriting resource for nontraditional business (at least not until someone finds a way to speed up their acquisition process dramatically).

It's easy to see why nontraditional life insurance providers feel caught between the proverbial rock and a hard place. If they underwrite adequately, they'll see the rate of declined business skyrocket, undermining their efforts. Conversely, if they disdain sound underwriting, they're forced to either overprice their merchandise or run the gauntlet of adverse mortality. Either solution lays waste to their profitability.

The specter of antiselection hovers. If they unwittingly facilitate scenarios ripe for pillaging by those who have a "special need" for insurance, they'll pay dearly.

The history of life insurance is replete with sad tales of those who thought they could pare underwriting to bare bones, or even eliminate it completely, and still prosper. In the age of AIDS and the hepatitis C epidemic, antiselection is no laughing matter.

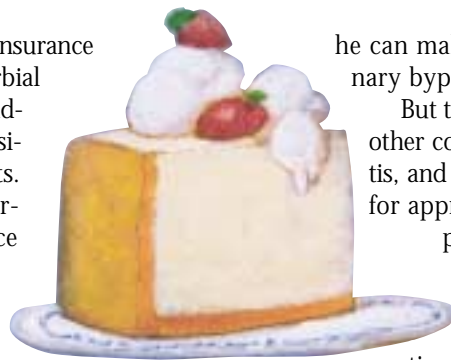
There is a solution. But to get to it requires a dramatic paradigm shift, one that may induce scary symptoms in those too wedded to the past. We have the means to accomplish sound underwriting, within the turnaround time constraints mandated by nontraditional distribution. That's to say, we can have our cake—and eat it—if we embrace a dynamic new way of assessing risk.

And there's a fringe benefit if we do. The new way is customer-friendly, a quality that hasn't always been part of what we have historically called "underwriting."

The Primary Solution

In order to approve adequately underwritten life insurance applications—from application initiation to policy issue—in a median interval of 72 hours, the underwriter will largely need to abandon tools that are too slow. This means routine use of medical exams, most (but not all) medical tests, inspection reports, and physicians' reports.

Not every physician's report can be dispensed with, however. If a proposed insured has a history of cancer, for example, the underwriter must acquire key information from the physician to sufficiently ascertain the risk before



he can make an offer of insurance. Ditto for coronary bypasses.

But the same cannot be said quite so readily for other common impairments such as asthma, colitis, and even diabetes. There is dramatic potential for appraising such risks without routine use of physicians' reports.

How? By using faster information-gathering modalities.

In the case of diabetes, these modalities might consist of a detailed questionnaire probing the medical history plus a urine or oral fluid (saliva) laboratory profile. Such a combination could be gathered in a few days. Even if a blood profile is needed to assay diabetic markers, the use of a responsive collection service would allow most cases to be presented to the underwriter for a decision barely a week after the application is taken—a fraction of the time required if an underwriter holds out for a physician's report!

The anchor of this new paradigm will be a questionnaire, much like those gathered, currently by many companies, in a format some call a "telephone inspection report." This underwriter prefers the term personal history interview (PHI) because it better reflects the actual contents of such reports.

The PHI, conceived in the 1980s, began as a simple reprising of the application questions. Additional power was added through the collection of protective information; YES answers were amplified by drilling down the proposed insured with a handful of impairment-specific questions. The PHI continues to evolve with questioning of the proposed insured about a range of epidemiologically valid information related to health status, risk of disease and death—and, ultimately, insurability.

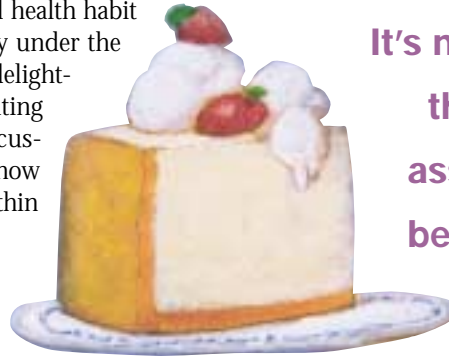
We've done this for years for tobacco use and the results have been gratifying. We succeeded in charging those who choose to increase their mortality risk by indulging in tobacco more for their insurance to cover that risk. And when we took the bold step to do this, those who previously had criticized underwriting as "unfair" came to applaud smoker/nonsmoker (more accurately, user/nonuser!) underwriting as just!

The next step in this process will be more dramatic. It will embrace a wide range of what one might call health habit issues. The factors we'll target will be largely under the control of our customers. (One of the more delightful effects of this new approach to underwriting will be higher approval ratings from our customers!) But the focus, for now, should be on how this will allow us to assess and price risks within the aforementioned 72-hour time constraint.

It's now an established fact that the mortality curve associated with alcoholic beverage consumption is U-shaped. That is to say, mortality is higher in teetotalers than in temperate (one or two drinks per day) drinkers. This is most strikingly evident with heart disease, but it's also been shown to extend to all-cause mortality.

More recently, investigators have looked at specific alcoholic beverage types to see if one's choice—wine, beer or spirits—offers any advantage. Simply stated, what they found is that wine drinkers have better mortality than beer and hard liquor drinkers. Why? Because of something in the wine? Perhaps. But, there's also evidence to suggest that the advantages of wine may be less in the wine itself than in the health habits of those who choose the wine!

A recent University of California study of a large cohort of women with noninvasive breast cancer demonstrates this concept from a very different perspective but no less emphatically. (See references.)



It's now an established fact that the mortality curve associated with alcoholic beverage consumption is u-shaped.

These were women who had had what is called ductal carcinoma *in situ*. This form of breast malignancy, while not potentially fatal by itself, is felt to predispose a patient to invasive and thus life-threatening tumors.

What the authors found when they looked at mortality in women who had had such carcinomas in situ was that their risks of death by both cardiovascular disease and all-cause mortality were reduced by as much as 40 percent.

Does this mean that noninvasive breast cancer protects against coronary artery disease and fatal car crashes? Not likely! What it does mean is that women who opt to have periodic screening mammograms (most carcinomas in situ are discovered on a mammogram) also have other desirable health habits that make them better insurance risks. In other words, the decision to embrace periodic screening mammography may be a marker for a healthier lifestyle.

A recent report in the Archives of Internal Medicine on a large population of physicians who took low-dose aspirin to ward off heart attacks showed the same thing. (See references.) Those who chose to take aspirin for this reason were more apt to exercise regularly, to have a drink or two each day, to take vitamin E supplements, and to be faithful to any prescription they may have been given for high blood pressure or elevated cholesterol. These are highly desirable characteristics in life insurance applicants; they make better risks.

Is the decision to take "an aspirin a day to keep an MI away" in fact a marker for the presence of such healthful characteristics? As in drinking wine or having screening mammograms, the answer appears to be YES.

The same may now be said for postmenopausal women who choose to take hormone replacement therapy (HRT). Not only does the therapy itself appear to have significant risk-reducing impact, but the decision to take it also points to a high probability that the HRT user is a health-conscious individual. This has been revealed in several large studies, including one published in the *British Medical Journal*. (See references.) As a group, HRT users are better insurance risks than HRT disdainers.

If the foregoing are valid examples of how health-habit choices reflect risk, then why don't we start asking applicants about their patterns of (nonabusive) alcohol intake and their optional preventive medicine interventions, such as using aspirin, HRT, vitamin supplements, herbs, and perhaps other remedies as well?

1/4
JLS
Page 32

In fact, we have the wherewithal to take this approach even further.

A recent study in the *Journal of the American Medical Association* showed that when women were divided into quartiles based on their dietary patterns, those in the lowest (least favorable) group had significantly greater heart attack, stroke, and cancer mortality than those who embraced healthier diets. The medical researchers ascertained the relative merits of their subjects' diets by using a Recommended Food Frequency Score which, in turn, was derived from a food frequency questionnaire.

Could a modified version of such a questionnaire serve us in risk management? In the setting of nontraditional insurance (that is, with risk information gathered directly from the proposed insured), this should easily be accomplished.

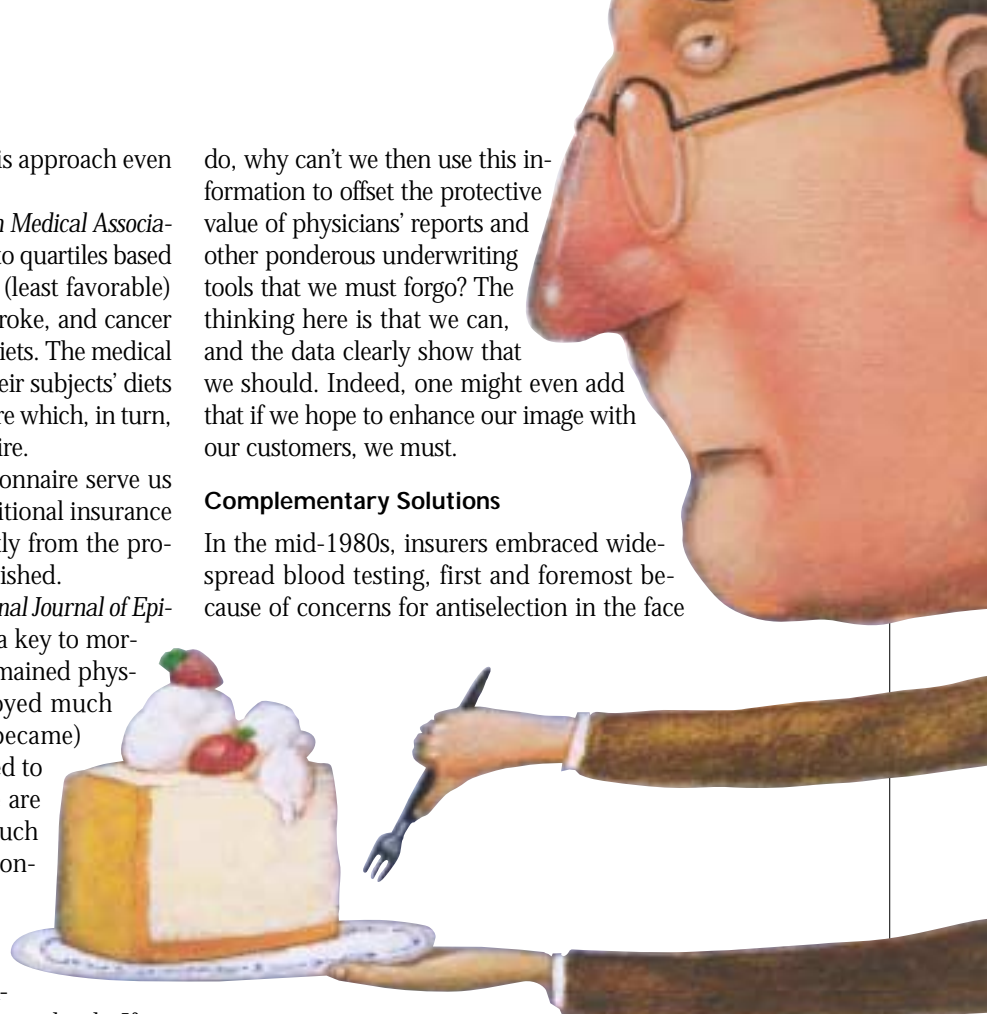
A Swedish study, published in the *International Journal of Epidemiology*, has shown that physical activity is a key to mortality. (See references.) Study subjects who remained physically active over a decade of follow-up enjoyed much lower mortality than those who were (or became) sedentary. The levels of physical activity judged to be "active" were not those of a triathlete! We are talking about leisure time physical activities such as bowling, gardening, and hiking actually conferring a mortality advantage.

The basic premise being advanced here is that we can embellish the PHI with strategically selected questions that get at valid risk markers, such as dietary proclivities and physical activity levels. If we

do, why can't we then use this information to offset the protective value of physicians' reports and other ponderous underwriting tools that we must forgo? The thinking here is that we can, and the data clearly show that we should. Indeed, one might even add that if we hope to enhance our image with our customers, we must.

Complementary Solutions

In the mid-1980s, insurers embraced widespread blood testing, first and foremost because of concerns for antiselection in the face



JACOBSON ASSOCIATES

Connect with us at: <http://www.jacobson-associates.com>

MARKETING EXECUTIVE

Creative, client-focused, savvy and technically brilliant describe the leader that this innovative specialty insurance firm will attract to its management team. Products champion (Actuary or Non-Actuary) with proven know-how in the Life Insurance and the broad Employee Benefits arena (Retirement & Health) are foremost. This is a multi-dimensional executive role offering high visibility, business development and client management responsibilities plus tremendous internal resources. If you're ready to step into a world of leading-edge product manufacturing and delivery this is it. Call Margaret Resce Milkint. Retained Search.

CHIEF LIFE ACTUARY

Lead the Actuarial endeavors of this dynamic product line and be groomed for the Presidency. Handle a myriad of Specialty Life Product Development, Valuation, Financial Illustration and Systems Interface at this industry leader. Business savvy, marketing finesse and winning presentation skills are foremost. If you are ready for more challenge and responsibility - look no further our client has it all—Call Margaret Resce Milkint. Retained Search.

LIFE REINSURANCE CONSULTING, FSA

Midwest-based reinsurer seeks a Life Reinsurance consultant. Responsibilities include setting assumptions, building and running pricing models and providing quotes to clients for mortality risk opportunity. Other duties are Client Management, overview of Mortality Assumptions, and some travel to clients. TAS experience is preferred. Located in a thriving Midwestern City. For more information, please contact Gretchen Adler.

P&C CHIEF ACTUARY

Exceptional opportunity with an "A+" rated insurer. Our client seeks a FCAS/MBA with strengths in financial modeling and risk analysis. This highly visible position will review financial implications of new ventures and ensure statutory compliance. Additional responsibilities include assisting in the development & implementation of new products. All inquiries are welcomed. Please call (770) 952-3877 to learn more.

DOT-COM CHIEF ACTUARY, FCAS

Pioneering chance of a lifetime! Become a part of the future technology within the Insurance Industry, join the dot-com world. Our financially secure client seeks an FCAS to lead their Actuarial team for web-based Homeowners products. The ideal candidate will have prior experience as a Chief Actuary. Personal Lines background and an entrepreneurial spirit are pluses.

GROUP HEALTH ASA/FSA

Mid-Atlantic/Midwest. Our client seeks a knowledgeable ASA or FSA to handle a variety of Pricing and Reserving duties. Group Health and Stop Loss Pricing experience are preferred. Career development, exam support and highly competitive salary await the right candidate.

VARIABLE PRODUCTS

New England insurer seeks Near-FSA/FSA to join their Variable Products team. This individual will be responsible for designing, pricing, and implementing Variable Life and Annuities. TAS and Excel experience is preferred. Other ideal traits include Ind. Life & Annuity experience as well as strong communication skills. This area offers a great quality of life. Contact Gretchen Adler.

DIRECTOR—INVESTMENT PRODUCTS

World-renowned financial leader seeks entrepreneurial-minded FSA/CFA for their Institutional Markets division. This individual will be responsible for new Business Development (exploring new products and markets in the Investment Banking community), Hedging, and Risk Management of new initiatives. Ideal candidate will be an FSA, CFA with strong Capital Markets and Fixed Income derivatives know-how, and dynamic consulting skills. For more information, please contact Gretchen Adler.

VP PRODUCT & MARKETING, FSA/CFA

Join an international powerhouse in a turnkey executive post. Lead all Product Design & Strategy for Individual Life & Annuity Products. Keen awareness of the investment arena, risk management and institutional distribution channels foremost. If bottom-line accountability, high visibility and building inspire you please call Margaret Resce Milkint at (312) 726-1580 to learn more.

FINANCIAL FOCUS

Our clients are searching for Financial expertise with an innovative twist. Use your foundation in GAAP, Tax, Valuation and Reserving issues to move into Merger & Acquisition, joint Venture Strategies, Reinsurance Negotiations, Financial Engineering and Investments. Enjoy high visibility and a wide spectrum of projects. FSA, ASA, CPA, MBA, CFA designations are all welcome. Call Margaret Resce Milkint to discuss. Retained Searches.

Actuarial Division: 120 S. LaSalle Street, Suite 1410 ■ Chicago, IL 60603
Phone: (312) 726-1578 ■ Fax: (888) 523-0740 ■ E-mail: chicago@jacobson-associates.com
ATLANTA, GA ■ CHICAGO, IL ■ DALLAS, TX ■ PHILADELPHIA, PA

of the AIDS pandemic. Once they became comfortable with this new blood testing, insurers found real value in many of the blood profile components, most notably liver enzymes, diabetic markers, and lipid (cholesterol, etc.) tests. The veracity of this statement has been testified to by a bevy of published and proprietary protective value studies.

Now, in the 21st century, we turn our attention to what some call alternative fluids. By this, we mean oral fluid (saliva) and urine. Both are readily amenable to rapid collection and processing, thus qualifying them as a good fit with a rapid turn-around-time underwriting model.

Epitope Corporation, in suburban Portland, Ore., has developed an oral fluid test profile that's a near-perfect fit with this new risk management focus. It includes cotinine (a byproduct of nicotine, used to detect tobacco users with short memories), cocaine, HIV-1, and hepatitis B and C tests. Ambitious plans call for the potential addition of key tests for heart disease (c-reactive protein) and diabetes (glycated albumin) risks in the months ahead.

Calypte Biomedical, in Oakland, offers a user-friendly battery of urine tests. Like oral fluid, this includes cotinine, HIV-1, and drug testing. The key to the urine profile, however, is a test known as microalbumin. Originally conceived as a marker for early kidney damage in diabetics, this test is showing great promise as a broad circulatory disease risk marker of the same magnitude as cholesterol or high blood pressure.

These oral fluid and urine profiles allow underwriters to ward off antiselection, while gathering highly risk-relevant protective information and having to cope with the delays (and oc-

casional client angst) associated with blood collection. It's no wonder that some adventurous insurers will now offer seven figures of life insurance protection at younger ages using an alternative-fluid profile in lieu of blood tests.

The third component that fits nicely into this unconventional underwriting paradigm is the motor vehicle report (MVR). Accidents kill five times as many American males between the ages of 20 and 39 as does heart disease. The number one medium for fatal accidents is car crashes. Subjects with adverse driving records (and there's much more to an adverse driving record than just drunk driving) are usually risk takers, and risk takers are more likely to become death claims.

MVRs are fast and inexpensive. Coupled with an enhanced PHI, plus an oral fluid or urine profile, they provide the third key element of this new, fast, inexpensive risk management model.

No More Nitpicking

We have the means to change the underwriting process to accommodate the priorities of nontraditional products. In fact, traditional insurers would also be well served to reflect upon the aforementioned potential of the PHI, alternative fluids, and MVRs.

By maximizing our use of these tools, we send a powerful message to customers: Underwriting is no longer about routinely nitpicking your medical history; it's about translating healthful living choices into access to affordable life insurance.

Instead of antagonizing customers, we create a covenant with them. ●

HANK GEORGE IS A FREQUENT SPEAKER AT INDUSTRY MEETINGS WORLDWIDE AND CO-AUTHOR OF *GETTING IT ISSUED*, A BESTSELLING BOOK ABOUT UNDERWRITING. HE MAY BE REACHED AT HANKGEORGE@AOL.COM.

References

Virginia L. Ernster et al. University of California. Published in *Archives of Internal Medicine*. 160(2000):953-58. Titled: "Mortality Among Women with Ductal Carcinoma in Situ of the Breast in a Population-Based Surveillance, Epidemiology and End-Results Program."

Nancy R. Cook. Harvard. Published in *Archives of Internal Medicine*. 160(2000): 921-28. Titled: "Self-Selected Posttrial Aspirin Use and Subsequent Cardiovascular Disease and Mortality in the Physician's Health Study."

Kerstin Rodstrom et al. Vasa Hospital, Gothenburg, Sweden. Published in *The British Medical Journal*. 319(1999):890-93. Titled: "Pre-existing Risk Factor Profiles in Users and Nonusers of Hormone Replacement Therapy: Prospective Cohort Study in Gothenburg, Sweden."

Sven-Erik Johansson and Jan Sundquist. Published in *International Journal of Epidemiology* [28(1999):1073-80]. Titled: "Change in Lifestyle Factors and Their Influence on Health Status and All-Cause Mortality."

1/4
UPMC
Page 34



The entire September/October issue of Contingencies is now available online. Visit us and explore more aspects of the topics in this issue at www.contingencies.org

Classic Solutions

35



small is beautiful

the key to 21st

many years ago, as punishment for disruptive behavior, students in public schools were often forced to write, "I will not talk in class," 100 times on the blackboard. Today, actuaries, economists, and public policy experts should be forced to type, "There are no more economies of scale in health care," 1,000 times on their personal computers as punishment for their equally disruptive and destructive behavior over the past several decades.

Policy wonks searching for economies of scale in the delivery of health care services are like alcoholics searching for happiness at the bottom of a whisky bottle. Not only are they looking in the wrong place, but their thinking is completely backwards: They need less, not more, of what they're pursuing to achieve the result they ultimately desire.

First and foremost, people forget that economy of scale is an identifiable and measurable economic phenomenon, and not an abstract Freudian concept. If there really were untapped gains to be reaped from economies of scale, General Motors would have the lowest

characteristics reveals where they come from, how they're measured, and why they don't apply to health care.

■ **Savings: reduced marginal production costs**—The first copy of Microsoft's Windows 95 operating system cost tens of millions of dollars to produce, while the second copy cost less than \$1.00. The reason for this economy of scale is that none of the labor required to produce the first copy was needed to produce the second copy. Because millions of other people also want a copy of Windows 95, you're able to purchase one for a minuscule fraction of the cost of making the first one. Many can make a market, where few can't.

■ **Synergy: increased production output**—Four workers are able to lift and carry a piano to a moving van in 15 minutes, while one worker won't make any progress in an hour. But assigning eight workers to the task instead of four just means that half of them will end up watching the others, because they're not needed and would only get in the way. Many can do the work that one can't.

■ **Synchronization: reduced transaction costs**—Domino's Pizza will offer to sell you a second pizza at half price. It does so, not because the second pizza is cheaper to make than the first, but because it's delivering both pizzas to the same address at the same time. If you want the second pizza delivered to a different address, or next Thursday, the offer doesn't apply. Time is money; and timing is everything.

■ **Selection: reduced information costs**—If you represent a group of 50 people who want to take a Caribbean cruise, you'll be able to negotiate a much better rate than if you represent only two people, say you and your spouse. Here the advantage

of scale is not the number of people but the specific organized information about those people. They all want to enjoy the same vacation cruise. Because you have done some of the work by expending the time, money, and effort to assemble, organize, and deliver the information about those 50 people to the travel agent, she is willing to cut you in on a share of the savings. If what you don't know can hurt you, telling someone else exactly what he or she wants to know can help you.

Why Economies of Scale Don't Exist in Health Care

Now imagine a city with 10 businesses, each employing 500 persons. And consider the effects on health care delivery when they're viewed as one large group of 5,000, 10 medium-sized groups of 500, or separately as 5,000 unique individuals. Obviously, some will have babies. Some will be diabetics. Some

century health care

Economies of scale may work for selling pizzas and Caribbean cruises, but they don't work for health insurance.

Here's why.

per capita health care costs of any employer in the United States.

The plethora of health care policy initiatives highlighting economies of scale under the guise of "risk pooling" or "risk sharing" looks like an amateurish "mine's bigger than yours" game of one-ups-manship to see whose proposal can gain the most media exposure by threatening (or promising, depending on which side of the transaction you're on) the largest bloc of voters with an ultimatum. In 1993, Hillary Clinton finally terminated this silly bidding hysteria by proposing the largest possible scenario for economies of scale in health care purchasing—the entire nation of 270 million people.

Economies of scale resemble alcohol in another key dimension: Behind every example of the benefits of economies of scale inevitably lurks the more insidious and dangerous diseconomies of scale. Two drinks may be better than one, and three may even be better than two. But 20 drinks isn't 10 times better than two. It's more like 10 times worse.

Economies of Scale Defined

There are four general categories of economies of scale: savings, synergy, synchronization, and selection. A survey of their char-

will develop cancer. And some will have accidents. Look back over the four categories of economies of scale and you'll easily see why none of them apply to health care.

Let's say that among this aggregate population of 5,000, 50 women will have a baby, 50 will be diabetic, 10 will develop cancer and 10 will be involved in auto accidents. Is there any labor savings (pun partially intended) for an obstetrician in delivering two babies instead of just one? Does he not have to sterilize the instruments for the second mother's delivery? Can he record his coaching instructions to the mother during the first delivery and play them back on tape during the second mother's delivery (perhaps while he's out on the golf course)?

Is there any synergy in the delivery room because the mother belongs to a 5,000-employee group instead of a group of only 500, or even five? Is there any synchronization involved? Do expectant mothers in larger employer groups conspire to go into labor in a precisely ordered sequence to maximize the use of the hospital's maternity ward equipment? Do 50 people agree to get sick in ordered succession, thus facilitating office appointments grouped together to get a volume discount?

But the biggest reason for exploding the myth of economies of scale in health care is that an employee group of 500 contains no more information than the first 500 names in the phone book, or even the first 5,000. There might be 50 pregnant women in either group. There also might be 50 people who want to take that Caribbean cruise. The problem is identifying, organizing, and delivering them to the vendor. This is where the real value and savings from economies of scale lie: selection, or reduced information costs. Otherwise, obstetricians might as well pick names out of the phone book at random.

Diseconomies of Scale

If the 10 companies that embrace these 5,000 employees were located in the same business district, there would be a huge potential for collective savings if everyone had the same Big Mac, fries, and Coke for lunch every day. McDonalds would be able to share the savings from its economies of scale because of the specific organized information about the market for lunchtime meals. And lunch is only the beginning of the massive savings from economies of scale. We could all save a huge amount on clothes if everyone agreed to wear the same clothes every day. We could all agree to drive the same car, watch the same movies, and buy the same furniture.

But does everyone want a Big Mac, fries, and Coke for lunch? And does anyone want that for lunch every day? Do we all want to dress like Maoist soldiers of the cultural revolution? Do we all have the exact same health care needs? And do we all want



Do we all have the exact same health care needs? Obviously not.

the same health care services delivered in the same way, at the same time, in the same place, in the same amount? Obviously not.

The reason we don't is that economic wealth is not maximized by providing the same goods and services to everyone, at the same time, in the same place, in the same amount, at the same price, for the benefit and convenience of the vendor; it's maximized by providing individually tailored goods and services, at different times, in different places, in different amounts, at different prices, for the benefit and convenience of the customer.

The problem with employer-provided health care is that the laws require employers to buy the same package of benefits, most of which their employees don't want and will never use. For example, most people aren't at risk of getting pregnant, yet they're all required to buy that coverage. This twisted logic asserts that if you can force enough people to buy something they don't want and can't use, eventually even the most incompetent person will be able to figure out a way to save some money by not providing that portion that doesn't represent real demand and can't physically be consumed. In other words, if you build an excessive amount of waste into the system at the front end, you'll be able to find some savings on the back end.

One-to-One Health Care

Reviewing the fundamentals of economies of scale reveals that the first three categories are saturated. Health care services can't be replicated as quickly, easily, and cheaply as CD-ROM copies of Windows 95. No one has any revolutionary ideas for new untapped synergies of reorganizing health care personnel in the operating room. And if people had the ability to get sick and seek treatment in organized synchronization, then instead of providing health care services, medical science would be able to develop a cure.

Fortunately, selection, the last category of economies of scale, represents a huge untapped source of potential health care savings. Unfortunately, most people's minds are closed to the ideas and methods necessary to reap the rewards waiting here. Because selection—or the exchange of information between buyers and sellers—in the health care arena is called underwriting. And underwriting—for all practical purposes—is illegal.

Just as there are huge savings from economies of scale to be realized by identifying and delivering 50 people who want to take a Caribbean cruise to a travel agent, there are also huge savings to be reaped from identifying and delivering 50 pregnant women or 50 diabetics to health care providers. Unfortu-

nately, most people operate under the false assumption that this information should be kept secret and not shared with health care providers, because they fear it will be used against them to charge them more.

This makes about as much sense as refusing to tell a waiter what you'd like to order for dinner because you fear he might use that information against you and bring you the one item on the menu you hate the most. Is the waiter going to serve you prime rib if you tell him you're a vegetarian? Can a doctor, hospital, and the medical community at large provide you with cost-efficient high quality health care services if you make them guess about your health status and you wait until the last possible moment to provide them with the vital information they need to treat your specific condition?

Imagine all the excess expense and waste there would be in the rental car industry if Hertz was prohibited from asking its customers to provide their drivers license (can they drive?), a credit card (can they pay?), proof of auto insurance (are they covered?), and driving record (have they been convicted of drunk driving?). Would the rental car industry be more or less productive? Would rental car rates be lower or higher? And would "those who can't afford it" be able to rent a car if the industry were structured that way?

Yes, pork bellies are cheaper by the pound if you buy them in bulk. But you'll lose all of what you save, and a whole lot more, if you're feeding a diverse group of people that includes a significant number of orthodox Jews, Hindus, and vegetari-

ans. And since health care services are more unique and varied than dietary preferences, it's obvious that we need less, not more, economies of scale in health care.

The Trojan Horse of Risk Pooling

The mythical panacea of health care savings from economies of scale often is a Trojan horse disguised under the name of risk pooling or risk sharing. Actuaries should know all about the principles of risk pooling and risk sharing. If you can amass enough specific, identifiable, and verifiable information about a group of like individuals (such as 30-year-old, non-smoking, married, gainfully employed males), then you can reap economies of scale by pooling this group of individuals together and sharing their like risks. This is the economies of scale from selection, or reduced information costs, noted above.

But health care risk pooling not only abandons this concept of economies of scale; it moves in the opposite direction, producing the naturally opposite consequences. Instead of identifying similar risk characteristics of individuals (to reap the economies of scale from selection), it openly pursues the opposite extreme of grouping together individuals with little or nothing in common. And since the local phone company has already done this, this represents a complete waste of effort. Because risk pooling and risk sharing have value only if the risks are similar—like those of the 30-year-old males noted above.

Note that there are no products or services that produce savings from economies of scale by grouping random customers,

1/2
Pinnacle
Page 39

with differing needs, consuming different goods and services, at random times, in different places, in different amounts. If you combine a healthy 30-year-old male, who uses \$1,000 in health care services, with a 58-year-old diabetic female, who uses \$5,000 in health care services, the result still totals \$6,000. There are no benefits from any one of the economies of scale categories: savings, synergy, synchronization, or selection.

There are examples of savings in health care from the economies of scale. But you won't find them in the organized health care system. You'll find them in borderline ad hoc groups of people who have come together to share their common health care risks and conditions, such as Alzheimer's or Parkinson's disease support groups, breast cancer patients, or Alcoholics Anonymous. The economies of scale here are no different from a trade association of electrical contractors: a group of individuals with similar characteristics, who are willing to exchange and share their commonalities for the purpose of pooling their resources to reap the benefits of savings, synergy, synchronization, and selection.

That's why it's cheaper to vaccinate first grade children en masse before they start the school year. The vaccinations are done at the same time, in the same place, in the same manner,



The road to recovery in health care will not be a pleasant journey at the start.

to a homogeneous group for the same purpose. Unfortunately, vaccinations are one of the few health care services that can be delivered in this way.

In grade school, they teach children that three plus three is the same as two plus four and one plus five. The basics of the math don't change just because you're talking about health care. Actuaries, physicians, and patients are no more above the laws of economics than airline pilots, physicists, and skydivers are above the laws of gravity. Just like physics, if you aggregate a large amount of disorganized and unrelated information about health care, you haven't magically produced a solution; you have just wasted your time and increased the potential for disaster—especially if other people take you seriously.

One Small Step for Health Care

a final word to the wise: There's one more analogy to draw between health care and alcoholism. In his book, *Money Mischief*, economist Milton Friedman compares inflation to alcoholism, noting the similarities of both destructive habits. On the road to ruin, the good effects come first (easy credit and partying) and the bad effects come later (inflation and hangovers). While on the road to recovery, the bad effects come first (fiscal restraint and withdrawal) and the good effects come later (economic expansion and sobriety).

The road to recovery in health care will not be a pleasant journey at the start. But one thing is certain. We cannot continue to entertain a parade of health care policy proposals touting some new form of grouping together health care purchasers under the guise of economies of scale. This amounts to nothing more than trying to avoid a hangover by staying drunk. Like inflation and alcoholism, the road to health care recovery is actually very simple. It just requires a lot of courage to take the first step. ●

GERRY SMEDINGHOFF IS A CONSULTING ACTUARY, A FREQUENT SPEAKER ON HEALTH CARE ISSUES, AND A BOARD MEMBER OF THE HEALTH CARE POLICY REFORM GROUP OF THE CATO INSTITUTE, LOCATED IN WASHINGTON, DC.



The entire September/October issue of Contingencies is now available online. Visit us and explore more aspects of the topics in this issue at www.contingencies.org

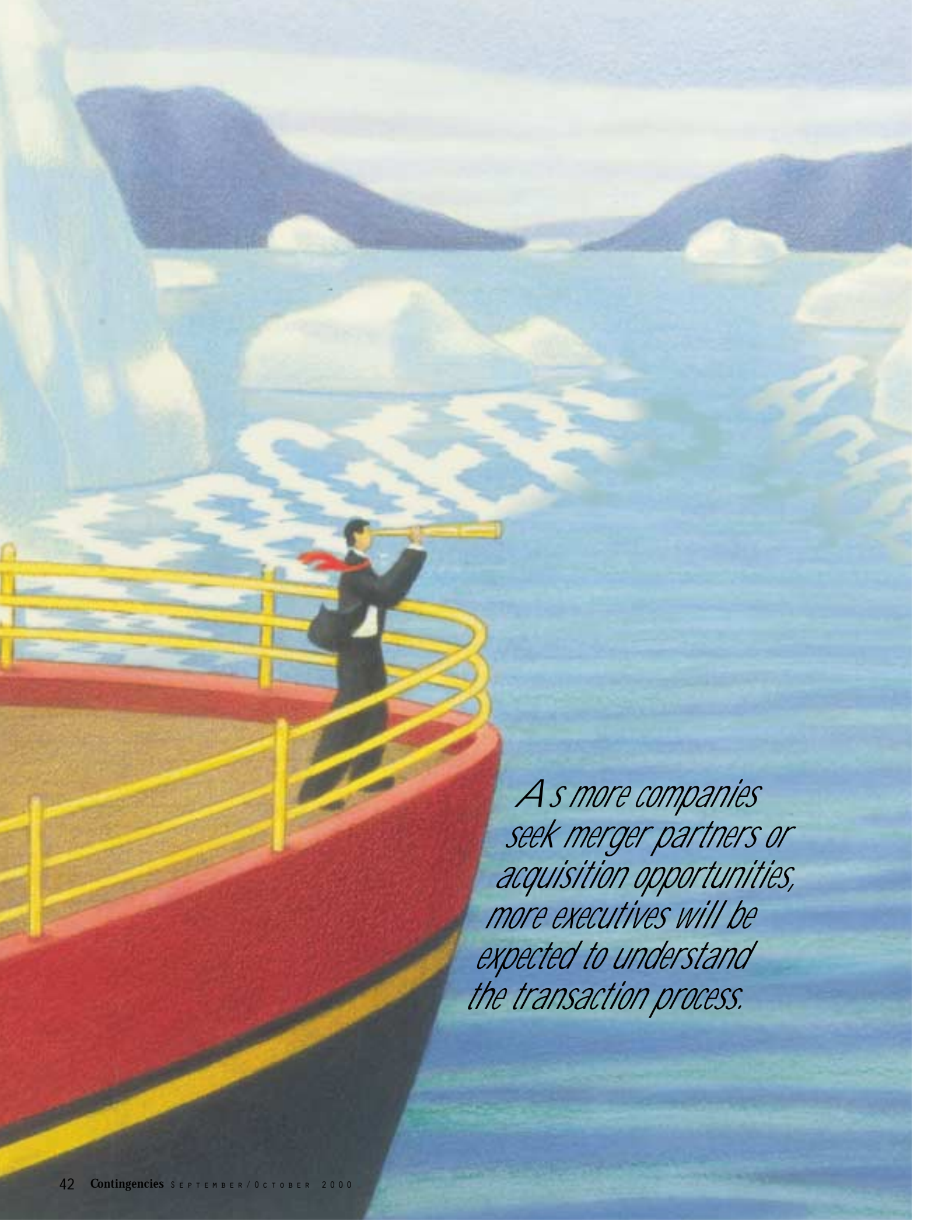
1/4
MidAmerica Search
Page 40

Contingencies Online Does More Than Just Take Up Cyberspace.



Not only will you find the complete text of the print magazine at www.contingencies.org, you'll also find exclusive extras and links that will take you to areas the printed articles can only touch on.

[Come to Contingencies online and stay awhile.](http://www.contingencies.org)



As more companies seek merger partners or acquisition opportunities, more executives will be expected to understand the transaction process.



Navigating Safely Through Mergers & Acquisitions

By Dennis L. Schoff

PARTICIPATING IN A MERGER or acquisition isn't something that most insurance executives do every day, although more may have the, um, pleasure of doing so in the near future. Individuals typically are pulled into the process sometime after the starting shot has been fired and well before the finish line can be crossed. Those who don't understand the process beyond the role they're asked to play can wind up making it difficult for the transaction to go the distance. In fact, it's important that all involved in a merger or acquisition understand the process from start to finish and how their pieces of the puzzle fit into the overall transaction. Unfortunately, that often isn't the case.

A transaction team is like an onion, with the dealmakers at the core. Ancillary players from different areas of the business surround the core team and are brought into the process as it unfolds. For many ancillary players particularly, their job isn't to do deals; it's to run systems, administer claims, process new business. No one would expect them to understand the struc-

ture of an overall transaction, and many don't. But what they don't understand and aren't made aware of right away can have a ripple effect with the potential to eventually damage the deal or even destroy it altogether.

Naturally, all deals are different so the process varies as well. Moreover, certain regulatory schemes will control how some aspects of a transaction are structured. While no two deals are identical, the deals I've been involved in have taught me that certain principles generally apply.

The Confidentiality Agreement

Most transactions begin with the potential acquirer executing a confidentiality agreement. The agreement's principal purpose is to allow the seller(s) to disclose information to the interested party with the assurance that it will remain confidential and not be used for any other purpose. The confidentiality agreement

is important for two reasons: It opens the flow of information between the parties, enabling the potential purchaser to negotiate with some knowledge of the property, and it sets the rules of the transaction until a definitive purchase agreement is signed.

Considerations often addressed in a confidentiality agreement include:

- A promise not to disclose that the companies are in discussions about a transaction
- How contacts with the company or property for sale (often referred to as the target company) can be made
- Whether the confidential material can be copied
- How materials must be returned if the transaction isn't consummated with the bidder

The agreement also may specify that unsolicited bids are prohibited (a standstill provision that often extends beyond termination of the immediate transaction). Many agreements also contain a nonsolicitation provision requiring the party to whom the disclosure is being made to agree not to hire anyone from the target company for a specific period of time.

All individuals involved in a transaction should be made aware of the key provisions of the confidentiality agreement, by being provided either a copy of it or a memorandum that sets forth the key provisions.

When individuals asked to assist with a transaction at some point later in the process aren't made aware of the terms of the confidentiality agreement, there's a risk of breaching the agreed-upon terms and possibly damaging the transaction. If, for example, an uninformed employee casually mentions to an agent that a sale is being explored, the leaked information could cause insurance sales to slow down and the value of the company to drop by millions.

If the company is publicly traded, such a leak would not only expose the employee giving out the information to significant potential civil and criminal liability; it also could cause the acquirer to spend much more for the company.

*Communication
among
everyone
involved in
due diligence
is critical.*



Information Memorandum and Initial Bid

In situations where several potential bidders are being approached simultaneously, the second step tends to be issuance of an information memorandum by the seller. This document provides material information about the property for sale that's necessary for interested buyers to submit a preliminary, non-binding bid.

When only one bidder is involved, the seller rarely prepares an information memorandum. Instead, a limited amount of due-diligence information is provided.

In both instances, the potential purchaser generally is required to submit a nonbinding bid, or letter of intent. The bid is requested to determine whether both parties will be able to agree upon mutually acceptable terms.

It's important for the individuals preparing the initial bid to have the information memorandum or diligence material reviewed by experts on the subject matter (e.g., systems, law) so they can identify anything (either positive or negative) that should be considered in determining the bid amount.

Let's say, for example, that the seller's systems aren't compatible with the buyer's, or a class-action lawsuit exists. Consulting experts on those topics is vital to determine the potential costs of the items before calculating a purchase price. A specialist is likely to see potential costs that aren't readily apparent to a generalist. Likewise, an expert might see synergies between the companies that could produce significant cost savings, thus allowing the bidder to make a more competitive bid for the company.

Although the bid is nonbinding, lowering it later is difficult in a competitive situation if the information memorandum revealed matters that weren't fully comprehended by the bidder until sometime later in the process. If the item was disclosed in the information memorandum or in the preliminary diligence information, its potential costs should be considered in the initial bid calculation.

Due Diligence

If one or more of the initial bids leads the seller to believe a deal is possible, one or more bidders will be selected to advance to the next step: due diligence.

One goal of due diligence is for the potential buyer to identify issues that will need to be addressed in the purchase agreement, either through specific contract terms (e.g., warranties, covenants) or by adjusting the purchase price. It's also possible that problems discovered during this phase may cause the buyer to terminate negotiations altogether.

Another very important reason to conduct due diligence is to identify integration decisions that will need to be made. If, for example, the purchase would duplicate the buyer's facilities or systems, a transition plan will need to be developed.

Make sure to include individuals who will be responsible for running the business after it's acquired so they can identify any issues or needs with respect to integrating the acquired business with the existing business. Communication among everyone involved in due diligence is critical.

Too often, information known to one part of the diligence team isn't communicated to the dealmakers or another part of the team until critical aspects of the transaction have already been negotiated or, worse, until after the transaction has been closed. All members of the diligence team must understand that information not particularly important to one group may be very important to another. Let's say, for example, that the information systems (IS) specialists know that the department is staffed primarily by independent contractors. This detail might be very important to those responsible for employee benefits and may need to be addressed in the purchase agreement.

Other details that will be important to whoever will be running the business include differences in the compensation structure, product mix, customer focus, even something as simple as different vacation schedules. The point is that every piece of information must become shared knowledge because the deal is struck at signing, not at closing. Too often, issues aren't raised early because people mistakenly believe they have until closing to work out the details. It's incorrect to assume that requests, much less demands, can be made after a transaction has been negotiated.

Document Negotiation

The agreement to purchase will frequently be in the form of a stock-purchase agreement, asset-purchase agreement, or merger agreement, although it may take some other form if the asset being purchased is a block of business or a distribution system. Regardless of the form it takes, this is the most important document in a transaction. In it, the parties set forth:

- What is being purchased
- The purchase price
- Representations and warranties about the company or property being purchased
- Representations and warranties about the purchaser
- Any covenants or promises made by either party (e.g., how many employees will be hired, noncompetition agreements, transition services)
- Recourse if a representation, warranty, or covenant is breached

(known as the indemnification provision)

- Miscellaneous issues that either party wants addressed

Agreements generally contain a number of miscellaneous provisions, many of which are considered "boilerplate" but all of which should be reviewed. They may have a greater impact on the transaction than initially appears, particularly if a disagreement arises before or after the transaction's closing.

Include all relevant subject-matter experts in the review of purchase agreement drafts and instruct them to raise all business issues identified. The deal team may decide against addressing every issue for strategic reasons, but their decision should be an informed one, not based on someone else's assumption that the issue could be raised later. Likewise, all contingencies and future needs should be considered and, if significant, addressed in the agreement.

Items generally addressed in the agreement include:

- Warranties for any business issue that could not be adequately determined during diligence
- Indemnification for any significant liabilities discovered during diligence
- Covenants addressing any business concerns such as non-competes, transition services, benefit plans, etc.

The draft of the agreement will change as issues are negotiated, and subsequent drafts should be circulated to the same group of people. Not only should the party who identified the issue be consulted about the adequacy of revised language; others should be made aware as well, since a change in terms for one area may affect another.

1/4
CPS
Page 45

For example, if the seller agrees to provide IS transition services using the seller's employees, employee benefits issues may be created that hadn't been present in the agreement's initial draft. As a consequence, a provision drafted to address a systems issue may need to be reviewed by the entire team, as other areas may be affected such as employee benefit matters, space planning, etc.

I cannot overemphasize the importance of identifying any postclosing needs during this stage in the process. This is the time to address any noncompetes, nonsolicitation of employees, and rights to continue using the seller's paper when issuing insurance products. If the buyer will need the seller to perform any functions after the closing, those needs should be addressed at the time the purchase agreement is executed.

Similarly, the buyer should identify any contingencies that could lead to the need to terminate the proposed transaction. If possible, a right to terminate the agreement should be negotiated into the document. If contingencies exist that could cause a diminution in the value of the property, they should be addressed as purchase price adjustments. Likewise for the seller, if potential events could cause the value of the property to increase, a price increase mechanism should be sought. If this could happen after closing, the adjustments can be structured as an earn-out.

Document Execution

Once the parties have agreed to the terms of the transaction, final drafts are prepared for execution. Before the agreement can

be executed, both parties need to obtain the requisite corporate approvals. Other approvals also may be required, but the corporate ones typically are obtained prior to execution as an internal requirement.

Give the transaction team one last opportunity to react to the terms and conditions of the agreement before it's executed.

Likewise, I strongly recommend a final review of the representations and warranties before the agreement's execution. Most often, a memorandum is sent to all appropriate parties for review in order to avoid executing a document that's immediately a cause for breach.

Preclosing Activities

The preclosing stage of the process tends to be the most confusing. Once the document is executed and press releases are issued, many people consider the transaction finished. Little could be further from the truth. Not only must the deal be technically closed, but also several items must be addressed before the closing can occur. From a business perspective, the period between signing and closing is when a great deal can be accomplished to make the postclosing integration of the business go more smoothly.

It's critical that the dealmakers focus on items that must be accomplished for closing immediately after the deal is signed, including assigning responsibilities and ongoing communication.

In connection with the transaction itself, three principal activities should occur at this stage:

■ **Complete any unfinished diligence.** This is the time to further investigate any diligence items that were reviewed quickly. Often, certain matters can't be explored before the contract is signed and the deal has been made public due to the confidential nature of the negotiations.

■ **Follow through on any promises made.** In the transaction, both parties tend to make covenants in regard to what they'll do between signing and closing. These promises must be kept. Examples of promises made by the buyer include: determining how many of the seller's employees will be hired; cloning benefits plans for new hires; filing new products similar to those that had been offered by the seller to give the acquired sales force continuity in product offering. Items the seller may have agreed to include closing regional offices; terminating certain marketing campaigns; or converting systems.

■ **Obtain necessary third-party consents.** This may be the most critical activity, for failure to obtain necessary consents can preclude a closing from occurring. Consents include state and federal regulatory filings such as the Hart-Scott-Rodino filing required of material transactions to ensure antitrust concerns aren't violated.

It may also include consents from third-party vendors. Many contracts, particularly software contracts, will terminate upon a change of control if the vendor's consent isn't obtained. Any internal corporate consent not obtained earlier may need to be procured now as well. For example, very material transactions may require the consent of shareholders or policyholders, in the case of sponsored demutualizations.

Now is also the time to make plans to integrate the acquired property into the purchaser's operations. This may be a source

1/4
SC Intl.
Page 46

of conflict between the buyer and seller, so it should be addressed early. There tends to be tension between the desires of the parties planning the integration, both in terms of exchanging information and actually taking steps to begin the implementation.

In addition, antitrust rules and regulations may require that certain integration activities occur after closing. Working closely with antitrust counsel in planning these activities is warranted.

Also, buyer and seller may strongly disagree on which activities should occur before and after closing. Sellers often have little incentive to engage in these activities preclosing, preferring to let the buyer handle them entirely after the closing for cost and manpower reasons.

To avoid conflict, buyer and seller should thoroughly discuss the proposed activities prior to executing the purchase agreement, and any agreed-upon preclosing integration activities should be documented.

Closing

What occurs during preclosing often determines how smoothly the closing goes. It can be a nonevent, disorganized madness, or somewhere in between.

It's important that people assuming responsibility for the business be made aware of obligations after closing.

During closing, any ancillary documents are signed concerning reinsurance, administrative services, transition services, and similar agreements. Also signed are any side letters regarding matters the parties want to document outside the purchase agreement, such as subleases and software sublicenses.

Certain officers of the company generally are required to sign certificates evidencing compliance with the purchase agreement's covenants, the accuracy of representations and warranties, due corporate authorization, and similar matters. And of course this is when the money is exchanged.

Buyer and seller are expected to arrive at the closing prepared. One closing I was a party to was delayed for 11 days because the buyer (not my client!) hadn't attended to the activities discussed earlier. Several important third-party consents hadn't been obtained, nor had adequate financing. The buyer's ability to pay the purchase price was \$3 million short because the chief financial officer hadn't figured in some important parts of the purchase price calculation. The deal closed only because the seller was willing to agree to last-minute solutions, including accepting a short-term note as part of the payment.

After Closing

Because certain agreements extend beyond the closing, consideration must also be given to postclosing responsibilities. In many cases, the seller must attend to obligations related to transition services, for example. It's possible that a period of non-competition will need to be honored, as well as restrictions against soliciting employees for an agreed-upon period of time.

It's important that everything both parties have agreed to is communicated and honored.

The difference between a smooth transaction and a rough one often comes down to who's in charge. It's a good idea to put one person or a small team of individuals in charge of overseeing the transaction from start to after closing. This individual

or team could focus on postclosing integration issues at the same time the acquisition itself is being studied.

Identifying the ideal person or team depends on the acquiring company and the nature of the deal. The responsibility tends to be assigned to the corporate planning person, legal counsel, or whoever will ultimately be in charge after closing. A company with a strong central planning group, for example, is most likely to assign responsibility there. An acquisition made to satisfy a specific need—to add a product line, for example—might be better off if responsibility is assigned to the corporate officer who must make sure the transaction satisfies the need.

A smooth and successful transaction is more apt to occur when it is someone's job to make sure that everyone involved understands the process from start to finish.

DENNIS L. SCHOFF IS SECOND VICE PRESIDENT AND ASSOCIATE GENERAL COUNSEL FOR LINCOLN FINANCIAL GROUP IN FORT WAYNE, IND. REPRINTED WITH PERMISSION OF LINCOLN REINSURANCE REPORTER.



The entire September/October issue of Contingencies is now available online. Visit us and explore more aspects of the topics in this issue at www.contingencies.org

1/4
Computer
Programming
Page 47

The Economics of Insurance Securitizations

The practice of risk management has evolved significantly over the last 20 years and the development of derivative securities has played an important role. Insurers use derivatives to hedge against interest-rate risk, foreign exchange risk, and other risks.

Insurers can hedge the risk that interest rates will change. Without hedging, the company's surplus bears the risk and the firm must collect additional premiums from policyholders to compensate the capital providers for such an unhedged risk. Entering into a futures contract to hedge this exposure is substantially less costly than bearing the risk with shareholder capital.

Today insurers have a better understanding of options implicit in life insurance, annuities, and other insurance products. They value the risks explicitly and decide whether to hedge or to retain these risks. Hedging increases the demand for derivatives.

An example of a property/casualty insurance risk security is a catastrophe risk bond. Financial engineers have created even more complex instruments such as double-trigger puts, in which the payoff of the derivative is contingent upon an "insurance" event, such as a catastrophe and a "financial" event, such as rising interest rates. In the case of the catastrophe risk bond, the transaction is straightforward, representing either an alternative to a layer of traditional catastrophe reinsurance or catastrophe coverage.

The expanding role of risk management has not solved the problem of insufficient insurance capacity for certain lines of business. In the case of tradition-

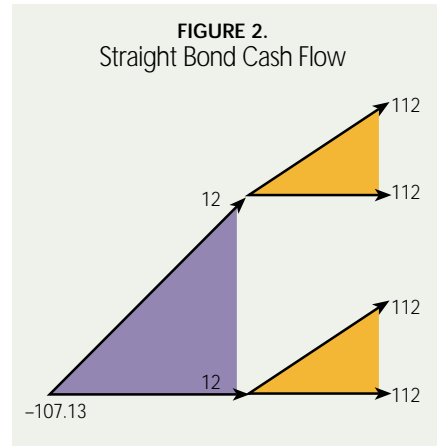
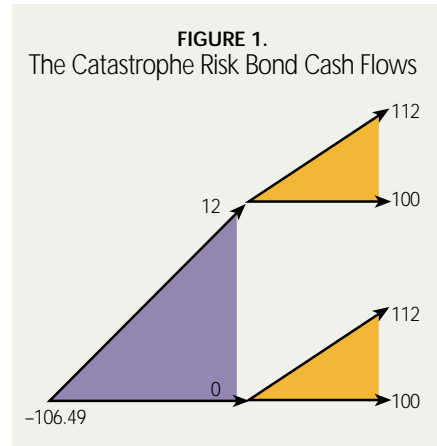
al insurance, shareholders of insurance firms bear these risks and expect a return on their capital that is commensurate with the degree of risk assumed. However, if alternative solutions to risk management problems (such as securitization) are more efficient in that the risk manager can hedge risk at lower cost than under traditional insurance methods and produce adequate returns to the risk-bearers, then these alternative methods will replace the traditional ones.

This is the basis of the economic argument in favor of securitization and derivatives in general. Specifically, securitization results in a more efficient distribution of risk throughout the economy through both lower insurance costs and increased capacity. Additionally, due to market imperfections, insurance securitizations increase investment opportunities. Here's how the process works.

Securitization of Catastrophe Risk

The following model is a simple illustrative idealization of catastrophe risk bonds—customarily referred to as cat bonds. USAA, Swiss Re, Winterthur, St. Paul Re and others (about 25 in all) successfully issued catastrophe risk bonds during 1997, 1998 and 1999.

Our example is a two-period catastrophe risk bond. For simplicity, there's no interest rate risk. The face amount is 100



and only coupons are at risk. The principal of 100 will be paid to the bondholder at the end of period 2 with certainty. A coupon of 12 is paid at the end of periods 1 and 2, provided no catastrophe occurs during the corresponding period.

Further, the market interest rate on risk-free securities is a constant 8 percent per year. The probability of a catastrophe, which triggers a default on the coupon payment, is a constant 3 percent per year.

The catastrophe states and probabilities, along with the corresponding cat bond cash flows, are shown in Figure 1.

The value of the cat bond at the time of issue, given the above assumptions, is \$106.49.

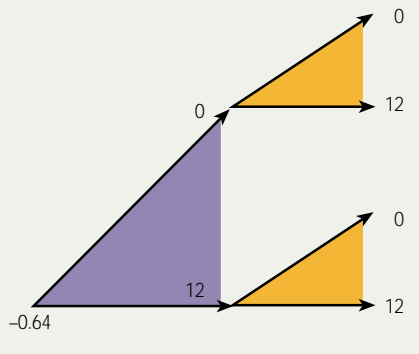
Now consider a bond that has the

SAMUEL H. COX AND HAL W. PEDERSEN ARE PROFESSORS IN THE ACTUARIAL SCIENCE PROGRAM, DEPARTMENT OF RISK MANAGEMENT AND INSURANCE, J. MACK ROBINSON COLLEGE OF BUSINESS, GEORGIA STATE UNIVERSITY, ATLANTA. E-MAIL: SAMCOX@GSU.EDU, INSHWP@PANTHER.GSU.EDU

JOSEPH R. FAIRCHILD IS AN ACTUARY WITH ZÜRICH CENTRE GROUP IN NEW YORK CITY. E-MAIL: JOE.FAIRCHILD@ZURICH.COM

Max Re
49

FIGURE 3.
Long Straight Bond and Short Cat Bond



same prospective cash flow (i.e., 12 percent coupons), but no possibility of coupon default. This is called a straight bond. The cash flows of the straight bond are illustrated in Figure 2.

The price of the straight bond at the time the cat bond is issued is \$107.13.

Suppose an insurer issues the cat bond and simultaneously buys the straight

bond. The straight bond is more expensive. The insurer's net cost is 0.64 per 100 of face value. What does the insurer get in return? In each of the two future periods, if there's no catastrophe, the insurer's net cash flow is zero because it receives the straight bond coupon and pays the cat bond coupon.

If there's a catastrophe in either period, however, it still receives the straight bond coupon (12), but doesn't pay it. In effect, the insurer has purchased a two-year catastrophe reinsurance contract that pays 12 in case a catastrophe occurs during period 1 or 2. This increases the insurer's capacity to sell insurance over the next two years by 12, at a cost of 0.64 per 100 of face value. The net cash flow is shown in Figure 3.

The line of insurance is immaterial to the capital market; it doesn't have to be catastrophe risk. Investors prefer these bonds because their returns have low correlation with stock returns. There may be

many kinds of insurance risks that have low covariance with the stock market. An insurer could, for instance, issue bonds that would transfer mortality risk to bondholders. Clearly, mortality risk has low covariance with the stock market, making these bonds attractive to investors. Many insurers have issued long-term pension policies and face the risk of unexpected improvements in pension beneficiary mortality. A security with bondholder cash flows tied to a mortality index could provide long-term coverage not available in the traditional reinsurance market.

Structure of Securitization

The securitization technology applies to many kinds of risk, in addition to insurance risk. In asset and liability securitizations, the common structure typically involves four entities: retail customers, a retail contract issuer, a special purpose company, and investors. In the case of insurance risk bonds, the four entities are as follows:

- Individuals or firms who buy policies from an insurer;
- The insurance company that issues the individual policies (retail contracts) and buys reinsurance from a special-purpose reinsurer (the special purpose company);
- The special-purpose reinsurer that issues the reinsurance and sells bonds;
- Investors who buy the bonds.

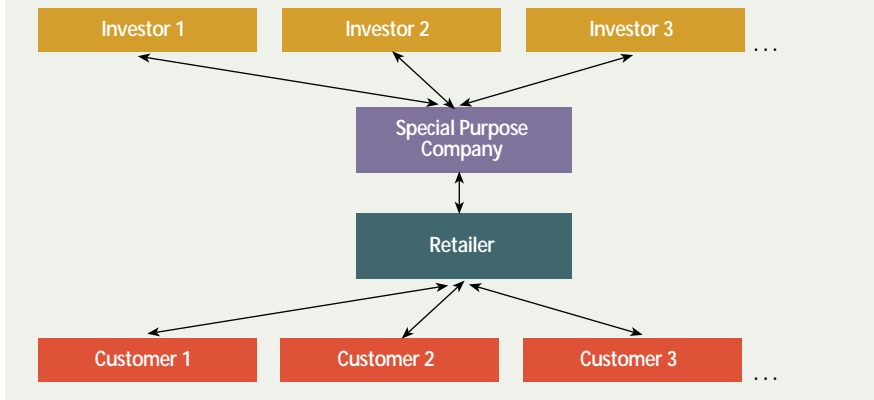
Figure 4 illustrates the direction and timing of cash flows to and from each entity involved in or related to an insurance risk securitization. Each of the arrows represents an exchange of cash corresponding to a contract. The timing varies with the application. In the case of homeowners insurance, for example, the customers pay a cash premium to the insurer and receive a contract (the homeowners policy) in exchange. Later, cash flows the other way for those customers who suffer losses and receive insurance benefits. The insurer pays a premium initially to the special-purpose reinsurer and receives a reinsurance policy in exchange.

The investors initially pay cash to the special-purpose company and receive bonds in exchange. Subsequently, they

1/3
MFC
Page 50

Lincoln National Re
51

FIGURE 4.
Securitization Components



receive coupons and principal, provided the insured event does not occur. If an insured event does occur, the special purpose reinsurer reimburses the insurer and the investors forfeit a portion of the coupon or principal depending on the bond contract.

The transactions are structured so that the price of the bonds (paid by the investors) and the reinsurance premium (paid by the retailer) are adequate to cover the insured loss with certainty. Under such arrangements, the special purpose reinsurer cannot default on its insurance

Derivatives greatly reduce the cost of certain financial transactions.

obligations. Therefore, there is no counterparty risk. (This implicitly assumes the instruments purchased with the proceeds of the bond issue are default-free.) The ability to eliminate counter-party risk is a major distinction between securitization and traditional reinsurance.

There is an obvious moral hazard problem associated with insurance risk securitizations. At least two methods that have been used to resolve this problem.

- The security can be written in terms of an independently determined loss ratio. This takes determination of the security's coverage out of the hands of the insurer, solving the problem, but introducing basis-risk — the contract covers industry losses, not the insurer's own risks.
- An independent firm is hired to provide claims services.

The Economic Basis of Insurance Risk Securitization

The basic argument in favor of insurance risk securitizations is the same argument in favor of all derivatives, namely, derivatives greatly reduce the cost of certain financial transactions. Furthermore, insurance risk securitization can:

- Increase insurance capacity;
- Allow insurers more efficient access to capital markets;
- Permit customized contracting for the hedging of risks.

As one example, suppose an insurance firm wishes to reduce its exposure to some price or index and increase exposure to some other price or index. One way to do this is to sell the existing long position and use the proceeds to purchase the appropriate instruments, producing the desired exposure profile. This can result in significant transaction costs, tax effects,

1/3
Actuarial Search
Page 52

Mynd
53

and market impact. Using derivatives, such a transaction can be accomplished quickly and at a fraction of the cost and the insurer can focus more directly on the risks it wants.

To the extent that insurance risk securities continue to be attractive to investors, the potential for providing needed capacity for otherwise uncovered insurance exposures will continue to be exploited. In the same vein, development of more efficient risk transfer techniques will result in lower insurance prices, the elimination of some capacity-related pricing cycles, and cheaper substitutes to traditional reinsurance.

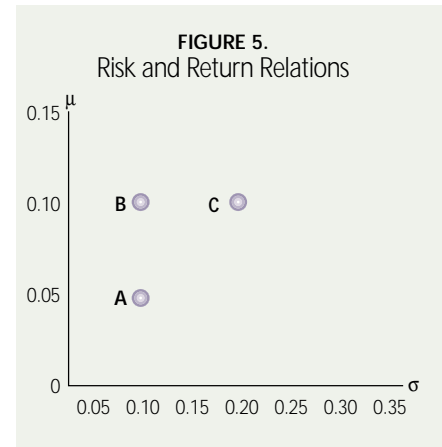
The Demand for Insurance Risk Securities

Why do investors buy insurance risk bonds? The demand for insurance risk securities can be examined within the Markowitz mean-variance model in which the total risk of an asset is mea-

sured by its variance over the planning period. In this one-period model, the focus is on the return random variable r , through the expected return $\mu = E[r]$ and the standard deviation $\sigma = \sqrt{\text{Var}(r)}$.

Suppose there's a total of n assets an investor can purchase. A *portfolio* is constructed from the n given assets by specifying the percentage of the value of the portfolio invested in each asset. It's assumed that the scale of investment doesn't affect the percentages; investors with the same risk-return preferences will select the same portfolios regardless of the size of their investments. To specify a portfolio, one need only specify the percentage invested in each security. Let the expected portfolio return and the portfolio return standard deviation be denoted as μ_p and σ_p , respectively.

An efficient portfolio is defined as one not dominated by another portfolio. It's a portfolio for which there's no other with lower standard deviation and an equal or



higher expected return. Figure 5 illustrates the concept of efficiency and the associated notion of portfolio dominance.

Note that portfolio B dominates portfolio A since it offers the same risk (standard deviation) but has a higher expected return. Similarly, portfolio B dominates portfolio C since it offers the same expected return but a lower level of risk. The basic problem is to find the maximum portfolio return for a given portfolio risk level or the minimum portfolio risk level for a given portfolio return. These optimal portfolios are said to be *mean-variance efficient* portfolios.

There are potentially different minimum variance portfolios for each target return. In fact, one can graph an entire set of efficient portfolios, plotting the points (μ, σ) by solving the portfolio problem for different values of σ , corresponding to a range of values of target expected returns, μ . This graph is called the *efficient frontier*.

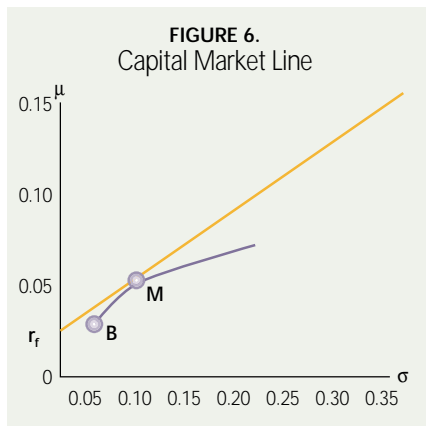
The efficient frontier can be completely defined in terms of two efficient portfolios. This is called a "mutual fund" theorem. It states that investors will be indifferent between holding a combination of two mutual funds (efficient portfolios) on the efficient frontier or a combination of the underlying n assets. This result is independent of the wealth or preferences of the individual investors.

Now add two new securities to the investment opportunity set. The first is a risk-free bond. It has return r_f and zero variance. Every investor is better off (or

1/3
Actuarial Recruiter
Page 54

MHL

55



no worse off) as a result of this expanded investment opportunity set. This can be illustrated by use of a mutual fund theorem: an efficient portfolio of risky assets, *M*, can be combined with the risk-free asset, the combination of which dominates all other portfolios on the previously defined efficient frontier. This is shown graphically below in Figure 6.

Hence, in this economy of *n* risky assets and one risk-free asset, all investors will hold a combination of the mutual fund, *M*, and the risk-free asset.

As before, this result is independent of individual investor preferences or wealth. The straight line in Figure 6 is called the *capital market line*, and portfolio *M* is termed the *market portfolio*. The efficient frontier, before introducing the risk-free bond, is the curved line. Any point on the capital market line can be obtained by investing in the risk-free bond and the fund *M*. The capital market line lies above the original efficient frontier, except at *M* where they're equal. All investors will demand a portfolio on the capital market line, given the investment opportunity set composed of the *n* + 1 assets.

Next, introduce a new security with relatively large expected return, correspondingly high standard deviation, but little correlation with other risky assets. This security can be considered an insurance risk security, such as a catastrophe risk bond. The set of investment opportunities has been expanded and investors can add this new (risky) security to their portfolio. Because this security's return is uncorrelated with the oth-

All investors will now demand portfolios that are on the new capital market line.

er *n* risky securities, a portfolio containing it will dominate portfolios that don't. (See Figure 7.)

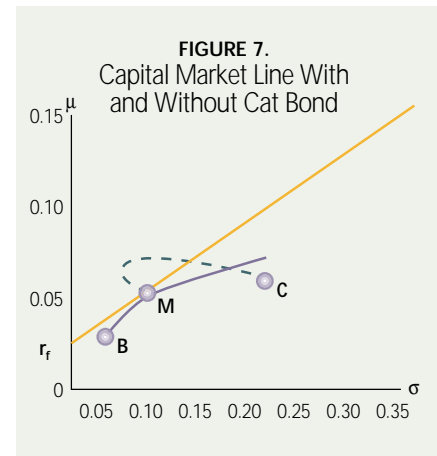
The new security pushes the frontier up and to the left, so the slope of the capital market line increases when it's redrawn as a tangent to the new frontier. The new securities added can be any security with relatively low covariance with the market. Long-term bonds with coupons based upon a mortality index, for example, would also improve investment opportunities. (More details on this argument can be found in the authors' paper: *ASTIN Bulletin*, May 2000, Volume 30 number 1, "Economic Aspects of Securitization of Risk," pages 157–193.)

One criticism of this analysis is that the insurance risk security should be attainable from pre-existing capital market assets. However, because of market imperfections the introduction of insurance risk securities does produce changes in capital market conditions because the insurance risk security reduces transaction costs in an imperfect market. Therefore, the type of shift in the capital market line described above does occur.

Life Insurance Securitization

There are potentially two ways securitization can be applied to life insurance. First, a long-term bond based on mortality could cover the risk that annuity beneficiaries live longer than anticipated, perhaps based on a countrywide mortality index. A reinsurer issuing such a bond would have increased capacity to issue contracts to direct writers and pension plans in the given country.

A second example might be a bond designed to cover a specific portfolio of lives. Large amounts of term life insurance are written with very selective underwriting.



There's little experience for this business, so the projected mortality has relatively high variance. A 5- to 10-year bond could be designed to cover this risk and provide coverage that's hard to find or expensive in traditional reinsurance markets.

Conclusion

The economic justification for insurance risk securitization is that insurance risks are repackaged and sold to the capital market so investors can distribute their capital over these risks more efficiently than they could when the risks were contained in the original risky securities. This holds regardless of individual investor risk preferences or wealth. As long as this increase in efficiency is possible, insurance risk securities should continue to proliferate in the capital markets.

The effects of more efficient risk transfer and risk sharing will manifest themselves in the form of more insurance coverage of assets, better insurance pricing, and lower capital costs for insurers and reinsurers. ●

The entire September/October issue of Contingencies is now available online. Visit us and explore more aspects of the topics in this issue at www.contingencies.org

Ernst & Young
57

Writing the Book on GAAP

BECAUSE THE LURE OF THE U.S. CAPITAL MARKETS IS STRONG, many actuaries around the world find themselves having to prepare Generally Accepted Accounting Principles (GAAP) financial statements for the first time. In addition, actuaries who work for companies that demutualize fully or partially are preparing their inaugural GAAP statements.

While GAAP for insurers was introduced only 30 years ago, its sources of authority have proliferated. There are standards, concepts, interpretations, bulletins, consensuses, and opinions. Which is more important? Where do you find them? Which ones are out of date? How are these interpreted in light of evolving products and environments? Are there illustrations of these principles that help in understanding the objectives?

In the past, the actuary had to ask others for the answers. Now there is a single source. A new textbook, *U.S. GAAP for Life Insurers*, addresses the principles underlying GAAP, the accounting model used by publicly-traded companies and many mutual life insurers as well.

The Society of Actuaries' Financial Reporting Section initiated this book in the spring of 1999. A project oversight group consisting of Tom Herget, Mike McLaughlin, and Shirley Shao organized a writing team and sponsored the effort. The authors, selected for their knowledge, experience, and ability to communicate, are Frank Buck, Tom Kochis, Dan Kunesh, Mike McLaughlin, Ed Robbins, Dave Rogers, Eric Schuering, Brad Smith, and Jay Zellner.

U.S. GAAP for Life Insurers is aimed at three target audiences:

- Near or recent fellows who need to understand GAAP
- Seasoned accountants who want to know what the actuary is doing
- Non-U.S. actuaries or accountants who need education in U.S. GAAP accounting

The book took a year to write. It went through a rigorous peer review process that involved numerous technical experts, veteran practitioners, and professional editors. The goals of the review were to eliminate ambiguities, avoid omissions, and ensure that the text and supporting examples were educational. This layer of review provided very valuable input to the book.

TOM HERGET IS EXECUTIVE VICE PRESIDENT OF POLYSYSTEMS INC. IN CHICAGO.



Following is a summary of the contents of each chapter.

1 Objectives of U.S. GAAP. Accounting perspectives and terminology; numerical representation of the financial health or performance of an enterprise; the essential components of the balance sheet and the income statement; the concept of regular income and comprehensive income; relation of income to change in surplus; measurement, disclosures, and materiality.

2 Authorities. Standard setter identification; authoritative GAAP literature hierarchy; perspectives on accounting by analogy; role of the auditor; measurement of materiality.

3 Expenses and Capitalization. Basic instruction in the Audit Guide, SFAS 60, and other subsequent standards; identification and categorization of deferrable acquisition costs, nondeferrable acquisition costs, maintenance costs, investment expenses, future utility expenses, and overhead expenses; illustration of methods to convert such expenses into per-unit values; formulas and numerical examples for developing factors and worksheets.

4 Traditional Life Insurance (SFAS 60 & SFAS 97). Provision for adverse deviation; considerations for selecting assumptions; the lock-in concept, recoverability, and loss recognition; formulas and examples of factor development and earnings emergence; establishment of an undistributed participating policyholder's earnings account; methods for indeterminate premium policies; calculation of a deferred profit liability for limited-pay contracts; formulas for converting terminal reserve factors to values applied on a statement date.

5 Traditional Life Insurance (SFAS 120). Participating traditional life insurance where dividends are determined by the contribution principle; dynamics of how dividends are determined and awarded; identification of such contracts; the SFAS 120 accounting model, the nature of the estimated gross margins, and the selection of assumptions; retrospective and prospective unlocking; the impact of realized capital gains; recoverability and loss recognition.

Actuarial Resources
59

tion; formulas for and examples of deferred acquisition costs and terminal dividend liability calculations.

6 Universal Life Insurance. Product classification and typical product designs; comparison of SFAS 97 income statement presentation to that of traditional products; estimated gross profits and the selection of assumptions; techniques underlying retrospective and prospective unlocking; amortization issues, capital gains impacts, recoverability, and loss recognition; establishment of deferred acquisition costs; examples of unearned front end load and special benefit reserve liabilities.

7 Deferred Annuities. Classification of annuities by their accounting model; differences between accounting models SFAS 91 and SFAS 97; the nature of estimated gross profits and considerations in selecting assumptions for its components; retrospective and prospective unlocking;

recoverability and loss recognition; accounting treatment for specialized products, such as market value annuities, two-tiered annuities, and bonus annuities.

8 Variable and Equity-Based Products. Variable universal life, variable deferred annuities, variable income-pay annuities, and equity-indexed annuities; the impact of guaranteed and nonguaranteed aspects on this accounting model; the impact of embedded derivatives and market volatility on the GAAP financial statements; options, numerical examples, and formulas for selecting assumptions for a future earned rate.

9 Annuities in Payment Status. Contract classifications between limited-pay and investment contracts; selection of assumptions and provisions for adverse deviation where appropriate; formulas for and examples of reserve calculations.

10 Individual Health Insurance. Types of coverage (medical, dis-

ability, long-term care, and many more), the nature of policy management (company guarantees and premium rate increases), and product classification; calculation of benefit reserves, deferred profit liabilities, and expense reserves; selection of assumptions and provision for adverse deviation; recoverability and loss recognition; the impact of SFAS 5 on claim reserve establishment; numeric examples and formulas.

11 Credit Insurance. Short-duration life and accident and health contracts under SFAS 60; recoverability, loss recognition, and claim reserves; formulas for benefit reserve establishment; examples of earnings emergence.

12 Group Coverages. Group life, group health, and guaranteed investment contracts; accounting model selection; benefit reserve methodologies; establishment of deferred acquisition costs; recoverability and loss recognition.

1/2
Hewitt
Page 60

ASA
61

13 Invested Assets. Callable bonds, noncallable bonds, collateralized mortgage obligations, other asset-backed securities, real estate, mortgage loans, derivatives, policy loans, partnerships, common stocks, preferred stocks, and stocks of subsidiaries and affiliates. At publication, SFAS 133 was being amended and is not effective until 2001. Consequently, it has been excluded from the scope of this textbook. This chapter has numerical examples of the calculations of book values.

14 Shadow Adjustments (SFAS 115). The reporting and impact of unrealized holding gains and losses; the impacts on benefit reserves, deferred acquisitions costs, loss recognition, and claims; formulas and sample calculations.

15 Purchase Accounting. The difference between pooling and purchase; the evolution of authority for

purchase GAAP, including Academy, AICPA, SEC, and FASB involvement; the elements of the opening balance sheet; considerations for selecting assumption; calculation of benefit reserves and value of business acquired.

16 Foreign and Hybrid Products. Determination of SFAS applicability to foreign products; product features foreign to the U.S. market and examples of how such characteristics can be input into the accounting model; selection and application of an accounting model to products not addressed by the SFASs.

17 Reinsurance. The purposes and uses of reinsurance; the major types of reinsurance treaties; summary of GAAP authority for reinsurance under SFAS 113; accounting requirements for reserves and deferred acquisition costs. The spreadsheets presented come from the preceding chapters and have reinsur-

ance superimposed, allowing the reader to easily observe and reproduce the effects of reinsurance.

18 Other Topics. Deferred taxes; riders; fair value SFAS 107 requirements and techniques; GAAP accounting for closed blocks of business in a demutualization; surplus notes; determination of materiality.

You may order your book by contacting the Society of Actuaries or by going to its Yearbook 2000 section on the www.soa.org Web site. ●



The entire September/October issue of Contingencies is now available online. Visit us and explore more aspects of the topics in this issue at www.contingencies.org

1/2
Stewart Search
Page 62

Integrated Actuarial Services

63

A Most Ingenious Paradox

The Pirate King Is an Actuary

*"Oh, better far to live and die under the brave black flag I fly,
than play a sanctimonious part, with a pirate head and a pirate heart."*

Strange thing for an actuary to be singing. And strange dress: black trousers, puffy white shirt, gathered at the wrists, open down to the chest, with a sash, high-topped black boots and—what's this?—a sword! A real sword! What's going on here?

What's going on is the Actorsingers' production of Gilbert and Sullivan's "Pirates of Penzance," with an actuary (me) playing the title role. An avid G&S fan for the past 30 years, I devote much of my spare time to light opera, both on and off the stage.

My love of acting began in my early teens. I appeared in plays in junior high and high school, and took some acting classes in college. As with many in our profession, I put it all aside while concentrating (successfully) on actuarial exams. Then came marriage and family. It wasn't until 1984, when the children began taking music lessons, that I thought about returning to the stage. After 11 years of listening to me sing off-key in the shower, Kathy (my wife since 1973) got me singing lessons as a Valentine's Day present. That fall, I sang the role of Fyedka in a local production of "Fiddler on the Roof" and a star was born.

Well, maybe not. But it was the first role of a 16-year (so far) amateur stage career.

I spent the first 5 years with Simsbury Light Opera Company, singing in the chorus and understudying a variety of principal roles. The discipline of studying for exams made learning lines and music an easy task, and I understudied 14 roles in six shows. In 1988, I joined the Connecticut Gilbert and Sullivan Society

LAURENCE R. WEISSBROT IS DIRECTOR OF ACTUARIAL AND RESEARCH AT NORTH-EAST DELTA DENTAL IN CONCORD, N.H.



(CG&SS), playing the part of Grosvenor, an aesthetic poet modeled after Oscar Wilde, in G&S's "Patience." Twelve years and 12 roles later, I still sing with CG&SS and sit on their board of directors, although working in New Hampshire the past 2 years has made attendance at rehearsals a challenge. I do a "weekend commute" to Concord while Kathy holds down the fort in Glastonbury, Conn.

Actorsingers is a new group for me, although not a new group by any means, having been in the Nashua, N. H., area since 1955. Since arriving in New Hampshire in 1998, I'd been searching for a G&S performing group. After a 37-year hiatus, Actorsingers returned to their G&S roots with "Pirates of Penzance." I learned of the auditions for this production on

Savoynet, an Internet listserv devoted to all things Gilbert and Sullivan, hosting about 600 ardent G&S lovers all around the world. Nashua is on the route from Glastonbury to Concord, so Sunday night rehearsals were a stop-off on the trip back north.

Steel and Stamina

This is the best staging of "Pirates" I've ever been involved with or seen. Was it the full chorus of pirates and a separate full chorus of policemen? No. Was it the 28-piece orchestra? No. Was it the well-run organization, with dedicated publicity and set construction and ticket committees? No.

It was the steel! A professional stage combat coach brought real swords and choreographed realistic-looking dueling for the pirates. And, of course, it was Gilbert's libretto and Sullivan's music, which have delighted audiences for more than 100 years.

My odyssey with Actorsingers began on a cold evening early in February. I approached the auditions at Actorsingers Hall with nothing to lose. I've always wanted to play Major General Stanley (the very model of a modern major general), and I'd already been the pirate king, in 1991 with CG&SS. (And it is, it is a glorious thing to be a pirate king!) If I got either role, I'd do the show; otherwise, it would take too much time. On the other hand, I did feel some trepidation. The group enjoys a good reputation, and few amateur theater groups own their own three-story building where they can conduct auditions and rehearsals, and construct scenery and store costumes.

At auditions, few of the other hopefuls were very familiar with Gilbert and Sullivan. Some had seen the Linda Ronstadt movie. One gentleman, who really looked the part, was a fencing student of the fight coach, and the two of them put on an impressive fencing display. Luckily for me,

Pryor
65

he couldn't sing! The audition judges, however, did know their G&S and I was able to impress them well enough to be cast as the king. While I was waiting for a call back, I got a call telling me the part was mine if I wanted it. I did.

Our cast comprised a variety of people from all walks of life and all levels of experience. Teachers, real estate agents, a house painter, an insurance account executive, a pharmacist, high school and college students, stay-at-home moms, and, of course, one actuary. A husband and wife team played Frederic and Mabel; it works out well when the romantically involved couple is married in real life. Fewer jealousies. They were both trained singers and had done many shows before. Others were newcomers.

This group functioned amazingly well together. One young man who had never before done a show was somewhat rough around the edges and had jewelry sprouting out of many parts of his face



and body. He was surprised to find that, during the final week, we were expected at rehearsal every night! When someone with many shows under his belt made a disparaging comment, the young man said, very sarcastically, "well excuse me for not knowing."

Rather than escalating the incident into a battle, the first fellow apologized and spent some time explaining the "tech week" schedule to the newcomer. If

you've never done a show, it's hard to explain the feeling of "instant family" that can develop.

Rehearsals went well except for missing people. I've always believed that if you commit to doing a show, you should make rehearsals a priority. Two weeks before the performance date, the stage manager informed me I was the only cast member who had never missed a rehearsal. Moreover, I started already knowing all the words and music!

Clueless Cops

Learning music can be a challenge. Many of the cast don't read music, present company included. Personally, I think this is an advantage when you have to learn songs. Looking at the notes doesn't help much, so you have to internalize it and commit it to memory. The good sight singers always take longer to get "off book."

The music director made practice tapes for the cast members who asked for them, in which he isolated just the voice part requested. I have my own method. Years ago I wrote a BASIC program that generates tones on the computer, and I create data lines for each song. It's dull, but the tones and note durations are perfect. At the end of each workday, I run the programs, and in five minutes I go over all the music I have to learn. I wrote the program originally for a 64K machine without a hard drive and I have upgraded it and kept it with me for almost 20 years. It now resides on a Pentium II/233. And yes, it was Y2K compliant.

One problem was that we kept adding people. The last pirate joined the cast about six weeks before the show date. Sometimes, when you're in the middle of it, you wonder whether a two and a half month rehearsal schedule is necessary. When you factor in all the absences, I guess it is.

The policemen were especially challenging. As I alluded to earlier, we had a separate full chorus of police. In most stagings of "Pirates" there's a large band of pirates in the first act, and then half of them (the basses) magically disappear in

1/3
Quasar
Page 66

Membership Ad
67

Act 2, only to show up in dark blue uniforms with nightsticks. This group has a sufficient talent pool to be able to field a second men's chorus. But while the pirates had their words, music, and movement down after a few weeks of rehearsal, we did a charity preview performance about three weeks before the production and discovered a clueless bunch of police. Happily, thanks to some concentrated last-minute drilling, they were perfect on stage and really stole the show.

Playing with steel swords does have its drawbacks. In dress rehearsal, with microphones on stage for the first time, I drew my sword to threaten another cast member and swung it down and forward. A resounding BOOM echoed through the auditorium as the tip of the sword made contact with the floor mike. The combat coach spent a little more time with me, and I learned how to draw the sword and bring it out and up at the same time. No more "booms."

Sharp edges weren't the only hazard. It was an especially bad spring for colds, and I managed to catch a nasty one that settled right into my vocal cords. It left me with half my singing range, and the part calls for an optional high "G." Never being one to play it safe (except in pricing and valuation, where I use appropriate margin), I tried for the high note. Two out of the three shows I made it, thanks to lots of warm salt water gargling. After the show closed, it took two weeks to get my voice back.

It's always a sad event when a show closes, especially such a good one. All that rehearsal for only three performances. We performed at the Elm Street School, the town's former high school with a 1,500-seat auditorium. We played to a total audience of about 3,000, almost selling out the theater Saturday night. Financially it was a huge success. A large part of that is because there are no royalties on a G&S production.

Singing light opera has given this actuary the opportunity to express a great many alter egos. In addition to playing Grosvenor in "Patience" twice, in "H.M.S. Pinafore" I've been a carpenter and Dick Deadeye, a "disabled bodied" seaman. I've played an usher in a British courtroom in "Trial by Jury," a country gentleman in "The Sorcerer," a recovering alcoholic who gets to trade places with Bacchus, the Greek god of wine, in "Thespis," a Japanese nobleman in "The Mikado," a Venetian gondolier in "The Gondoliers," a Buckingham Palace guard in "Iolanthe," a head jailer/assistant tormentor in "Yeomen of the Guard," and, of course, a pirate king. I've never appeared in a production of "Princess Ida" or "Grand Duke," and I'll be in my first "Ruddigore" this fall as lead ghost Sir Roderick Murgatroyd.

Belonging to Savoynet has opened additional possibilities. Members of this virtual community occasionally meet at "sing-outs" to run through the entire G&S canon in a weekend. It gives people the opportunity to sing roles for which they might otherwise be unsuited. I participated in one such event recently in Westport, Conn. We had attendees from five countries and nine states, and I had the chance to sing some of the parts I'd previously only understudied. By the time this is published, I will have visited another such event in Toronto, Canada.

My passion for this branch of the arts has also carried over into my work. Northeast Delta Dental uses the Baldrige quality management framework. Part of the Baldrige criteria is community involvement by the leaders of the organization. To meet that end, I've recently replaced our CEO as a member of the board of directors of the Opera League of New Hampshire.

Branching out from Gilbert & Sullivan and coming full circle, I will audition for the role of Tevye in Actorsingers' production of "Fiddler on the Roof" next spring. "If I were a rich man. Ya guh dih guh dih guh dih guh dih guh dih guh dih guh dum . . ."

1/3
DW Simpson
Page 68

Price Waterhouse
69

Isaac's Storm

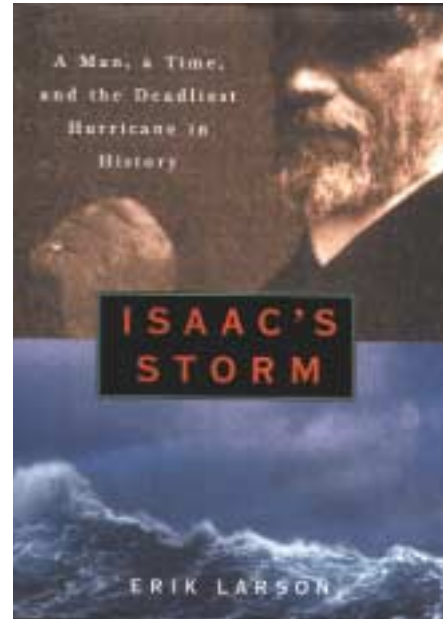
By Erik Larson, Crown Publishers, 1999

Long before the perfect storm, long before anyone even knew what a perfect storm was, there was the Galveston Hurricane of 1900.

The deadliest storm ever to hit this country, the hurricane killed 8,000 men, women, and children over the course of 24 hours. It ended forever Galveston's aspirations to civic preeminence. And it saddled Isaac Cline, director of the fledgling U.S. Weather Bureau's Galveston office, with permanent doubt.

Galveston, a booming port on the Texas coast of the Gulf of Mexico, was uniquely vulnerable to destruction. Situated on an island between the gulf to the south and Galveston Bay to the north, the city rode low in the water: "Visitors approaching Galveston from the sea saw it as a brilliant swath of light between sea and sky, like mercury floating on a deep blue plain."

Its highest point was only 8.7 feet above sea level, but its average altitude was half that, so that with each one-foot increase in tide, the city lost a thousand feet of beach. Flooding was common enough that street curbs were built high and many of the houses were settled on piers that raised them an additional four or five feet above the street. Yet by 1900, Galveston was the biggest cotton port in



the country and rivaled Houston as the most important city in Texas.

Cline, one of Galveston's prominent citizens, was a self-confident, self-made man. Larson writes: "Things were clear to him. He was loyal, a believer in dignity, honor, and effort. He taught Sunday school. He paid cash..." Trained as a physician, Cline had worked as a meteorologist for 18 years. His Galveston neighbors trusted him, then, when he assured them the storm would bypass the city.

Actually, as Larson points out, Cline's role in the disaster is ambiguous. He misread early signals that warned of the coming catastrophe, and he underestimated its destructive power when it hit.

But, says Larson, Cline was operating with bad intelligence. Operatives of the U.S. Weather Service in Havana, engaged in petty rivalry with their Cuban counterparts, deprecated the size and gravity of the tropical storm that washed over Cuba days before it engulfed Galveston. The U.S. Weather Service dismissed Cuban predictions in deference to official fears that hurricane warnings create panic. As Larson puts it: "The Cubans took a more romantic view, a psychoanalytic approach, that was the product of the island's long and tragic experience. Nearly every Cuban alive had experienced at least one major hurricane. Cuban meteorologists had the

1/3
Actuarial Strategies
Page 70

TransAmerica

71

same instruments as their American counterparts, and took the same measurements, but read into them vastly greater potential for evil. The Cubans wrote of hunches and beliefs, sunsets and foreboding. Where the Americans saw numbers, the Cubans saw poetry.”

Larson’s writing serves his subject well. His descriptions are cinematic and he builds tension from the opening pages with strategically placed details. The book is anchored by exhaustive research yet reads like an airport thriller.

When the storm actually hits, Larson keeps pace, serving up page after page of hair-raising descriptions, culled from first-person accounts, that will keep you glued to your chair: “At the expensive Lucas Terrace apartment building, Edward Quayle of Liverpool, England, who had arrived in Galveston with his wife three days earlier, happened to walk past a window just as the room underwent a catastrophic depressurization. The window exploded

outward into the storm along with Mr. Quayle, who rocketed to his death trailing a slipstream of screams from his wife.”

This is good, muscular writing. But I would argue that even without it, this book would be a page-turner. The relentless nature of the tragedy that unfolds needs no embellishment.

— Linda Mallon

LINDA MALLON IS MANAGING EDITOR OF THE ACTUARIAL UPDATE AND THE EAR.

The Johnstown Flood

By David McCullough

Fascinating historical account of the flood that engulfed Johnstown, Pa., in May 1889, but the breaching of a dam above the hapless town was no simple Act of God. Faulty engineering in the construction of a man-made lake at a private fishing and hunting club, and indifferent maintenance of the dam that contained it,

combined with torrential rains to unleash a disaster that eventually claimed the lives of more than 2,000 townspeople.

The Perfect Storm

By Sebastian Junger



This tragic, true tale of a commercial fishing boat caught in the North Atlantic at the confluence of three horrific weather systems offers a graphic depiction of man los-

ing the battle against nature (nature, here, being 100-foot waves driven by hurricane-strength winds). Junger includes a parallel story, with a slightly happier ending, of a dramatic Coast Guard rescue of passengers from a 32-foot sailing yacht battered by the same weather system.

Outerbridge Reach

By Robert Stone

Offers a vivid fictional portrayal of a haunted man who decides to sail solo around the world. His boat is small, he is inexperienced, and he meets some very big storms. Compellingly written, Stone’s novel considers not only the motivations of someone who chooses to take such risks but also the havoc his choice wreaks on the loved ones he leaves behind.

Topsy-Turvy (video)

Written and directed by Mike Leigh

Wildly popular in Victorian England, Gilbert and Sullivan’s operettas are beginning to go stale and lose their luster at the box office. Their working relationship, prickly in the best of times, threatens to come undone. Then a cultural exhibition from Japan arrives in London and inspires “The Mikado,” the show that puts G&S back on the map. A fascinating look at how art arises from talent, egos, chance, and sweat.

1/3
Actex
Page 72

Dual Duel

THIS ISSUE'S PUZZLES

1. Pistols at Dawn. After a three-way argument about probabilities, actuaries Al, Ben, and Chad agreed to a duel. They would draw straws to see who would shoot first, second and third. They would stand at corners of an equilateral triangle, fire single shots in order of the draw and continue the cycle until only one survived. The shooter may aim wherever he chooses. Research on marksmanship reveals that Al is 100% accurate; Ben, 75%; and Chad, 60%. If Chad drew the first shot he had decided his chances would be improved if he missed intentionally since Al would surely fire at Ben, given a chance. Assuming that strategy, calculate the probabilities of survival for each. Is there a problem with this puzzle?

2. Queens vs. Jacks. South, on lead at ♠ 6, needs four more tricks to make the slam. The offense has all the jacks, but the defense has the queens. The cards are exposed for all to see; will declarer succeed? If so, how? If not, why? This bridge problem was presented to me by David McCann.

	♠ A 7	
	♥ —	
	♦ J 8	
	♣ J	
	NORTH	
♠ K Q	WEST	EAST
♥ A 8 7		♠ —
♦ —		♥ Q 9
♣ —		♦ Q 9
		♣ Q
	SOUTH	
	♠ J 9	
	♥ K J	
	♦ K	
	♣ —	

ANSWERS TO LAST ISSUE'S PUZZLES

1. Four Cubes. A small rectangular aquarium had a base of "a" square inches and was partially filled with "i" inches of water. Four six-inch cubes were then placed on the bottom (not stacked), one at a time. The water level increased by 1 inch when the first cube was inserted; further increased by some unknown amount when the second cube was placed inside; and by one and one-half inches each for the third and fourth cubes. What was the water level after the fourth cube was inserted? This is a modification of a puzzle submitted by Bill Graham.



THE ANSWER IS: The water reached a height of nine inches from the bottom of the aquarium. The increase in water level varied because the first cube was not fully submerged. Since the impact of the

fourth cube was the same as the third cube, previous cubes were fully submerged and the one and one-half increase is due solely to the water displaced by the 216 cubic inch volume of the 6 inch cube.

1/3

PFPC

Page 73

PLEASE MAIL ALL ANSWERS TO ALAN GOLDBERG, PUZZLES EDITOR, 303 BLUE RIDGE ROAD, LOUISVILLE, KY 40223; OR E-MAIL TO CONTPUZZLE@AOL.COM; OR FAX TO (502) 245-5260. THE NAMES OF THOSE WHO SEND CORRECT SOLUTIONS WILL BE ACKNOWLEDGED IN A FUTURE ISSUE OF *CONTINGENCIES*.

This gives the area of the base of the aquarium as $216/1.5$, or 144 sq. in. When the first cube was inserted, the water level rose only 1 inch, representing an increased volume of 144 cu. in. This equals two thirds of the volume of the cube, therefore the cube was submerged only two-thirds, or 4 inches; thus the original water level was three inches. The four six-inch cubes exactly fit the 144 sq. in. base and hence accounted for the first six inches of height; adding the original three inches of water brings the total height to nine inches. [The base must have been either 12×12 or 6×24 .] The second cube increased the water level by two inches, the number which accounts for the total

increases of six inches. An alternate calculation for the second cube uses the volume of two cubes (432 cu. in.) plus the original water (144×3 cu. in.); this total divided by the 144 sq. in. base yields a height of six inches. Thus, the two cubes were fully submerged and the increased height due to the second cube was two inches. A similar process verifies the increase due to the third and fourth cube. The fish were not happy!

2. A Pair of Fours. South, declarer at 6 notrump, needs four more tricks to make the slam. Can South succeed with the hands shown below? What is the result if East's $\spadesuit 4$ is changed to the $\clubsuit 4$. This

doubleheader is a modification of a problem posed by David McCann.

	\spadesuit —		
	\heartsuit Q 3 2		
	\diamondsuit Q		
	\clubsuit 3		
	NORTH		
\spadesuit 7 5		\spadesuit 9 6	
\heartsuit J 5	WEST	EAST	\heartsuit 8 7
\diamondsuit —			\diamondsuit 4
\clubsuit Q			\clubsuit —
	SOUTH		
	\spadesuit J 8		
	\heartsuit 9 6		
	\diamondsuit 3		
	\clubsuit —		

THE ANSWER IS: When East has the $\diamondsuit 4$, declarer succeeds with either of two approaches. South leads the $\heartsuit 9$ and West must cover. Dummy wins the $\heartsuit Q$ and leads the $\diamondsuit Q$ followed by a heart which endplays East in spades. Alternatively, South wins by leading the $\spadesuit J$ followed by a diamond to dummy's $\diamondsuit Q$. West must discard the remaining spade, but is endplayed when put on lead with the $\clubsuit Q$. For the puzzle with East holding the $\clubsuit 4$, declarer again succeeds but with a different line of play. The $\spadesuit J$ is led and dummy discards the $\diamondsuit Q$. South now leads the $\diamondsuit 3$ and West discards a spade while dummy throws a heart. East, however, must discard the $\clubsuit 4$ in order to keep a spade and both hearts. South now leads the $\spadesuit 8$ to put East on lead and simultaneously squeezes West. West can't keep both the $\clubsuit Q$ and guard the $\heartsuit J$; and dummy's discard comes after West chooses his fate.

Solvers (Previous Issues): C.C. McLeod, A. Minten, I. Pogrebinsky, D. Sondergeld, A. Spooner, R. Whitney.

Solvers (Jul/Aug): E. Avantis, M. Barsky, M. Chartier, M. Colpran, H.N. Crooks, G. Crosby, Mark Evans, W. Feldman, N. Franceshine, L.K. Helfgott, J. Herder, Thomas Herzog, H. Ingraham, D. Kidwell, R. Koch, J. Lemke, D.T. McNeese, G. Samp, Wm.H. Scott, R. Shapland, G. Shook, D. Sondergeld, E. Sondergeld, A. Spooner, W. Steffen, R.C. Stokes, D.A. Thomas, D. Tinney, K. Trapp, L. Tsui, R.Q. Wendt, S.L. White, R. Wilton.

ADVERTISER INDEX

To add your company's name to this list,
call Mohanna & Associates at (800) 800-0341 or e-mail info@mohanna.com.

For links to these advertisers' e-mail addresses and Web sites,
visit the Contingencies Web site at www.contingencies.org/links_ad.html

COMPANY	PHONE	WEB/FAX	PAGE
Actex	860-379-5470	www.actexmadriver.com	72
Actuarial Careers, Inc.	914-285-5100	www.actuarialcareers.com	5
Actuarial Connection	949-253-3444	www.actuarialconnection.com	29
Actuarial Recruiter, An	860-379-6456	www.actexmadriver.com	54
Actuarial Resources Corporation	913-451-0044	www.arcvall.com	59
Actuarial Search Associates	800-776-6415	www.actuarialsearch.com	52
Actuarial Strategies, Inc.	860-726-9292	www.datalife.com/actstrat	70
AM Best	908-439-2200	www.ambest.com	13
Andover Research Ltd.	212-986-8484	www.andoverresearch.com	7
ASA		www.asabenefits.com	61
Classic Solutions	312-879-2400	www.cs.com.au	35
Computer Programming & Systems	203-324-9203	www.cpsincorp.com	47
COSS Development	800-776-7087	www.cossdev.com	19
CPS Inc.	708-531-8289 617-368-3550	cpsact1@aol.com Mary@cpsboston-jobs.com	45
Data Life	800-950-1118	www.datalife.com	18
D.W. Simpson & Company	800-837-8338	www.dwsimpson.com	C2,68
Ernst & Young	312-879-2400	www.ey.com	17,57
Hewitt & Associates	See numbers in ad	www.hewitt.com	60
ING Americas	800-465-3330	www.ingamericas.com	10-11
ING Reinsurance	800-203-2559	www.ing-re.com	C4
Integrated Actuarial Services	312-321-1963	312-321-0909	63
Jacobson Associates	312-726-1578	www.jacobson-associates.com	33
JLS & Associates	626-585-8420	626-585-8420	32
Lincoln Re	219-455-0379	www.lincolnre.com	51
Max Re	441-296-8800	info@maxre.bm	49
MFC	703-799-0518	www.mathematical-finance.com	50
MHL Actuaries & Consultants	309-662-0102	www.mhlconsult.com	55
Mid America Search	515-225-1942	www.midamericasearch.com	40
Milliman & Robertson, Inc.	206-624-7940	www.milliman.com	1,3
Mitchell Group, The	914-638-2700	www.kennethmitchell.com	8
Mynd	803-333-4000	www.mynd.com	53
PFPC	214-346-9410	www.pfpc.com	73
Pinnacle Group	800-308-7205	www.pinnaclejobs.com	39
PolySystems, Inc.	312-332-5670	www.polysystems.com	75, C3
PricewaterhouseCoopers	860-240-2005	www.pwcglobal.com	15,69
Pryor Associates/Pauline Reimer	516-935-0100	www.pryor.com	65
Quasar Systems	414-228-8622	www.qsi-r2.com	66
SC International Ltd.	800-543-2553	www.scinternational.com	46
Stewart Search	603-430-2122	www.stewartsearch.com	62
Tillinghast-Towers Perrin	404-365-1700	www.tillinghast.com	9
Transamerica Reinsurance	704-344-2700	www.transamerica.com/reinsurance	71
UPMC		www.upmc.edu/upmchealthplan	34
Winklevoss	203-661-0275	www.winklevoss.com	6

Poly Systems

75

Vividness, Anchoring, and Regret

I recently attended a conference on behavioral finance at Harvard. It's a field gaining support, or at least attention, in both academic circles and the popular press. The research centers on stock market behaviors, but the work may have general implications for any decision making under uncertainty—including actuarial estimates.

Through the concepts of vividness, anchoring, and regret, the behaviorists are demonstrating that psychological biases not only influence investment decisions but may do so in a predictable and measurable way. Perhaps not since the chaos theorists of a decade ago do we have a group so eager to upset conventional thinking.

Max Bazerman, from Northwestern, believes that most people invest on the basis of vivid events rather than bland, diagnostic data. This would certainly come as no surprise to Ernest Hemingway, who once said about fiction that "all good books are alike in that they are truer than if they had really happened."

But to suggest that stock markets operate inefficiently because of personality traits? That a stock's price can fluctuate based on the amount of press coverage it gets? In insurance, underwriters gather supplemental data to better evaluate risk. But when might discretionary pricing adjustments based on particularly vivid data work against actuarial pricing models?

Many of us resist change. In behavioral terminology, we can become "anchored" to an opinion, causing us to underreact to new information. In the securities world, for example, an analyst can become anchored to a particular stock price, even when a new earnings report suggests a much different valuation.

The University of Chicago's Richard Thaler describes an experiment showing that even a completely useless anchor can bias a person's estimate of an uncertain event. Try this. Pick a random number between 400 and 1399. This becomes your anchor for the next question, which is: When did the Romans defeat Attila the Hun at the Battle of Chalon? Was it before or after the random number you picked? When was it?

Since most people don't know the correct answer (451 AD), they guess. The results are fascinating, uncovering a direct correlation between people's guesses and the random number they chose. For people

who chose a random number between 400 and 600, the mean guess was 626 AD. For random numbers between 800 and 1000, the mean guess was 789 AD. And for people who chose a number between 1200 and 1400, the mean guess was 988 AD.

If a completely useless anchor can have this impact, what about a somewhat useful one? If analysts are anchored to a particular stock price, will they resist adjusting their position when a big earnings surprise occurs? Might anchoring influence a consulting actuary who's asked to perform a loss reserve analysis and, as part of the data set, is given a current report from the company's own actuary?

One of the more provocative new ideas is the concept of regret. Thaler describes regret as "the feeling of ex post remorse about a decision that led to a bad outcome. Even for those trained to differentiate between bad decisions and bad outcomes, it's often difficult not to feel regret after a bad outcome. Regret becomes of interest to theorists if decision-makers take steps to avoid regret."

In the investment world, regret might explain why investors tend to sell winners and hold on to losers. When insurance company management disagrees with the actuary opining on the company's loss reserves, how much of management's position is influenced by the possible regret at reporting reduced earnings? And how much of the actuary's position is influenced by the possible regret at having to admit to an underestimate later?

Much work remains before the formal measurement of behavioral traits becomes common practice in either investment or actuarial decision-making. In an insurance world plagued by recurring cycles of hard and soft markets, better explanations are certainly welcomed. ●



RICHARD T. ZATORSKI IS CHIEF ACTUARY AND VICE PRESIDENT, UNDERWRITING, AT THE GUARD INSURANCE GROUP IN WILKES-BARRE, PA.

Poly Systems

c3

ING Re
c4